

School Context, Principal Leadership, and Student Reading Achievement

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Abstract

In this article, we explore the nature and extent of the school principal's effects on reading achievement in a sample of 87 U.S. elementary schools. Our study responded to prior critiques of the literature in school administration by formulating and testing a multidimensional model of principal effects on student learning. By using principal and teacher questionnaires and student test scores, we examined relations between selected school context variables (student SES, parental involvement, principal gender, and teaching experience), principal instructional leadership (principal activity in key dimensions of the school's educational program), instructional climate (school mission, opportunity to learn, teacher expectations), and student reading achievement. Results showed no direct effects of principal instructional leadership on student achievement. The results did, however, support the belief that a principal can have an indirect effect on school effectiveness through actions that shape the school's learning climate. We also found that principal leadership itself is influenced by both personal and contextual variables (SES, parental involvement, and gender). The study confirmed the appropriateness of viewing the principal's role in school effectiveness through a conceptual framework that places the principal's leadership behavior in the context of the school organization and its environment and that assesses leadership effects on student achievement through mediating variables.

Do principals make a difference? Practitioners and parents have long noted the seemingly obvious effects principals have on the learning climate, educational programs, and workplace norms of schools (Gross & Herriott, 1965; Keeler & Andrews, 1963; Leithwood & Montgomery, 1982; Wellisch, MacQueen, Carriere, & Duck, 1978). Though farther removed from school settings, the educational policy community as

well as researchers are also generally inclined to believe that principal leadership is critical to the success of educational programs. Moreover, this faith in principal leadership crosses the borders of nations and cultures (e.g., Caldwell, 1992; Cheng, 1994; Eckholm, 1992; Heck, 1993; Murphy & Hallinger, 1992).

At the same time, the nature of the principal's effect on schooling continues to be the subject of controversy (Firestone & Herriott, 1982; Rowan, Dwyer, & Bossert, 1982; van de Grift, 1990). This debate has been fueled by at least two factors. First, the question that often guides such discussions—Do principals make a difference?—is subject to varying interpretations depending on the outcomes of interest. Second, when examined closely, the research evidence regarding the principal's role in school effectiveness is more ambiguous and conflicting than might be assumed from casual reading of the professional literature in educational leadership (e.g., Hallinger & Heck, in press; Leithwood, Begley, & Cousins, 1990; Rowan et al., 1982; van de Grift, 1990).

During the 1980s, a preoccupation among policy makers with issues of educational productivity recast the issue of principal effects largely in terms of the effects of administrative leadership on student learning. For better or for worse, in the short run this led policy makers and researchers to search for evidence concerning the effects of principals on one particular school outcome: student achievement on standardized tests. The paucity of well-designed studies of principal effects, however, forced researchers and policy makers to draw conclusions from studies that were never designed to address this issue (Leithwood et al., 1990; Murphy, 1988; Murphy, Hallinger, & Mitman, 1983; Rowan et al., 1982).

The task of unraveling the effects of administrative practice on student learning has been complicated by the concurrent effects that school contexts exert on princi-

pals. In their review of the literature on organizational leadership and successful schooling, Bossert, Dwyer, Rowan, and Lee (1982) argued against a unitary construct of principal leadership. "Like earlier leadership studies . . . no single style of management seems appropriate for all schools . . . principals must find the style and structures most suited to their own local situation. . . . a careful examination of quantitative studies of effective schools . . . suggests that certain principal behaviors have different effects in different organizational settings. Such findings confirm the contingency approach to organizational effectiveness found in current leadership theories" (p. 38).

Yet, such a contingency approach to the study of school leadership and its effects has been conspicuously absent in both the dialogue and empirical research in this field (Hallinger & Heck, in press). The implicit models of leadership that guide educational policy makers generally overstate the influence of school administrators on organizational processes and outcomes while underestimating the effects of environmental and organizational constraints on their leadership behavior (Bridges, 1970; Leithwood et al., 1990; March, 1978). An implicit model of "the educational leader as the independent variable" in school improvement characterizes both the research and professional literature on school leadership (Boyan, 1988; Murphy et al., 1983; Pitner, 1988). This assumption is illustrated in the often-stated conclusion that the principal is the "cause" of effective schools, despite the paucity of research studies designed for causal inference (Rowan et al., 1982).

In this article, we report the results of a study that sought to address some of the criticisms of prior studies of the effects of principal leadership. The analyses presented here address the general question, Do principals make a difference in student learning? Although we strongly disagree with the notion that principal effects should be framed solely in terms of student

achievement, we believe that such studies serve a useful purpose. In addition to addressing the concerns of policy makers, they assist in defining the boundaries of the knowledge base concerning how principals achieve an effect in one domain of their work.

We sought to assess both the direct and indirect effects of principal instructional leadership on student achievement while accounting for variations in the school context and in selected personal characteristics of principals. These goals are reflected in our two research questions: (1) How do selected school context variables and personal characteristics influence the instructional leadership behavior of principals who make a difference in students' learning? (2) What is the nature of principal effects on school climate variables and the subsequent achievement outcomes of students? Thus, the study was designed to contribute to an understanding of the role of principal leadership in school effectiveness.

Conceptual Framework

Much of the literature on the relation between administrative leadership and student learning consists of either case studies or cross-sectional research designs employing overly simplified, bivariate statistical models (Bridges, 1982; Hallinger & Leithwood, 1994). Although they report results concerning principal leadership, the effective schools studies conducted during the 1970s and 1980s were not designed as investigations of leadership. Thus, they often yielded ambiguous findings concerning the nature of the principal's leadership role in school improvement (Hallinger & Murphy, 1985; Leithwood et al., 1990; Rowan et al., 1982).

Although some progress has been made on this front in the past decade, researchers too often still rely on weak research designs when investigating principal effects (Hallinger & Heck, in press; Hallinger & Leithwood, 1994). For example, in a preponderance of investigations researchers have

simply examined the bivariate relation between measures of principal behavior and student learning (e.g., Krug, 1986; O'Day, 1983). Most scholars now believe that principals influence student learning through their interactions with teachers and by shaping features of the school organization (Cuban, 1988; Hallinger, & Leithwood, 1994; Heck, 1993). Yet relatively few studies have examined how principal leadership interacts with intervening school-level variables to yield improvement in student learning (see, as exceptions, Heck, Larson, & Marcoulides, 1990; Leithwood, 1994; Leitner, 1994). In addition, as suggested earlier, researchers have given inadequate attention to the influence that the organizational context exerts on educational administrators. Despite both theoretical and empirical support for the belief that principal effectiveness is influenced by the school context, researchers have largely avoided this issue.

At the same time, we would be remiss if we did not note that there has been demonstrable progress in the quality of research conducted on principal effects over the past decade (Hallinger & Heck, in press; Leithwood et al., 1990). Studies have been conducted that have overcome one or more of these limitations noted above (e.g., Andrews, Soder, & Jacoby, 1986; Crawford, Kimball, & Watson, 1985; Ogawa & Hart, 1985; Rowan & Denk, 1984; Vanderstoep, Anderman, & Midgeley, 1994). Even among these better efforts, however, surprisingly few investigators simultaneously studied both the antecedents and effects of principal leadership (Boyan, 1988; Bridges, 1982; Leithwood et al., 1990; Pitner, 1988). These limitations of the research on principal effects suggest that, despite the volumes that have been written on principals' leadership, the nature of the principal's effects on student learning remains poorly understood.

Modeling Principal Effects on Teaching and Learning

In an analytical review, Pitner (1988) sought to conceptualize the available ap-

proaches that could be taken to study administrator effects. She identified five models: direct effects, antecedent effects, reciprocal effects, mediated effects, and moderated effects (pp. 106–108). The five models offer different perspectives for viewing both effects of the school context on administrative behavior and the influence of administrative behavior on a school's organization and student outcomes. The present study incorporated features of the antecedent-effects, direct-effects, and mediated-effects (or indirect-effects) models (see Fig. 1). Our data did not lend themselves easily to an examination of reciprocal-effects or moderated-effects models.

Although several models may be used to examine principal effects, we contend that a comprehensive framework for viewing the principal's role in school effectiveness must locate principal leadership within both organizational and environmental contexts. This suggests the appropriateness of using an antecedent-effects model (see models B and C in Fig. 1). Pitner (1988, p. 106) noted that in such models "the administrator variable stands as both a de-

pendent and an independent variable." As a dependent variable, administrative behavior is subject to the influence of other variables within the school and its environment.

Both quantitative and qualitative studies confirm the appropriateness of conceptualizations that posit exogenous or antecedent variables as influencing the exercise of principal leadership. For example, school characteristics such as community type and homogeneity, school size, student socioeconomic status, and school level have been identified as factors that influence how principals approach their jobs (e.g., Bridges, 1970; Crowson & Morris, 1985; Goldring, 1986, 1990; Hallinger & Murphy, 1986a; Heck et al., 1990; Rowan & Den, 1984). Furthermore, prior research suggests that selected personal characteristics of administrators may influence how principals enact their role (Boyan, 1988; Leithwood et al., 1990).

As an independent variable, the administrator is an agent who influences the learning of pupils (Bridges, 1970; Hallinger & Murphy, 1986a; Leithwood et al., 1990).

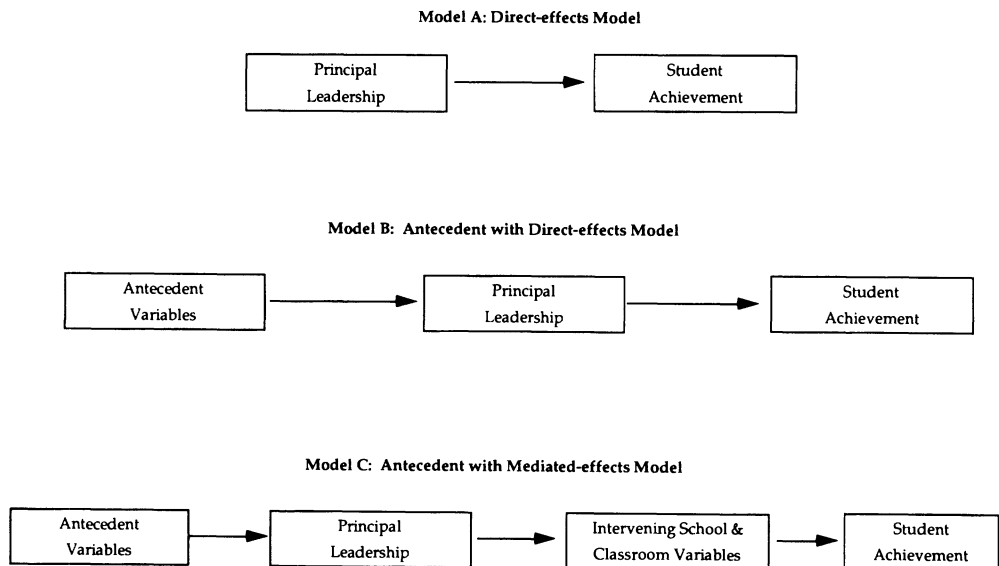


FIG. 1.—Models of principal effects on school effectiveness

Within the framework of models offered by Pitner (1988), the effects of the principal on the organization can be viewed in terms of direct and/or mediated effects (see Fig. 1). (In this article we will use the terms "mediated" and "indirect" effects interchangeably.)

As we have noted, prior to 1990 researchers in educational administration generally confined their empirical investigations to the study of direct effects of principal leadership on student learning (Bridges, 1982; Hallinger & Heck, in press; Pitner, 1988). Often this was studied as a simple bivariate relationship (see model A in Fig. 1) or sometimes with control variables such as prior achievement of students or student socioeconomic status (see model B in Fig. 1).

Such studies ignore the possible effects of intervening variables on this relationship. Not surprisingly, few researchers using a bivariate design have been able to detect a direct effect of principal leadership on student learning (van de Grift, 1990). This is true despite the virtual consensus among researchers, policy makers, and practitioners that principals "make a difference" in the quality of schooling (Glasman, 1984; Leithwood et al., 1990; Leithwood & Montgomery, 1982).

More robust conceptualizations of principal leadership suggest that the effects of principal leadership are most likely to occur indirectly through the principal's efforts to influence those who come into direct contact with students in the instructional setting (e.g., Boyan, 1988; Hallinger & Murphy, 1985; Heck et al., 1990; Leithwood et al., 1990; Silins, 1994; see model C in Fig. 1). Thus, Bossert et al. (1982) suggested that the principal influences student learning by shaping the school's instructional climate and instructional organization. This occurs through the principal's own actions as a leader as well as through development of school policies and norms (Dwyer, 1986; Leithwood, Begley, & Cousins, 1992).

Although it is theoretically possible that principals do exert some direct effect on students' learning, our own belief is that the linkages between principal leadership and students are inextricably tied to the actions of others. This makes the detection of direct effects of principal leadership on student achievement difficult. If, in fact, there are any direct effects to be found, they are more likely to occur in elementary schools since the principal's ability to influence students directly is likely mediated by the size of the institution and the nature of the school organization (Firestone & Herriott, 1982; Hallinger & Murphy, 1986a; Jones, 1987).

In the current study, we tested models that portrayed the principal's instructional leadership in terms of an antecedent with direct-effects model and two variations of the antecedent with indirect-effects model. This selection of models for examination reflects both pragmatic and theoretical criteria. Pragmatically, the data set at our disposal limited our ability to test other alternatives such as reciprocal-effects or moderated-effects models. At the same time, the models that we examined allowed us to test propositions that are theoretically consistent with the literature on the principal's role in school effectiveness.

The basic model that guided this study is displayed in Figure 2. The approach implicit in this model is consistent with the conceptual work of leading researchers in this field (e.g., Andrews et al., 1986; Bossert et al., 1982; Goldring & Pasternak, 1994; Heck et al., 1990; Leithwood et al., 1990; Pitner, 1988; Rowan & Denk, 1984). The model incorporates (1) contextual and personal antecedents of principal leadership, (2) a principal leadership construct, (3) in-school factors related to teaching and learning, and (4) student achievement outcomes. Development of this model was heavily influenced by the conceptual model proposed by Bossert et al. (1982) at the Far West Lab. We discuss briefly how each of these parts of the model was conceptualized for the purpose of this study.

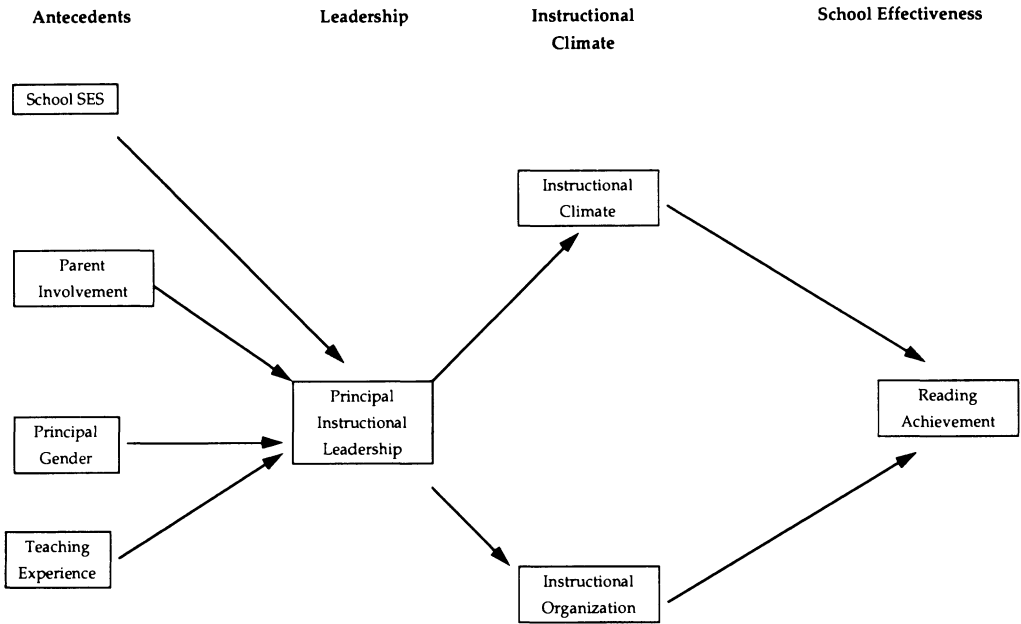


FIG. 2.—Basic model of principal effects on achievement

Antecedents of Leadership

If one starts with the assumption that leadership is a contextually dependent variable, a variety of contextual and antecedent variables are of potential interest. These include features of the school and its community that set the context for leadership. In addition, both principals' prior experiences and backgrounds shape their perspectives toward their role. We considered both types of variables in this study.

School context. The school's environment offers both constraints and resources that shape the situation in which a principal will lead. The requirements for leadership in a large inner-city high school differ substantially from those in a rural elementary school or even in a large suburban high school. For example, although his strong-arm actions were not universally accepted in the inner city, it is difficult to imagine Joe Clark lasting 1 day carrying a baseball bat and a bullhorn in a wealthy suburban high school. The contexts in which principals work present different constraints, needs, and opportunities.

Potentially salient features of the school community include its ethnic homogeneity, the socioeconomic status of families, the nature of parental expectations and involvement in schooling, and the geographic location of the school. These factors combine to create a context in which principals exercise leadership (e.g., Crowson & Morris, 1985; Dwyer, Lee, Rowan, & Bossert, 1983; Goldring, 1986; Hallinger & Murphy, 1986b; Miller & Sayre, 1986). The same approach to school leadership from the principal will simply not be appropriate across all such contexts.

In this study, we incorporated two measures of community context: school-level SES and parent involvement in schooling. These variables were selected, in part, because of the importance attributed to family background effects on student learning (Coleman & Hoffer, 1987; Purkey & Smith, 1983). They were also included, however, because prior research suggests that student SES influences the type of leadership principals exercise (Goldring, 1986, 1993; Hallinger & Murphy, 1986a, 1986b; Heck et al., 1990).

Personal characteristics of the principal. Administrators' personal characteristics may also be viewed as antecedents of their behavior (Boyan, 1988). Scholars assert that the values, beliefs, and experiences of principals are salient to understanding how they exercise educational leadership (Barth, 1986; Dwyer et al., 1983; Leithwood et al., 1992). For example, researchers have found that the number of years of prior teaching experience of a principal is positively associated with instructional leadership activity (Eberts & Stone, 1988; Glasman, 1984; Hallinger, 1983; Leithwood et al., 1990). Principals' personal values have also been identified as potentially important by implicitly shaping principal attention to different aspects of the educational program (Barth, 1980, 1990; Cuban, 1988; Glasman, 1984; Leithwood et al., 1990, 1992).

An accumulating body of research also shows an association between principal leadership and gender (Adkison, 1981; Glasman, 1984; Gross & Trask, 1976; Hallinger & Murphy, 1985). This research suggests that, on average, female elementary school principals are more actively involved in instructional leadership than are their male counterparts. In noting this finding in an earlier review of research, Leithwood et al. (1990, p. 26) suggested that "the socialization experiences of men and women [are linked] with differences in career aspirations and views of the principal's role. Such experiences appear to cause more men to seek the principalship earlier in their careers (before age 30) and to aspire to the superintendency as a career move. Gender related socialization experiences also seemed to contribute to a relatively large proportion of women viewing themselves more as curriculum and instructional leaders; relatively larger proportions of men, in contrast viewed themselves as general managers."

These observations suggest that certain personal characteristics of principals may correlate with each other as well as with principals' actions. In this study, we in-

cluded both principal gender and years of prior teaching experience as antecedent variables in the analyses.

Principal Leadership

If one intends to study the effects of principal leadership, it is important to be clear about the definition of principal leadership. Principal leadership may be examined in terms of a variety of leadership roles including managerial, political, and instructional leadership (Cuban, 1988). Prior to the 1980s, most empirical research on principals utilized measures of general leadership behavior (Boyan, 1988).

Current research on effects of principal leadership on student learning draws its conceptual lineage more directly from research on school effectiveness and school improvement. These literatures consistently point to the importance of the principal's role as an instructional leader. Bossert et al. (1982, p. 35) summarized key dimensions of this role: "Effective principals create the conditions . . . [for successful schooling] by providing coherence to their schools' instructional programs, conceptualizing instructional goals, setting high academic standards, staying informed of policies and teachers' problems, making frequent classroom visits, creating incentives for learning, and maintaining student discipline."

Based on qualitative inquiry, Dwyer (1986) contended that successful principals exercise more higher-order thinking in their leadership role than their typical counterparts. That is, instructional leaders connect their daily on-the-job practice with their goals for students and with the needs and resources of the school and its environment. Leithwood et al. (1990, p. 14) drew a similar conclusion: "Goals form a central part of the vision principals use to bring consistency to an otherwise unmanageably diverse set of demands. Effective principals act to influence a broad array of school factors with an extensive repertoire of strategies. Their priorities are expressed in their day-to-day actions; they are better attuned, than are typ-

ical principals, to behaviors that actually influence teachers." Studies show that principals differ substantially in the nature of the thinking in which they engage as they enact their role as instructional leaders (Dwyer et al., 1983; Leithwood et al., 1992; Marsh, 1992; Peterson, 1986).

At the same time, as we have noted, studies also indicate that the nature of the principal's instructional leadership is likely to vary in relation to features of the school and its environment. Thus, more recent conceptualizations of instructional leadership shy away from viewing it as a unitary behavioral construct (Heck, 1993; Leithwood et al., 1990, 1992; Leithwood & Hallinger, 1993). The measure of principal instructional leadership utilized in this study focused on representative behaviors and practices such as those identified by researchers at the Far West Laboratory for Educational Research in San Francisco (Dwyer et al., 1983), the Santa Clara County (CA) Office of Education (Hallinger & Murphy, 1985), and the Connecticut State Education Department (Sirois & Villanova, 1982). The conceptualization focuses on the principal's responsibilities for managing curriculum and instruction and creating an academically focused climate in the school.

Consequences of Principal Leadership

It is possible for the effects of administrative behavior to be observed in features of the school organization as well as in outcomes of schooling (Pitner, 1988). This view is reflected in the mediated-effects models of principal effects. For example, Bossert et al. (1982) conceptualized two dimensions of a school's organization that are likely to influence (mediate) the principal's effects on teaching and learning: instructional climate and instructional organization.

Instructional climate. Instructional climate comprises those facets of a school that shape the attitudes and behaviors of staff and students toward instruction and learning (e.g., Brookover et al., 1978; Brookover & Lezotte, 1979; McDill, Rigsby, & Meyers,

1969; Miller & Sayre, 1986; Rutter, Maugham, Mortimore, Ouston, & Smith, 1979). In this study, we conceptualized instructional climate as three related but separately measured constructs: school mission, student opportunity to learn, and teacher expectations for student learning.

School mission refers to the school's orientation toward improving student learning. Mission reflects the degree to which teachers share the view that student learning is the school's preeminent goal. Prior research on school improvement has shown that schools in which there is a clear, academically oriented mission are better able to make decisions in the interests of students and to allocate resources toward the improvement of teaching and learning (Leithwood & Montgomery, 1982; Purkey & Smith, 1983). This indicates that principals may be able to influence teaching and learning effectiveness through their role in developing a shared school-wide mission (e.g., Bamberg & Andrews, 1990; Duke, 1982; Estler, 1985; Goldring & Pasternak, 1994; Rutter et al., 1979; Sashkin, 1988).

A relatively long and consistent tradition of classroom research has shown that teacher expectations have a significant effect on student learning outcomes (Purkey & Smith, 1983). At the same time, school effectiveness researchers have concluded that schools differ in the degree to which they shape teachers' expectations for student learning (Brookover et al., 1978; Brookover & Lezotte, 1979; Rutter et al., 1979). Evidence suggests that reduced expectations have the greatest negative effects on students from low-SES backgrounds and students who attend schools serving predominantly low-SES populations (Murphy & Hallinger, 1989).

Studies of teacher expectations have also shown that principals play a key instructional leadership role by shaping teachers' attitudes concerning students' ability to master school subject matter (Brookover & Lezotte, 1979; Oakes, 1989; Purkey & Smith, 1983; Rutter et al., 1979). Thus, one way

principals can influence student achievement is through raising teachers' expectations for student learning. This is accomplished both through personal actions of the principal and through policies developed in conjunction with staff (Duke, 1982; Duke & Canady, 1991; Goldring & Pasternak, 1994; Murphy & Hallinger, 1989).

Another component of the school's instructional climate that has received attention over the past 20 years concerns students' opportunities to learn. Simply stated, schools differ in the degree to which they provide students with access to knowledge (Murphy & Hallinger, 1989; Oakes, 1989; Purkey & Smith, 1983). Again, this school-level variable is subject to principal influence through the development of academic policies and school-wide norms and through the direct monitoring of teachers' practices (Duke & Canady, 1991; Dwyer, 1986; Murphy & Hallinger, 1989).

Instructional organization. Instructional organization refers to the manner in which a school organizes opportunities for teaching and learning. Practices such as grouping for instruction and curricular tracking, as well as features of the formal curriculum, comprise the instructional organization of the school (e.g., Bossert et al., 1982; Cohen & Miller, 1980; Eberts & Stone, 1988; Glasman & Binianimov, 1981; Oakes, 1989). For our study of elementary schools we employed an admittedly limited measure of instructional organization: the degree to which students were grouped homogeneously by prior achievement, by class at given grade levels of reading.

School outcomes. Although school outcomes may be thought of quite broadly, for reasons discussed earlier, we chose to focus on achievement measures of student learning as our criterion variable. The study from which we draw our data utilized measures of reading and mathematics achievement as well as measures of teacher job satisfaction. In this article, we report relationships between model components and reading achievement.

Research Design

In this article we report the secondary analysis of data collected from 98 elementary schools in Tennessee that participated in the state's School Incentives Improvement Program (SIIP). SIIP was a 4-year study (1983–1986) designed to assess the effects of school-level financial incentives on student achievement. In this article, we use structural modeling to test the fit of alternative conceptualizations that model principal effects on school effectiveness. Data are drawn from the first through the third years of the project (spring 1983 through summer 1985).

Sample

Schools were recruited for voluntary participation in the project during the spring and summer of 1982. In the spring of 1982, the state commissioner of education held meetings across the state with superintendents of all Tennessee school systems in which he explained the purpose of the project. Afterward, the commissioner sent a letter to all superintendents outlining guidelines for participation in the project.

Thirty-six of the 147 school superintendents in the state returned participation request forms. These 36 systems represented a potential pool of 270 elementary schools. Calls and visits were made by SIIP staff to all superintendents who had responded positively to the initial inquiry from the commissioner. Following these contacts, 28 superintendents representing 133 schools indicated a continued interest in participation.

Criteria for participation in the project included location, size, and type of school system. Given the statewide nature of the project it was important to include, to the greatest extent possible, systems that represented Tennessee schools as a whole. Grade structure and testing patterns were also of primary importance. Schools with the most extensive testing programs, which also included grades 1–6 or 1–8, were identified as first-choice participants. Because

they did not include schools that had the 1-6 or 1-8 grade configuration, five of the remaining 28 systems were dropped from consideration. A total of 110 schools in 23 systems that remained met general project criteria. Of these, 98 ultimately agreed to participate in the project. However, 11 schools withdrew from participation before the project's third year. Thus, 87 schools remained in the SIIP project throughout the period on which we report.

Data Collection and Variables Studied

Consistent with our conceptualization of the principal's role in school effectiveness, we collected data on context factors, personal characteristics of the principals, measures of principal leadership, in-school organizational variables, and student achievement.

Antecedent variables. School administrators at all 87 schools completed a School Information Form. This instrument enabled us to collect contextual and demographic information on each school and included several SES measures. The measure used in this analysis is the percentage of students regularly receiving free or reduced-price lunch (PERCFL).

Principal's gender (PSEX, 1 = female, 2 = male) and years of teaching experience (TEXP) were also drawn from the principal questionnaire. To facilitate estimation of the structural model, TEXP was defined as total years of teaching experience divided by seven. This transformation was necessary to produce a set of variables with near equal variances. Before the transformation, TEXP's variance was so much greater than that of other variables in the study that it threatened the accuracy of the estimation routine.

Parent involvement was measured using a 13-item scale derived from the Connecticut School Effectiveness Questionnaire (Villanova, Gauthier, Proctor, & Shoemaker, 1981). The scale assessed the nature and extent of parent involvement in the school. The items focused particularly on

parent involvement in activities that supported student learning.

School organizational variables. In the first and third years of the project, principals and teachers completed questionnaires. Areas of inquiry included in the questionnaires were: (1) factors associated with effective schools, (2) organizational variables hypothesized to be related to student performance, (3) faculty attitudes toward their own ability to improve student performance, (4) the valence of various incentives to school personnel, and (5) selected context variables potentially affecting faculty effectiveness.

The CSEQ served as the source for 72 of the approximately 275 items on the questionnaire. Each year over 1,300 teachers (>90%) completed questionnaires, and no more than three principals failed to complete their questionnaires validly and return them.

In the present inquiry we employ measures of several constructs drawn from the teacher questionnaires. First, the principal leadership construct (PLEAD) focuses explicitly on the principal's instructional leadership role. As measured, the instructional leadership construct is consistent with the conceptualization outlined earlier drawn from the school effectiveness research (e.g., Andrews & Soder, 1987; Heck et al., 1990; Leithwood & Montgomery, 1982). Eighteen items for this scale were taken from the CSEQ (see the Appendix).

The measures of instructional climate came from several sources. Clear school mission (MISS), opportunity to learn-time on task (OPPO), and parental involvement (INVOL) were derived from the CSEQ. The expectations scale was drawn from the School Structure and Climate Study (Miskel, Bloom, & McDonald, 1982) as well as from the CSEQ.

In order to measure instructional organization we used one item developed by SIIP staff (RGRP). RGRP is a dichotomous item; 0 = did not group within grade by achievement, and 1 = did use such group-

ing. All school-level variable constructs met acceptable standards of alpha reliability (see Table 1).

Before analyses began, we aggregated all variables at the school level by taking the mean of all items for each teacher on each scale and then taking the mean across teachers. In the case of grouping, RGRP, this aggregation procedure resulted in a measure defined as "the percentage of teachers in a school who report their school as using the grouping practice." This measure may be confounded, for example, by school size, since grouping may be more difficult in smaller schools. In addition, the measure may be more indicative of teachers' agreement about practice than actual practice in a school.

Student learning. The achievement measure used in the study is a criterion-referenced reading test (Basic Skills First Test) designed by the Tennessee State Department of Education in cooperation with project staff. As such it is likely to have higher curricular validity than the standardized tests often used in similar research. This feature of the outcome measure is particularly salient to our attempt to determine the effects of principal leadership on school achievement.

Schools administered these tests to third- and sixth-grade students in both the fall and spring of the 1984–1985 academic year. The fall administration was used as a pretest; spring scores served as a posttest.

Before analyses began, gains over that school year were computed as posttest minus pretest scores. These gain scores were then regressed on pretest level. The residuals of this regression served as the final achievement gain variable (RREAD).

Data Analysis

We tested the operationalized model using a structural modeling program, EQS (Bentler, 1989), running on an IBM-compatible microcomputer. Structural modeling, a form of path analysis, allows the testing of assumptions of causality in relationships among multiple variables within a model. The independent effects of multiple antecedent and intervening variables can be assessed simultaneously. This fit the need in this study to understand relationships among multiple interrelated variables, as well as their effect on student achievement. The model estimation is recursive in nature. Estimation proceeded in several steps consistent with our interest in examining several possible models of principal effects.

Direct effects without antecedents. In the first step of the analysis, we tested a simple bivariate, direct-effects conceptualization. This model included measures of principal leadership and student reading achievement (model A in Fig. 1). This analysis yielded no significant effects of principal leadership on student achievement.

These results were not overly surprising. This approach assumes the existence of

TABLE 1. Properties of Measured Variable Scales

Variable and Source	Number of Items	Alpha		Mean	SD
		Prior	Current		
School mission CSEQ	10	.90	.86	3.8871	.3785
Principal leadership CSEQ	18	.93	.87	3.5242	.4349
Opportunity to learn CSEQ	10	.69	.67	3.7961	.2684
Teacher expectations:					
CSEQ	2	...	.82 (total)	3.4422	.2268
Brookover et al. (1978)	4	...	...	...	...
Miskel et al. (1982)	4	...	...	...	...
Parent involvement CSEQ	13	.85	.80	2.8200	.5600

NOTE.—CSEQ = Connecticut School Effectiveness Questionnaire (Villanova et al., 1981).

a "black box" through which administrator effects take place. Despite the predominance of this type of analysis in earlier principal effects studies, there is neither theoretical nor empirical support for a such a model of principal effects on student outcomes (Hallinger & Heck, in press). Our empirical results further confirm the limitations of this approach.

Mediated effects with antecedents: Constrained paths. In the second step of the analysis, we estimated a model consistent with the relationships portrayed in model C in Figure 1. We included the full set of antecedents in the model, and the effect of principal leadership on student learning was mediated by the constellation of intervening variables: school mission, opportunity to learn, teacher expectations, grouping. Though this model is more sophisticated than the first model tested, it still posits a causal process that is severely constrained and linear.

The model presents variables as discrete, directly related links in a linear causal chain. Each variable in the process affects only the next link in the chain. Such simplified structures are appropriate for theory building but seldom fit empirical data (Boyan, 1988; Pitner, 1988). Relations among the variables in the framework are more likely to be interactive than linear (Hallinger & Heck, in press). Empirically, causal chains usually include a number of such indirect linkages.

The data in the present study did not support the simple causal structure displayed in model C in Fig. 1. The chi-square test for fit produced a value of 64.4, $df = 19$, $p < .001$, and the normed Bentler-Bonett fit index was 0.563. This lack of fit suggests that the causal structure hypothesized in the model is unable to account for observed correlations.

Mediated effects with antecedents: Open paths. In the next step of the data analysis, we estimated a more complex structure, again using a recursive model. This structure differed from the first two

models in three respects. First, we allowed direct paths between the antecedent variables preceding principal leadership (PLEAD) and those following PLEAD. Second, we organized the variables comprising the instructional climate construct into a causal structure. Third, we excluded teaching experience (TEXP) from the analysis.

These structural changes were suggested by the residual covariance matrix (see Table 2). Moreover, they could be justified as a theoretically defensible model. Teaching experience (TEXP) was dropped because it did not correlate with principal leadership (PLEAD) or any variable affected by PLEAD. That is, the teaching experience variable did not contribute to the model.

These structural changes neither substantially altered the originally hypothesized role of principal leadership nor changed the relative position of other variables in the model. They did, however, result in a defensible model that fit the data; $\chi^2 = 27.5$, $df = 19$, $p < .05$, and Bentler-Bonett fit index = 0.911. As with any post hoc analysis, the results should be interpreted with caution. The model that emerged from this step is presented in Figure 3. Estimated equations generated by the structural model are shown in Figure 4.

In interpreting the data, it should be noted that the EQS program produces path coefficients in a linear covariance structural model (LCSM). These coefficients are equivalent to unstandardized regression weights in ordinary multiple regression analysis. They differ from the usual regression weights estimated by ordinary least squares only in that LCSM path coefficients are often part of a more complex model that cannot be estimated using ordinary least squares.

The coefficients produced in this analysis can be interpreted as follows. Consider the estimated coefficient between clear school mission and opportunity to learn: 0.669. This value means that when clear school mission increases by one unit, hold-

TABLE 2. Variance-Covariance Matrix

	Principal Sex (V1)	Percent Free Lunch (V3)	Parent Involvement (V4)	Principal Leadership (V5)	Opportunity to Learn (V6)	Teacher Expectations (V7)	School Mission (V8)	Reading Groups (V9)	Reading Achievement (V10)
Principal sex (V1)	.185								
Percent free lunch (V3)	.010	.059							
Parent involvement (V4)	-.047	-.068	.291						
Principal leadership (V5)	-.047	-.001	.074	.176					
Opportunity to learn (V6)	-.004	-.012	.045	.057	.064				
Teacher expectations (V7)	-.015	-.026	.081	.044	.033	.050			
School mission (V8)	-.015	-.011	.051	.062	.049	.033	.073		
Reading groups (V9)	.007	-.001	.007	.002	.005	.009	.008	.004	
Reading achievement (V10)	-.053	-.031	.051	.110	.044	.071	.025	.036	1.020

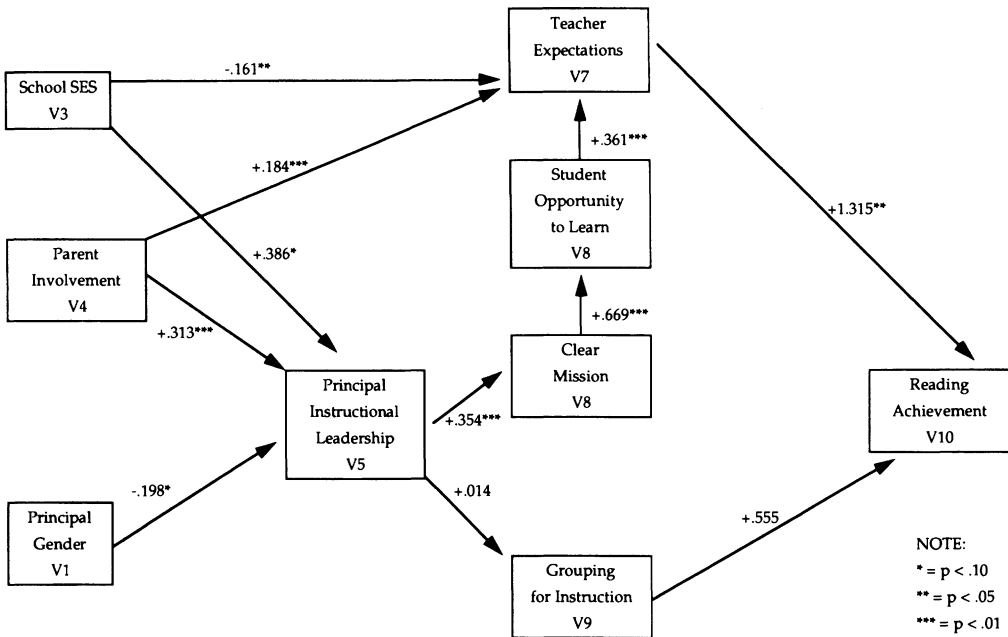


FIG. 3.—Final model of principal effects on school effectiveness

ing other variables constant, one would expect student opportunity to learn to increase by 0.669 units. Since these are unstandardized weights, the term “units” refers to the units in which the variables were measured, in other words, the raw, untransformed measure. If we discussed these in terms of standardized weights, all units would refer to standard deviations—standardized path coefficients are equivalent to standardized regression coefficients (beta weights). We use unstandardized rather than standardized weights in Figure 4 because we do not use the data to make statements about the relative importance of model components. In addition, the means and standard deviations in Table 1 provide information about the strength of the measured variables. Next we discuss the substantive results of the study.

Results and Discussion

The primary purpose of this study was to explore the effects of principal leadership on school effectiveness. In exploring this relationship we examined several models of

how principals exercise leadership in the context of a school and its environment. The nature of the data set collected by researchers as part of the Tennessee School Improvement Incentives Project made it possible to examine the principal leadership construct simultaneously as an independent and dependent variable. We again emphasize that our conception of the principals’ role in school improvement focused solely on their function as an instructional leader. In this section we discuss the results for our research questions that were concerned with understanding the antecedents and effects of principal instructional leadership.

Antecedents of Principal Leadership

Our first question involved an exploration of antecedent variables that might affect how principals enact their leadership role in schools. In this analysis of the SIIP data we examined effects of parent involvement, student SES, and principal gender and prior teaching experience on principal leadership. Prior research suggested that

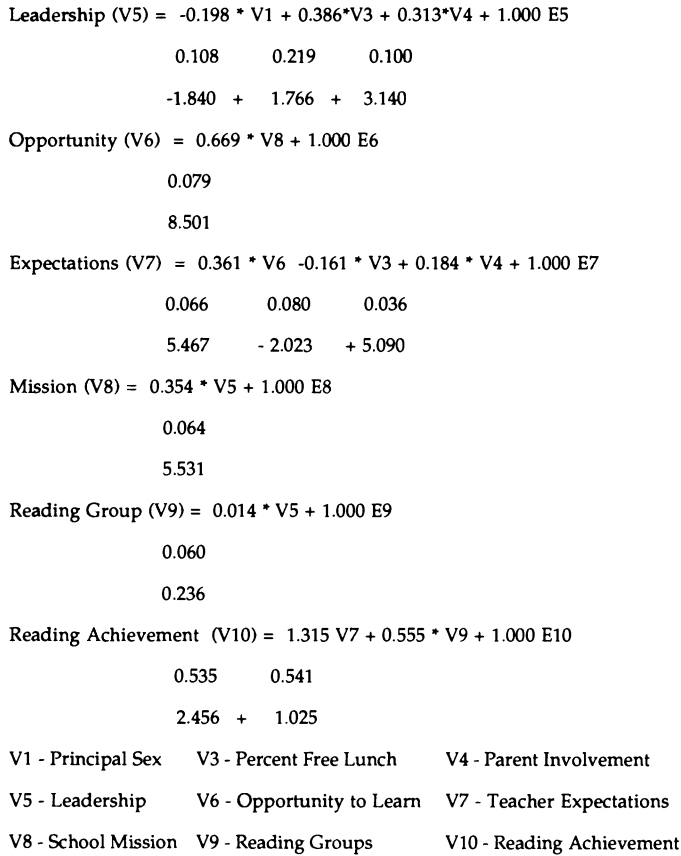


FIG. 4.—Estimated equations

each of these variables might have a measurable effect on principal leadership. Moreover, we thought there was also sufficient theoretical justification for the inclusion of these variables in an attempt to understand potential patterns of variation in principal leadership. Our findings are consistent with those of prior studies; each of these variables, with the exception of prior teaching experience (TEXP), contributed to the explanatory power of the final model.

Parent involvement in the school had a positive effect ($p < .01$) on principal leadership (see Fig. 3). Principals perceived by teachers as active instructional leaders worked in schools in which parents were more involved in the education of their children. The data do not allow us to infer the specific nature of the interaction between

these two variables nor to determine conclusively that causality is unidirectional. Although theoretically it is also likely that principals shaped the involvement of parents in their schools, testing this hypothesis empirically would require a different conceptual and statistical model (i.e., a reciprocal-effects model).

A second community-related antecedent of principal leadership included in the analysis was student socioeconomic status. Again, we found a statistically significant effect on principal leadership ($p < .05$; see Fig. 3). The nature of principals' instructional leadership differed systematically in relation to student socioeconomic composition in the schools. The direction of the effect indicates that principals in higher-SES schools exercised more active instructional

leadership of the type measured in this study than their counterparts in schools serving students of lower SES.

These positive results are consistent with findings from other empirical research on principal leadership and school context (e.g., Goldring, 1990, 1993; Goldring & Pasternak, 1994; Heck et al., 1990; Scott & Teddlie, 1987). The finding supports the notion that principals adapt their instructional leadership to the community context in which they work (e.g., Andrews et al., 1986; Hallinger & Murphy, 1986a; Miller & Sayre, 1986; Rowan & Denk, 1984). Although this result does not illuminate the ways in which these community variables shape principal leadership, it supports the hypothesis that principal leadership is contingent on these key features of a school's environment.

It is also interesting to note that both student SES and parental involvement not only influenced principal leadership but also had positive direct effects on teacher expectations for student learning. Consistent with prior research, teachers tended to have higher expectations for student learning in schools serving students from homes of higher SES and students whose parents were more involved in the school program (Hallinger & Murphy, 1986b; Leithwood et al., 1990). These students tended to perform better on the state reading tests.

As mentioned earlier, these relationships were revealed by the data when additional paths were allowed in the empirical model. Although these proxies for parental expectations were not predicted in our model, we were not surprised to find them exert such an influence on both the principal and teachers in the workplace. This finding concerning the effects of these community variables is consistent with both the theoretical and empirical literature on the role of parent and teacher expectations in school effectiveness (e.g., Brookover & Lezotte, 1979; McDill et al., 1969; Miller & Sayre, 1986; Miskel et al., 1982; Oakes, 1989; Purkey & Smith, 1983; Rutter et al., 1979). It further highlights an important area for fu-

ture research aimed at understanding the principal's role in school effectiveness. Specifically, this result suggests that researchers have much to learn about how principals vary their instructional leadership in response to the expectations, resources, and needs that characterize the communities in which their schools operate (Goldring, 1990, 1993; Hallinger & Murphy, 1986b; Heck, 1992). In addition, although we did not empirically explore this relationship, such research should examine how principals shape the involvement of parents and the expectations that their community has for students.

The third antecedent variable tested in this study was a personal characteristic, principal gender. Prior research suggested that female elementary school principals exercise more active leadership in the areas of curriculum and instruction than do their male peers. These data support this finding, though at a lower level of statistical significance ($p < .10$; see Fig. 3). Unfortunately, our data do not shed light on why female principals are more involved in instructional leadership than males but simply indicate that they are perceived as such by teachers at their schools.

Several explanations for this phenomenon have been suggested in the literature. Female principals tend to spend more years in the classroom prior to becoming principals than males and may therefore have greater expertise in instructional matters. It is also possible that females are better able to communicate with a predominantly female teaching force at the elementary level. Finally, both the personal values and the incentive systems of female principals appear to differ from those of male principals and may be more aligned with a focus on student learning as their primary goal.

In this article, we did not analyze the data to assess these possible explanations for the results related to gender, although we do know that the inclusion of the variable TEXP (prior years of teaching experience) did not contribute to the model's ex-

planatory power. Principal gender is another antecedent variable that deserves additional attention from researchers. Despite the fact that it has been identified frequently over the past 2 decades as exerting a statistically significant influence on perceptions of principal leadership behavior, researchers have failed to explain the underlying cause(s) of these results adequately (Gross & Trask, 1976; Hallinger & Murphy, 1985; Leithwood et al., 1990).

The Consequences of Principal Leadership

The second research question guiding this study concerned the consequences of principal instructional leadership. We examined three sets of dependent variables in relation to the principal instructional leadership construct: instructional climate, instructional organization, and student achievement outcomes. We included combinations of these variables in tests of several models portraying avenues of direct and indirect principal effects on student achievement.

In our data we found no significant direct effect of principal leadership on student achievement in reading. If direct effects are to be found in this relation, we believe that the sample size and design of this study should have been adequate to detect them. The finding of no direct effects on achievement is not, however, surprising. As noted at the outset of this article, the literature on principal effects consists of conflicting and often ambiguous findings (Hallinger & Leithwood, 1994; van de Grift, 1990). Moreover, the assumptions of the general principal leadership literature to the contrary, in theoretically robust conceptualizations of the principal's role in school improvement researchers have generally been hesitant to assert direct effects of principals on student achievement (e.g., Bossert et al., 1982; Heck et al., 1990; Leithwood, 1994).

Theoretically defensible models of principal effects incorporate intervening variables into causal chains that link principal

leadership to student outcomes. This type of modeling was attempted in our estimation of two different antecedent with mediated-effects models (see model C in Fig. 1). The model that yielded the best estimation portrayed principal effects on achievement as occurring through intervening school climate variables. Notably, this model was not constrained by limitations on interactions among the variables (see Fig. 3). Thus, as already noted, additional causal linkages were revealed between school context variables and the school climate variables. This model revealed a statistically significant ($p < .01$) positive relation between principal leadership and the school climate variables. Specifically, the model indicates a strong relation between the degree of instructional leadership provided by the principal and the existence of a clear school mission. A clear mission, in turn, influenced student opportunity to learn and teachers' expectations for student achievement. This constellation of instructional climate variables had a positive subsequent effect on student achievement in reading ($p < .05$).

These results are highly consistent with findings from other studies in which researchers have combined comprehensive conceptual frameworks with robust statistical modeling (e.g., Heck et al., 1990; Heck, Marcoulides, & Lang, 1991; Leithwood, 1994; Leitner, 1994; Silins, 1994). The findings suggest that elementary school principals who are perceived by teachers as strong instructional leaders promote student achievement through their influence on features of the school-wide learning climate. We believe that exploration of these indirect paths through which principals influence student learning represents the most potentially productive approach to understanding the principal's role in school effectiveness.

The other intervening variable examined in the study was instructional organization. Although prior research suggests that this should be a prime area for princi-

pal attention and intervention, we found no significant effects in this study. In retrospect, however, the measure of instructional organization used in this study was undoubtedly inadequate to the task of assessing this variable validly. Thus, despite this finding, we suggest that the principal's role in shaping instructional organization is a potentially fecund area for future study. In fact, we believe that valid measures of how principals shape students' access to equity in learning through the school's instructional organization may yield even more impressive results than the learning climate variables in terms of effects on student learning (Murphy & Hallinger, 1989).

Conclusion

Do principals make a difference? This was the question that provided the impetus for this study. Even when using—in our opinion—an overly narrow criterion for defining effectiveness (i.e., student achievement on tests), the results support the notion that principals play an important role in school effectiveness. This finding complements studies of the effects of principal leadership on other more diverse school processes and outcomes (e.g., Blase, Dedrick, & Strathe, 1986; Dwyer et al., 1983; Hoy & Brown, 1986; Leithwood & Stager, 1986; Miskel & Owens, 1983; Vanderstoep et al., 1994). The results indicate that, given a proper research design, it is possible to model and detect the indirect effects of principal leadership on student achievement. Prerequisites to detecting such effects include sufficient sample size, a theoretically defensible model, reliable data collection instruments, and sophisticated data analysis tools (Bridges, 1982; Hallinger & Heck, in press).

Our findings can be summarized in terms of two conclusions concerning research on the principal's role in school effectiveness: (a) the relation between principal and school effectiveness will be best understood through the use of models that account for effects of the school context on a principal's leadership; and (b) the effects

of principal leadership on student learning should be examined in terms of theoretically relevant intervening variables as well as school outcomes.

As predicted by our conceptual model, the inclusion of antecedent variables is critical to understanding the nature of principal leadership in school improvement. The effects of principal gender, student SES, and parental involvement on principal leadership were estimated to be significant in this study. This finding supports the contention that principal leadership should be viewed as both an independent and dependent variable and has implications for both research and practice.

In terms of practice, the important role played by school context variables in shaping the principal's instructional leadership reinforces prior admonitions against overgeneralizing from limited findings concerning principal and school effectiveness (Barth, 1986, 1990; Cuban, 1988; Murphy et al. 1983; Rowan et al., 1982). Few findings from research on principal leadership are sufficiently grounded as to be uniformly applicable in all schools. Although this study focused on the effects of community context variables, we would expect researchers to find similar effects as they explore other community-related variables such as societal culture (Hallinger & Heck, in press; Hallinger, Taraseina, & Miller, 1994; Heck, 1993) and institutional variables such as school size and complexity (Bossert et al., 1982; Cohen & Miller, 1980; Firestone & Herriott, 1982). Cookbook approaches to training packages that limit opportunities for principals to adapt research findings to their settings are, therefore, likely to be counterproductive (Barth, 1990; Hallinger, 1992; Marsh, 1992).

Our findings also support prior calls for researchers to direct greater attention to studying the antecedents and context of principal leadership (Bridges, 1982; Goldring, 1986, 1990; Heck, 1993; Leithwood et al., 1990; Murphy, 1988). We selected only three out of the numerous exogenous and

antecedent variables mentioned earlier; others require attention as well (see Hallinger & Murphy, 1986a; Leithwood et al., 1990). Moreover, although the methods we used in this study were appropriate to our goal of modeling relations among variables at a general level, this research design sheds little light on the substantive nature of relations among variables. Data that can be used to inform school practice will need to be generated from studies using qualitative designs (Dwyer et al., 1983). Multimethod studies that explore leadership within the context of a school represent another route for researchers who seek to illuminate the nature of these relations (e.g., Jackson, 1982).

The modeling of instructional leadership within a framework of antecedents and outcomes provides a more powerful lens for viewing the role of the principal than the simple models that have characterized research in this domain (Bridges, 1982; Hallinger & Heck, in press). Although consistently noted in key conceptual and empirical work that has been done in this field, such models too seldom find their way into the research at large (for exceptions, see Andrews et al., 1986; Heck et al., 1990; Jones, 1987; Leitner, 1994; Rowan & Denk, 1984; Silins, 1994). This situation needs to be rectified. In our judgment, there is neither theoretical nor empirical justification for a continuation of direct-effects research on the effects of school principals of the types depicted in model *A* or *B* in Figure 1.

The most interesting substantive finding in this study concerned the relation between principal leadership and school-level instructional processes. The findings confirm both the effects of selected school effectiveness factors on student achievement and the influence of the principal's leadership on those in-school processes. Our data do not resolve all issues concerning the nature of the principal's influence on school effectiveness. However, this finding supports the conclusion that principals contrib-

ute to school effectiveness, even if the influence is indirect.

The fact that the principal's effect on student achievement is indirect seems virtually irrelevant to us, since we assume that achieving results through others is the essence of managerial work (Bridges, 1970). More important, both for research and practice, is understanding the ways in which principals shape effective educational programs by working with teachers, staff, parents, and students. For the purposes of policy makers and practitioners, whether the principal's influence on student learning is direct or indirect ought not to be of primary concern.

Do principals make a difference? Yes, they do. Can researchers definitively measure that difference in terms of direct effects on student test scores? Probably not. Does that matter? Definitely not. We believe our study contributes to a growing body of literature on the principal's role in school improvement by indicating areas for future research that will further understanding of the principal's role in promoting student learning and school effectiveness.

Appendix

Sample Items from SIIP Scales

Principal Leadership (18 items):

1. The principal makes several formal classroom observations each year.
2. The principal reviews and interprets test scores with faculty.
3. Instructional issues are seldom the focus of faculty meetings.
4. At the principal's initiative, teachers work together to effectively coordinate the instructional program within and between grades.
5. The principal is very active in securing resources, arranging opportunities, and promoting staff development activities for the faculty.
6. The principal is highly visible throughout the school.

Clear Mission (10 items):

1. Schoolwide objectives are the focal point of reading instruction in this school.
2. Reading objectives are coordinated and monitored through all grades.

3. In reading, an identified set of objectives or skills exists at each grade level.

Teacher Expectations (10 items):

1. In my school, high academic standards are communicated to all students and parents.
2. Teachers in my school expect high proportions of their students to do well on standardized tests.
3. Teachers treat students in ways that emphasize their strengths and potential rather than focus on their failures.

Opportunity to Learn (10 items):

1. There are few interruptions of students' work during class time.
2. Other school activities do not often interfere with basic skills (reading and math) instruction in this school.
3. Class atmosphere in this school is generally very conducive to learning for all students.

All items were answered using a five-point Likert scale from strongly disagree (1) to strongly agree (5).

Note

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References

- Adkison, J. (1981). Women in school administration: A review of the research. *Review of Educational Research*, *51*, 311-343.
- Andrews, R., & Soder, R. (1987). Principal instructional leadership and school achievement. *Educational Leadership*, *44*, 9-11.
- Andrews, R., Soder, R., & Jacoby, D. (1986, April). *Principal roles, other in-school variables, and academic achievement by ethnicity and SES*. Paper presented at the annual meeting of the American Educational Research Association, San Francisco.
- Bamburg, J., & Andrews, R. (1990). School goals, principals and achievement. *School Effectiveness and School Improvement*, *2*, 175-191.
- Barth, R. (1980). *Run school run*. Cambridge, MA: Harvard University Press.
- Barth, R. (1986). Principal centered professional development. *Theory into Practice*, *25*, 156-160.
- Barth, R. (1990). *Improving schools from within*. San Francisco: Jossey-Bass.
- Bentler, P. (1989). *EQS structural equations program manual*. Los Angeles: BMDP Statistical Software.
- Blase, J., Dedrick, C., & Strathe, M. (1986). Leadership behavior of principals in relation to teacher stress, satisfaction, and performance. *Journal of Humanistic Education and Development*, *24*, 159-171.
- Bossert, S., Dwyer, D., Rowan, B., & Lee, G. (1982). The instructional management role of the principal. *Educational Administration Quarterly*, *18*, 34-64.
- Boyan, N. (1988). Describing and explaining administrative behavior. In N. Boyan (Ed.), *Handbook of research in educational administration* (pp. 77-98). New York: Longman.
- Bridges, E. (1970). Administrative man: Origin or pawn in decision-making? *Educational Administration Quarterly*, *6*, 7-25.
- Bridges, E. (1982). Research on the school administrator: The state of the art, 1967-1980. *Educational Administration Quarterly*, *18*, 12-33.
- Brookover, W., & Lezotte, L. (1979). *Changes in school characteristics coincident with changes in student achievement*. East Lansing: Michigan State University Press.
- Brookover, W., Schweitzer, J., Schneider, J., Beady, C., Flood, J., & Wisenbaker, J. (1978). Elementary school climate and school achievement. *American Educational Research Journal*, *15*, 301-318.
- Caldwell, B. (1992). The principal as leader of the self-managing school. *Journal of Educational Administration*, *30*, 6-19.
- Cheng, Y. (1994). Principal's leadership as a critical factor for school performance: Evidence from multi-levels of primary schools. *School Effectiveness and School Improvement*, *5*, 299-317.

- Cohen, E., & Miller, R. (1980). Coordination and control of instruction in schools. *Pacific Sociological Review*, *4*, 446–473.
- Coleman, J., & Hoffer, T. (1987). *Public and private schools*. New York: Basic.
- Crawford, J., Kimball, G., & Watson, P. (1985, March). *Causal modeling of school effects on achievement*. Paper presented at the annual meeting of the American Educational Research Association, Chicago.
- Crowson, R., & Morris, V. C. (1985). Administrative control in large city school systems: An investigation in Chicago. *Educational Administration Quarterly*, *21*, 51–70.
- Cuban, L. (1988). *The managerial imperative and the practice of leadership in schools*. Albany: State University of New York Press.
- Duke, D. (1982). Leadership functions and instructional effectiveness. *NASSP Bulletin*, *66*, 5–9.
- Duke, D., & Canady, L. (1991). *School policy*. New York: McGraw Hill.
- Dwyer, D. (1986). Understanding the principal's contribution to instruction. *Peabody Journal of Education*, *63*, 3–18.
- Dwyer, D., Lee, G., Rowan, B., & Bossert, S. (1983). *Five principals in action: Perspectives on instructional management*. San Francisco: Far West Laboratory for Educational Research and Development.
- Eberts, R., & Stone, J. (1988). Student achievement in public schools: Do principals make a difference? *Economics of Education Review*, *7*, 291–299.
- Eckholm, M. (1992). Evaluating the effects of comprehensive school leadership education in Sweden. *Education and Urban Society*, *24*, 365–385.
- Estler, S. (1985, April). *Clear goals, instructional leadership and student achievement*. Paper presented at the annual meeting of the American Educational Research Association, Chicago.
- Firestone, W., & Herriott, R. (1982). Prescriptions for effective elementary schools don't fit secondary schools. *Educational Leadership*, *40*, 51–53.
- Glasman, N. (1984). Student achievement and the school principal. *Educational Evaluation and Policy Analysis*, *6*, 283–296.
- Glasman, N., & Binianimov, I. (1981). Input-output analyses of schools. *Review of Educational Research*, *51*, 509–539.
- Goldring, E. (1986). The school community: Its effects on principals' perceptions of parents. *Educational Administration Quarterly*, *22*, 115–132.
- Goldring, E. (1990). Elementary school principals as boundary spanners: Their engagement with parents. *Educational Administration Quarterly*, *28*, 53–62.
- Goldring, E. (1993). Principals, parents and administrative superiors. *Educational Administration Quarterly*, *30*, 49–62.
- Goldring, E., & Pasternak, R. (1994). Principals' coordinating strategies and school effectiveness. *School Effectiveness and School Improvement*, *5*, 239–253.
- Gross, N., & Herriott, R. (1965). *Staff leadership in public schools*. New York: Wiley.
- Gross, N., & Trask, A. (1976). *The sex factor and the management of schools*. New York: Wiley.
- Hallinger, P. (1983). *Assessing the instructional management behavior of principals*. Unpublished doctoral dissertation, Stanford University, Stanford, CA.
- Hallinger, P. (1992). School leadership development: Evaluating a decade of reform. *Education and Urban Society*, *24*, 300–316.
- Hallinger, P., & Heck, R. (in press). The principal's role in school effectiveness: An assessment of methodological progress. In K. Leithwood (Ed.), *International handbook of research on educational leadership*. Dordrecht: Kluwer.
- Hallinger, P., & Leithwood, K. (1994). Exploring the effects of principal leadership. *School Effectiveness and School Improvement*, *5*, 206–218.
- Hallinger, P., & Murphy, J. (1985). Assessing the instructional management behavior of principals. *Elementary School Journal*, *86*, 217–247.
- Hallinger, P., & Murphy, J. (1986a). Instructional leadership in school contexts. In W. Greenfield (Ed.), *Instructional leadership: Concepts, issues and controversies*. Lexington, MA: Allyn & Bacon.
- Hallinger, P., & Murphy, J. (1986b). The social context of effective schools. *American Journal of Education*, *94*, 328–355.
- Hallinger, P., Taraseina, P., & Miller, J. (1994). Assessing the instructional leadership of secondary school principals in Thailand. *School Effectiveness and School Improvement*, *5*, 321–348.
- Heck, R. (1992). Principal instructional leadership and the identification of high- and low-achieving schools: The application of discriminant techniques. *Administrator's Notebook*, *34*(7), 1–4.
- Heck, R. (1993). School context, principal leadership, and achievement: The case of secondary schools in Singapore. *Urban Review*, *25*, 151–166.
- Heck, R., Larson, T., & Marcoulides, G. (1990). Principal instructional leadership and school achievement: Validation of a causal model. *Educational Administration Quarterly*, *26*, 94–125.

- Heck, R., Marcoulides, G., & Lang, P. (1991). Principal instructional leadership and school achievement: The application of discriminant techniques. *School Effectiveness and School Improvement*, *2*, 115-135.
- Hoy, W., & Brown, B. (1986, April). *Leadership of principals, personal characteristics of teachers, and the professional zone of acceptance of elementary teachers*. Paper presented at the annual meeting of the American Educational Research Association, San Francisco.
- Jackson, S. (1982, April). *Instructional leadership behaviors that differentiate effective and ineffective low income urban schools*. Paper presented at the convention of the International Reading Association, Chicago.
- Jones, P. (1987). *The relationship between principal behavior and student achievement in Canadian secondary schools*. Unpublished doctoral dissertation, Stanford University, Stanford, CA.
- Keeler, H., & Andrews, J. (1963). The leader behavior of principals, staff morale, and productivity. *Alberta Journal of Educational Research*, *9*, 179-191.
- Krug, F. (1986). *The relationship between the instructional management behavior of elementary school principals and student achievement*. Unpublished doctoral dissertation, University of San Francisco.
- Leithwood, K. (1994). Leadership for school restructuring. *Educational Administration Quarterly*, *30*, 498-518.
- Leithwood, K., Begley, P., & Cousins, B. (1990). The nature, causes and consequences of principals' practices: An agenda for future research. *Journal of Educational Administration*, *28*, 5-31.
- Leithwood, K., Begley, P., & Cousins, B. (1992). *Developing expert leaders for future schools*. Bristol, PA: Falmer.
- Leithwood, K., & Hallinger, P. (1993). Cognitive perspectives on educational administration: An introduction. *Educational Administration Quarterly*, *24*, 296-301.
- Leithwood, K., & Montgomery, D. (1982). The role of the elementary principal in program improvement. *Review of Educational Research*, *52*, 309-339.
- Leithwood, K., & Stager, M. (1986, April). *Differences in problem-solving processes used by moderately and highly effective principals*. Paper presented at the annual meeting of the American Educational Research Association, San Francisco.
- Leitner, D. (1994). Do principals affect student outcomes? An organizational perspective. *School Effectiveness and School Improvement*, *5*, 219-238.
- March, J. (1978). The American public school administrator: A short analysis. *School Review*, *86*, 217-250.
- Marsh, D. (1992). School principals as instructional leaders: The effects of the California School Leadership Academy. *Education and Urban Society*, *24*, 386-410.
- McDill, E., Rigsby, L., & Meyers, E. (1969). Educational climates of high schools: Their effects and sources. *American Journal of Sociology*, *74*, 567-586.
- Miller, S., & Sayre, K. (1986, April). *Case studies of affluent effective schools*. Paper presented at the annual meeting of the American Educational Research Association, San Francisco.
- Miskel, C., Bloom, S., & McDonald, D. (1982). *Effects of structural coupling and expectancy climate on the effectiveness learning strategies intervention* (Research Rep. No. 57). Lawrence: University of Kansas Institute for Research in Learning Disabilities.
- Miskel, C., & Owens, M. (1983, April). *Principal succession and changes in coupling and effectiveness*. Paper presented at the annual meeting of the American Educational Research Association, Montreal.
- Murphy, J. (1988). Methodological, measurement and conceptual problems in the study of instructional leadership. *Educational Evaluation and Policy Analysis*, *10*, 117-139.
- Murphy, J., & Hallinger, P. (1989). Equity as access to learning: Curricular and instructional differences. *Journal of Curriculum Studies*, *21*, 129-149.
- Murphy, J., & Hallinger, P. (1992). The principalship in an era of transformation. *Journal of Educational Administration*, *30*, 77-88.
- Murphy, J., Hallinger, P., & Mitman, A. (1983). Research on educational leadership: Issues to be addressed. *Educational Evaluation and Policy Analysis*, *5*, 297-305.
- Oakes, J. (1989). Detracking schools: Early lessons from the field. *Phi Delta Kappan*, *73*, 448-454.
- O'Day, K. (1983). *The relationship between principal and teacher perceptions of principal instructional management behavior and student achievement*. Unpublished doctoral dissertation, Northern Illinois University, Normal.
- Ogawa, R., & Hart, A. (1985). The effect of principals on the instructional performance of schools. *Journal of Educational Administration*, *22*, 59-72.
- Peterson, K. (1986). Vision and problem-finding in principals' work: Values and cognition in educational administration. *Peabody Journal of Education*, *63*, 87-106.
- Pitner, N. (1988). The study of administrator effects and effectiveness. In N. Boyan (Ed.),

- Handbook of research in educational administration* (pp. 99–122). New York: Longman.
- Purkey, S., & Smith, M. (1983). Effective schools: A review. *Elementary School Journal*, *83*, 427–452.
- Rowan, B., & Denk, C. (1984). Management succession, school socioeconomic context and basic skills achievement. *American Educational Research Journal*, *21*, 517–537.
- Rowan, B., Dwyer, D., & Bossert, S. (1982, April). *Methodological considerations in the study of effective principals*. Paper presented at the annual meeting of the American Educational Research Association, New York.
- Rutter, M., Maugham, B., Mortimore, P., Ouston, J., & Smith, A. (1979). *Fifteen thousand hours: Secondary schools and their effects on children*. Cambridge, MA: Harvard University Press.
- Sashkin, M. (1988). The visionary principal: School leadership for the next century. *Education and Urban Society*, *20*, 239–249.
- Scott, C., & Teddlie, C. (1987, April). *Student, teacher, and principal academic expectations and attributed responsibility as predictors of student achievement: A causal modeling approach*. Paper presented at the annual meeting of the American Educational Research Association, Washington, DC.
- Silins, H. (1994). The relationship between school leadership and school improvement outcomes. *School Effectiveness and School Improvement*, *5*, 272–298.
- Sirois, H., & Villanova, R. (1982, April). *Theory into practice: A theoretical and research base for the characteristics of effective schools*. Paper presented at the annual meeting of the American Educational Research Association, New York.
- van de Grift, W. (1990). Educational leadership and academic achievement in elementary education. *School Effectiveness and School Improvement*, *1*, 26–40.
- Vanderstoep, S., Anderman, E., & Midgeley, C. (1994). The relationship between principal “venturesomeness,” a stress on excellence and the personal engagement of teachers and students. *School Effectiveness and School Improvement*, *5*, 254–271.
- Villanova, R., Gauthier, W., Proctor, P., & Shoemaker, J. (1981). *The Connecticut School Effectiveness Questionnaire*. Hartford: Connecticut State Department of Education, Bureau of School Improvement.
- Wellisch, J., MacQueen, A., Carriere, R., & Duck, G. (1978). School management and organization in successful schools. *Sociology of Education*, *51*, 211–226.