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Instructional, Transformational, and Managerial Leadership and Student Achievement: High School Principals Make a Difference

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Abstract

This statewide study examined the relationships between principal managerial, instructional, and transformational leadership and student achievement in public high schools. Differences in student achievement were found when schools were grouped according to principal leadership factors. Principal leadership behaviors promoting instructional and curriculum improvement were linked to achievement. Within transformational leadership, the principal's ability to identify a vision and provide an appropriate model had the greatest relationship to achievement. Principal educational level also positively correlated with each leadership factor.

Keywords

principal, leadership, achievement

Introduction

The principal's role has become increasingly complex as the nature of society, political expectations, and schools as organizations have changed. The predominant role enacted by principals from the 1920s until the 1970s was one of administrative manager. For the most part, a nationwide trend toward school consolidation, the profession's desire to imitate corporate management, and the political nature of schools led the

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majority of principals to simply maintain the status quo (Hallinger, 1992). This managerial approach to leadership focused on the functions, tasks, or behaviors of the principal and assumed that if these functions were carried out competently, the school would operate effectively (Leithwood & Duke, 1999).

In his review of the correlational studies of school principals, Glasman (1984) identified the management role as the rational component of school organization, consisting of that portion of policy, daily operations, and decision making that is guided by the functional needs of conducting the work of the school. Myers and Murphy's (1995) study included "organizational control" mechanisms: supervision, input controls (e.g., hiring and firing personnel, teacher transfers, and budgeting), behavior controls (e.g., job descriptions and textbook adoption), and output controls (e.g., student testing). Rossmiller (1992) identified the importance of buffering the technical core (curriculum and instruction) of the school from excessive distractions and interruptions. Eberts and Stone (1988) noted the significance of the principal being a consistent, assertive disciplinarian. Rosenblatt and Somech (1998) observed effective principals involved in security, resource acquisition, routine paperwork, and communication with staff, students, and outsiders, providing an orderly school schedule and monitoring teachers. Brewer (1993) found that principals indirectly affect all students by simply ensuring that schools run smoothly on a day-to-day basis. "Clear and consistent school rules and policies tend to improve the general disciplinary climate of the school, and contribute to improved staff and student morale" (p. 281).

Bossert, Dwyer, Rowan, and Lee (1982) found that one factor of effective principal leadership was organization/coordination, which included managerial functions of the principalship. The researchers found that principal involvement in classroom management appears important to school success. They stated that structured learning environments with few disciplinary problems characterize successful schools, where students are engaged actively on tasks. Principals are important to this process, in particular to the extent that they support teachers with discipline problems. By controlling public spaces, by stressing discipline, and by handling disciplinary problems in their offices, principals buffer the instructional core from disruptions. The researchers found that there are other managerial functions in which principals can buffer classrooms so that they can run smoothly. For example, they found that principals in effective schools are more active in simply distributing materials in an organized manner and more supportive of special projects. They summarized that "these findings indicate that the managerial behavior of principals is important to school effectiveness" (p. 38).

During the 1980s, the effective schools movement began to describe the principal as an instructional leader. As researchers responded to the call for an explicit model of principal instructional leadership, the factors of an effective instructional leader began to emerge. Blumberg and Greenfield (1980) noted that characteristics of instructional leaders include setting clear goals to serve as a source of motivation, possessing a high degree of self-confidence and openness to others, tolerating ambiguity, testing the limits of interpersonal and organizational systems, being sensitive to the dynamics of power, maintaining an analytic perspective, and remaining in charge of their jobs.

De Bevoise (1984) suggested that instructional leadership focuses on establishing schoolwide goals, defining the purpose of schooling, providing resources for learning, supervising and evaluating teachers, coordinating staff development activities, and creating collegial relationships with and among teachers.

The key to Bossert et al.'s (1982) conception of leadership was the idea that the effective principal continually attempts to improve the quality of the staff's performance. This involves demonstrating a high concern for instruction, supporting staff development, and discussing work with teachers. A central finding in their study was that effective instructional principals increased teacher morale and performance, thereby increasing student achievement as assessed by teachers. The image of the effective instructional leader emerging from this study was of an individual who encouraged and supported the teaching staff rather than directed them, and one who strongly emphasized effective performance. Principals were expected to be knowledgeable about curriculum and instruction and able to intervene directly with teachers in making instructional improvements. High expectations for teachers and students, close supervision of classroom instruction, coordination of the school's curriculum, and close monitoring of student progress emerged as descriptors of effective principals (Hallinger & Murphy, 1985).

By the latter part of the 1980s and into the 1990s, consensus began to emerge from researchers concerning the factors of principal instructional leadership. Lashway (1995) stated that it was evident that "high-achieving schools have principals who boldly lead the academic program, set goals, examine curriculum, evaluate teachers, and assess results" (p. 1). Blasé and Blasé (1999) defined instructional leadership as a blend of several tasks, such as supervision of classroom instruction, staff development, and curriculum development. Leithwood (1992) asserted that the term *instructional leadership*

> focuses administrators' attention on "first-order" changes—improving the tech nical, instructional activities of the school through close monitoring of teachers' and students' classroom work. Yet instructional leaders often make such important "second-order" changes as building a shared vision, improving communication, and developing collaborative decision-making processes. (p. 8)

In 1994, Leithwood defined instructional leadership in terms of a series of behaviors designed to affect classroom instruction directly through, for example, supervision, coaching, staff development, modeling, and other such means of influencing teachers' thinking and practice.

In the 1990s, reformers began to recommend a change in the organizational structure, professional roles, and goals of public education. Some researchers (Beck & Murphy, 1992; Brandt, 1992; Darling-Hammond, 1993; Leithwood, 1992; Sheppard, 1996) suggested that the metaphor of the principal as instructional leader was ill suited for the changing contexts in which schools function. As a result of the numerous changes facing schools, the view of the principal as transformational leader emerged. The notion

of the transformational leader resulted mostly from Burns's (1978) work, which provided a conceptual framework on which to build the distinction between transformational leadership and other types of leadership.

Kenneth Leithwood and his colleagues have led the way in the exploration and application of transformational leadership in the sphere of educational administration. Leithwood (1994) argued that transformational approaches to school leadership are especially appropriate to the challenges facing schools entering the 21st century. He called for these approaches to be more strongly advocated to practicing school administrators and featured more prominently in principal preparation programs. Leithwood (1994) based his argument for the relevancy of transformational leadership for educational leaders on two assumptions. First, leadership primarily manifests itself during times of change, and the nature of change is the critical determinant of the most helpful forms of leadership. Second, the era of school change, reform, and restructuring will likely extend into the foreseeable future.

Leithwood (1994) noted that the focus for reform has shifted from elementary to secondary schools because of the size and complexity of secondary schools and because of the nature of secondary school principals' practices. The size of many secondary schools inhibits principals' direct influence on classroom practice envisioned in instructional leadership models. The number of teachers and classrooms is simply too large for the time available to principals. The secondary school curriculum and the amount of content knowledge required for graduation hinder direct principal involvement in instructional practices. Leithwood (1994) asserted, "It is past time the unique challenges of secondary school leadership were addressed more seriously" (p. 501). Transformational forms of leadership encourage secondary school principals to focus their energies on the capacities and motives of classroom teachers, those in a position to offer direct leadership in the classroom. In the school context, transformational leadership makes use of personal relationships to facilitate not only a change in the purposes and resources of those involved in the leader-follower relationship, but an elevation of both—a change "for the better" (Davies, 2004, chap. 2).

Although distinct principal leadership styles have emerged in the principal literature, several researchers suggest that no single set of leadership behaviors can be discerned to be more effective than others; principals must find the style and structures most suited to their own local situation (Bamburg & Andrews, 1991; Cuban, 1988; Deal & Peterson, 1994; Hallinger & Heck, 1996). Rather than focusing on a single model, a more comprehensive model might be of value. In this study, we analyzed data representing three distinct perspectives of leadership. We collected data about each of these perspectives from the same set of high school principals. Might one perspective of leadership be more highly linked to student achievement than others? Or do these perspectives complement each other, with an interactive or composite effect on student achievement? With limited research evidence linking principal leadership and student achievement (DeMoss, 2002; Hallinger & Heck, 1996, 1999; Heck, 1993a, 1993b), insight gained about the collective influence of the broad perspectives of managerial, instructional, and transformational leadership has the potential to enlighten the community of principal leadership research and practice.

Purpose of the Study

The purpose of this statewide study was to develop an understanding of the relative impact of principal managerial, instructional, and transformational leadership on student achievement as measured by a standardized high-stakes test in public high schools. The method of analysis was quantitative, with survey data collected from high school principals and teachers. The research questions that guided the study were as follows: (a) Do relationships exist between demographic variables of the principal and the factors of managerial, instructional, and transformational leadership? (b) Are there differences in student achievement when the high schools are grouped by principal leadership factor? (c) Are there relationships between selected school demographic characteristics, principal demographic characteristics, and principal leaderships factor scores with student achievement as measured by the Missouri Assessment Program (MAP)?

Method

Population and Respondent Sample

In Missouri, there were 496 public high schools at the time of this study serving students in Grades 9 to 12 and 10 to 12. Of these high schools, the principal had served as head principal for more than 3 years in 313 schools. These 313 schools were selected as the population for this study. The high schools included in the study were located throughout the state, and they represented a variety of sizes in urban, suburban, and rural settings. The principals of the 313 schools were asked by e-mail to participate in the study. In all, 155 principals agreed to participate, and of the 155 schools, teachers from 131 schools provided usable responses to the leadership surveys.

Instrumentation

Student achievement data were analyzed using test results from MAP. The MAP test is Missouri's high-stakes, performance-based assessment system used to measure student achievement and is administered annually by state mandate to all students at selected benchmark grade levels in Missouri public schools. At the time of this study, the science and mathematics subtests were administered to 10th graders and the communication arts and social studies subtests were administered to 11th graders. The MAP test assessed a broad range of student achievement, including basic skills, critical thinking, and problem solving. The test was aligned to the Missouri state curricular frameworks (Missouri Department of Elementary and Secondary Education, 2008).

Three types of test items are used on the MAP test to evaluate student achievement: multiple-choice questions that require students to select the correct answer; short-answer, constructed-response items that require students to supply (rather than select) an appropriate response; and performance events that require students to work through more complicated problems or issues (Missouri Department of Elementary and Secondary Education, 2008).

In addition to individual test results, local schools receive a report of their MAP Performance Index (MPI); a composite score that is used as a measure of a school's overall effectiveness in teaching the academic standards that were adopted by the State Board of Education. The MPI produces a single composite number that represents the performance of every student in all MAP achievement levels in a tested subject. For purposes of this study, the MPI results from the most recent 3 years of testing were averaged to determine a single composite score for each subject area.

Two instruments were used to collect quantitative data regarding teachers' perceptions of principal leadership behavior. The Audit of Principal Effectiveness (APE) adapted from Valentine and Bowman (1988) was used to assess one factor of principal managerial leadership and to assess two factors of principal instructional leadership. The three factors are described in the following paragraphs. A copy of the three factors used from the APE and their respective items and corresponding Cronbach's alpha coefficients may be found in Appendix A.

For the purposes of this study, the interactive processes factor from the organizational environment domain of APE was used to measure managerial leadership behavior. The interactive processes factor measures the following behaviors: the principal organizes tasks and personnel for the effective day-to-day management of the school, including providing appropriate information to staff and students, developing appropriate rules and procedures, and setting the overall tone for discipline in the school (Bowman & Valentine, 1984).

Principal instructional leadership was also measured by APE (Valentine & Bowman, 1988). The two factors from the educational program domain were used to measure instructional leadership behavior. The factors were instructional improvement and curricular improvement. Instructional improvement measures the degree to which the principal positively influences the instructional skills present in the school through clinical supervision, knowledge of effective schooling, and commitment to quality instruction. Curricular improvement measures the degree to which the principal promotes an articulated, outcome-based curriculum through diagnosis of student needs and systematic program review and change.

Principal transformational leadership was measured by the Principal Leadership Questionnaire (PLQ) adapted from Jantzi and Leithwood (1996). The six factors from the 1996 instrument and a brief description of each are listed below.

- *Identifying and articulating a vision:* Behavior on the part of the principal aimed at identifying new opportunities for his or her school leadership team and developing, articulating, and inspiring others with his or her vision of the future.
- *Providing an appropriate model:* Behavior that sets an example for school leadership team members to follow consistent with the values the principal espouses.
- *Fostering the acceptance of group goals:* Behavior aimed at promoting cooperation among school leadership team members and assisting them to work together toward common goals.

- *Providing individualized support:* Behavior that indicates respect for school leadership team members and concern about their personal feelings and needs.
- *Providing intellectual stimulation:* Behavior that challenges school leadership team members to reexamine some of the assumptions about their work and rethink how it can be performed.
- *Holding high performance expectations:* Behavior that demonstrates the principal's expectations for excellence, quality, and high performance on the part of the school leadership team (Jantzi & Leithwood, 1996).

A copy of the survey instrument and its items, grouped by factor with corresponding Cronbach's alpha coefficients, may be found in Appendix B.

Data Collection

An initial contact was made by e-mail with the public high school principals who had served as head principals in their current schools for at least 3 years. The e-mail contact described the study, outlined expectations, assured confidentiality, and invited participation. A total of 155 principals indicated their willingness to participate in the study.

The principal was asked to provide the e-mail addresses of the science, mathematics, social studies, and communication arts teachers in the building who had taught at least 3 years while the current principal was the school's leader. A total of 1,038 teachers were randomly selected for inclusion in the study using the proportionate sampling process described below.

- If the high school had less than 10 core area teachers, 100% of the teachers were selected for inclusion.
- If the high school had at least 10, but less than 20 core area teachers, 50% of the teachers were selected for inclusion.
- If the high school had at least 20, but less than 40 core area teachers, 25% of the teachers were selected for inclusion.
- If the high school had 40 or more core area teachers, 15% of the teachers were selected for inclusion.

Each selected teacher was then contacted by e-mail to describe the study, outline expectations, assure confidentiality, and invite participation. Each teacher was invited to indicate his or her willingness to participate in the study by replying to the e-mail with responses to a questionnaire that was included. Each questionnaire contained a school code number for temporary identification purposes to link the respondent to the appropriate school. The survey included short demographic questions, and 48 questions measuring teacher perceptions of principal managerial, instructional, and transformational leadership. Teachers were asked to select from a 6-point Likert-type scale the degree to which the statement described their respective principal. The Likert-type scale ranged from *strongly disagree* to *strongly agree*. A total of 443 teachers from

131 schools responded with usable surveys. The 443 responses comprised 44.1% of the total number of teachers invited to participate in the study. All schools included in the study, including even the smallest schools, had to have at least two respondents who completed usable survey returns. The number of returns ranged from 2 to 10 per school, with an obvious pattern of more returns from the larger schools.

Demographic Data

Of the 131 schools included in the study, 22% were in city or suburban settings and 78% were in small town or rural settings. Student enrollment ranged from 43 to 2,456 students, with a mean of 536.93 students per school. School socioeconomic status (SES) ranged from 3% of students qualifying for free or reduced lunches to 75% of students qualifying for free or reduced lunches. Data about gender, highest educational level attained, total number of years experience as a head principal, and number of years as a head principal in the current building for each of the 131 principals are provided in Appendix C.

Statistical Findings

The statistical findings from the data analyses are reported in the following sections. The findings are organized by research question.

Relationships Between Principal Demographics and Leadership Factors

Pearson product-moment (zero-order) correlation coefficients were calculated for the relationships between principal demographic variables and the principal leadership factors measuring managerial leadership, instructional leadership, and transformational leadership.

Table 1 contains the correlation matrix for the Pearson product-moment correlations. Three of the principal demographic variables, gender, total years experience, and years experience in the current building, had no significant zero-order correlations with any of the nine principal leadership factors. The principal education level demographic variable had significant correlations with all nine of the principal leadership factors.

Differences in Student Achievement Mean Scores

For each principal leadership factor, the schools were sorted in quartiles. Analysis of variance was used to test for significant differences in student achievement on each of the four content area tests. Quartile 1 represented the schools in the lower 25% of the respective principal leadership factor; Quartile 4 represented the schools in the upper 25% of the respective principal leadership factor. For comparison purposes, the student achievement score means on all four subtests were calculated for each principal

Table 1. Correlations: Principal Demographic Variables and Factors of Principal Leadership ($n = 131$)

Leadership Factor	Gender	Total Years Experience	Years Building Experience	Educational Level
Managerial				
Interactive processes	–0.017, $p = .849$	–0.050, $p = .568$	–0.010, $p = .910$	0.227, $p = .009$
Instructional				
Instructional improvement	0.038, $p = .665$	–0.066, $p = .949$	0.049, $p = .576$	0.285, $p = .001$
Curricular improvement	–0.030, $p = .736$	–0.033, $p = .712$	0.030, $p = .732$	0.335, $p = .001$
Transformational				
Developing vision	–0.012, $p = .888$	–0.075, $p = .392$	–0.016, $p = .856$	0.285, $p = .001$
Providing A model	–0.019, $p = .835$	–0.064, $p = .468$	0.006, $p = .946$	0.217, $p = .013$
Fostering goals	0.007, $p = .937$	–0.068, $p = .442$	0.019, $p = .831$	0.280, $p = .001$
Providing support	0.034, $p = .696$	–0.038, $p = .663$	0.055, $p = .536$	0.223, $p = .010$
Intellectual stimulation	–0.010, $p = .912$	–0.021, $p = .815$	0.017, $p = .843$	0.299, $p = .001$
Performance expectations	–0.022, $p = .801$	0.015, $p = .863$	0.034, $p = .701$	0.271, $p = .002$

leadership quartile. A Tukey post hoc analysis was used to identify differences in student achievement on each of the four subtests across each of the nine leadership factors.

Table 2 contains the results of the analyses, indicating that significant differences across quartiles were found for each leadership factor when analyzed for all tested content areas. Only those differences found significant for *all four* content areas are provided in Table 2. It is evident that student achievement is consistently higher in schools where principals are perceived to have more leadership competence than schools led by principals perceived as less competent. Significant differences were found for each of the nine factors tested. With such an overwhelming amount of evidence, it is clear that teachers in this study perceived that principals in schools with higher levels of achievement are more competent than principals in schools with lower levels of student achievement.

Linear Relationships Between School and Principal Demographics, Principal Leadership Factors, and Student Achievement

Two regression equations were estimated for each subtest of MAP. In both equations, student achievement was the dependent variable; in the first equation, the school and principal demographics served as the independent variables, whereas in the second

Table 2. Significant Differences in Mean Achievement Scores when High Schools Are Sorted Into Quartiles for Each Leadership Factor ($p < .05$)

Leadership Factor	Quartiles	Significantly Greater Than	Quartiles
Managerial leadership			
Interactive processes	4, 3	>	1
Instructional leadership			
Instructional improvement	4, 3, 2	>	1
Curricular improvement	4	>	1, 2
	3, 2	>	1
Transformational leadership			
Identifying a vision	4	>	1, 2, 3
	3, 2	>	1
Providing a model	4	>	1, 2
	3	>	1
Fostering goals	4, 3, 2	>	1
Providing support	4, 3, 2	>	1
Providing stimulation	4, 3, 2	>	1
High expectations	4	>	1, 2
	3	>	1

Note. Quartiles: 4 = upper quartile; 3 = third quartile; 2 = second quartile; 1 = lowest quartile.

equation, the nine principal leadership factors were added as additional variables. Entering the school, community, and principal demographics first produced an estimate of the relationship between the demographics and student achievement. Entering the principal leadership factors second produced an estimate of the relationship between the leadership factors and student achievement above and beyond the relationship between the demographics and student achievement.

Table 3 contains the results of the first model, which estimated the relationship between school, community, and principal demographics and student achievement. The demographics model alone accounted for a significant amount of the variability of student scores on all four subtests. Of the variables in the model, 13% of the variance in language arts scores, 27% of the variance in mathematics scores, 28% of the variance in science scores, and 25% of the variance in social studies scores were explained. Examination of the coefficients of Model 1 revealed that principal educational level explained variability in all four subtests; school SES explained variability in mathematics, science, and social studies scores; and principal gender explained variability in social studies scores.

Table 4 contains the results of the second model, which estimated the relationship between the demographic variables and principal leadership factors with student achievement scores. The second model accounted for a significant amount of the

Table 3. Model 1: Multivariate Regression of Selected Demographics on Student Achievement (n = 131)

	Language and Arts	Math	Science	Social Studies
Model summary				
Adjusted R^2	.132	.270	.280	.253
Analysis of variance				
F	3.863	7.884	8.213	7.298
Significant *F*	.001	.000	.000	.000
Significance by variable				
Principal variables				
Gender	.299	.093	.321	**.040**
Total principal experience	.503	.211	.408	.425
Principal experience in building	.918	.232	.273	.275
Education level	**.000**	**.003**	**.001**	**.000**
School variables				
Enrollment	.623	.941	.777	.618
Socioeconomic status	.330	**.000**	**.000**	**.002**
Community type	.151	.101	.031	.134

Note: Significant at the .05 or higher level.

variability on all four subtests: 38% of the variance in language arts scores, an increase of 25% over Model 1; 36% of the variance in mathematics scores, an increase of 9%; 41% of the variance in science scores, an increase of 13%; and 39% of the variance in social studies scores, an increase of 14% over Model 1.

Examination of Model 2 regression estimates (Table 4) indicate that the demographic factors principal education level, principal gender, and school SES explained variance in student achievement on one or more subtests. The principal leadership factors "instructional improvement," "curriculum improvement," "identifying a vision," "providing a model," and "fostering group goals" also explained variance in student scores on one or more subtests.

Discussion of Findings

The literature on effective principal behavior continues to address two broad issues: Do principals influence student achievement, either directly or indirectly? If so, what elements of principal behavior are most influential? This study attempted to provide insight into the two central questions by studying a sample of core content area teachers and their principals in Missouri high schools. Four major findings of the study are discussed in the following sections.

Table 4. Model 2: Demographics and Principal Leadership on Student Achievement (n = 131)

	Language and Arts	Math	Science	Social Studies
Model summary				
Adjusted R^2	.382	.361	.413	.393
Adjusted R^2 change	.250	.091	.133	.140
Analysis of variance				
F	6.532	5.580	6.715	6.271
Significant F	.000	.000	.000	.000
Significance by variable				
Principal variables				
Gender	.116	.058	.252	**.016**
Total principal experience	.939	.527	.892	.704
Principal experience in building	.699	.357	.374	.340
Education	**.028**	.137	**.036**	**.048**
School variables				
Enrollment	.163	.652	.886	.407
Socioeconomic status	.745	**.001**	**.000**	**.028**
Community type	.248	.166	.074	.317
Leadership variables				
Interactive processes	.947	.828	.691	.547
Instructional improvement	**.008**	.460	.515	**.037**
Curricular improvement	.509	.709	**.046**	.702
Identifying a vision	**.019**	.068	**.021**	.300
Providing a model	**.023**	**.028**	**.005**	**.046**
Fostering group goals	**.044**	.626	.792	.673
Providing individualized support	.132	.648	.831	.868
Providing intellectual stimulation	.943	.789	.477	.798
Holding high expectations	.851	.409	.933	.346

Note: Significant at the .05 or higher level.

Principal Education Is Related to Perceived Effectiveness

An examination of the data revealed significant (p = .05) positive relationships between principal education level and all nine of the principal leadership factors (Table 1). In this study, principal education level was coded in five categories: 1 = master's degree only; 2 = master's degree plus hours; 3 = educational specialist degree; 4 = specialists plus hours; and 5 = doctorate degree. The data were grouped as categorical but treated for the purposes of this study as continuous data. They represented a continuum of educational level, from lowest to highest. In essence, the data represented the "amount of" or "degree of" education of each respondent.

The findings of this study appear to confirm conventional wisdom that increased education on the part of a principal increases his or her perceived effectiveness. Although some researchers have pointed out deficiencies in principal preparation programs, especially the need for standards (Furtwengler and Furtwengler, 1998; Jackson & Kelley, 2002) and increased screening for prospective administrators (Creighton, 2002; Muse & Thomas, 1991), others have found a link between principal preparation programs and principal effectiveness (Brewer, 1993; Gonzalez, Glasman, & Glasman, 2002). While there may be other principal variables that influence effectiveness, such as personal motivation, prior experiences, intelligence, or dedication, the findings from this study reinforce the notion that the principal's education level is associated with teachers' perception of the principal's effectiveness. Principals with greater levels of formal coursework preparation focusing on the principalship were perceived as more capable leaders for each of the nine leadership variables. As principal educational level increased, so did the teachers' perceptions of their principals' competence. The overwhelming evidence indicates that principals in this study who had more education were considered more effective leaders by their teachers. This finding is particularly interesting because the secondary principals in this study were required by state certification standards to have advanced coursework focusing specifically on secondary principal preparation, as compared with coursework in other forms of leadership such as central office administration, curriculum and instruction, or elementary school administration. In other words, this finding supports the importance of building level leadership preparation for secondary school principals.

Principal Leadership Behaviors Differ Significantly in Schools With Higher and Lower Levels of Student Achievement

Schools whose principals demonstrated the highest levels of competence (Quartile 4) had achievement scores significantly higher than schools whose principal demonstrated levels of competence placing them in the lowest quartile (Quartile 1). This finding was present for *each* of the nine leadership factors (Table 2). Likewise, achievement in schools whose leaders demonstrated competence in Quartile 3 was significantly greater than achievement from schools in Quartile 1 for *each* of the nine variables. Therefore, it is evident that when schools were sorted by perceived leadership ability, those schools with principals in the upper half of abilities for each variable had achievement significantly higher than schools with principal leadership in the lower quartile.

There was also a significant difference in student achievement between schools sorted into Quartile 2 compared with Quartile 1 based on principal leadership for six of the nine factors studied. This underscores how noticeably different achievement was in schools led by principals in Quartile 1 compared with all the other schools. Clearly, schools with principals who are perceived as more competent have higher levels of achievement than schools with principals who are perceived as less competent. We realize that these differences do not indicate cause and effect but rather show patterns about leadership and achievement without respect to community type, SES, or other variables that might influence student achievement.

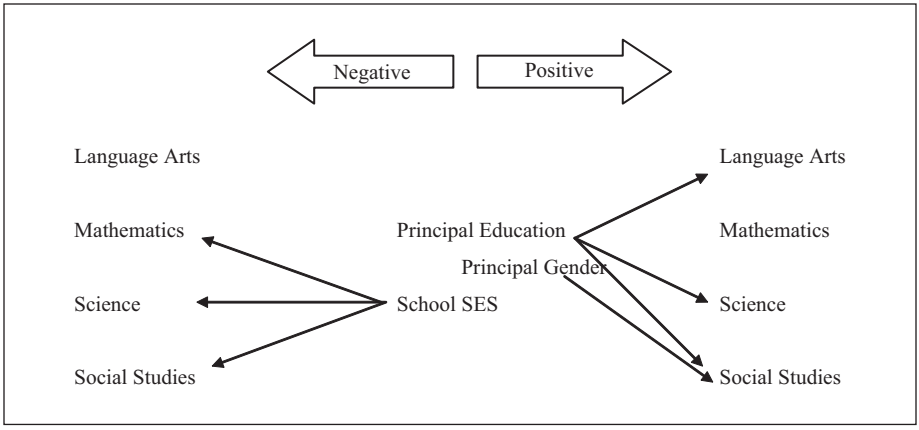

Figure 1. Regression results: Demographic variables and student achievement
Note. SES = socioeconomic status.

School and Principal Demographics Are Linked to Student Achievement

An examination of the regression equation estimates (Table 4) revealed that three demographic variables explained variance in student achievement scores. Principal education level explained variance in student scores on the language arts, science, and social studies subtests; principal gender explained variance in student scores on the social studies subtest; and school SES explained variance in student scores on mathematics, science, and social studies subtests. A visual depiction of these relationships is presented in Figure 1. Factors on the right side of the visual are positively influenced by the variables; those on the left side are negatively influenced.

The results of the regression analyses confirm the notion that increased levels of principal education are positively related to student achievement. This study supports others who indicate that principal preparation programs are vital foundations if principals are to lead schools that positively impact student academic success (Heck & Hallinger, 1999, chap. 7; Williamson, 1995). Gonzalez et al. (2002) asserted, "However ludicrous to some and uncomfortable to others it may seem, we believe in the existence of a linkage between principal preparation programs and student achievement" (p. 265). This research confirms that linkage among the 131 high schools in this study.

Principal gender explained variance for one of the four subtest scores. On the absence of a more consistent pattern of findings, we are not able to draw logical conclusions. Although secondary administrative positions continue to be dominated by males (Reynolds, White, Brayman, & Moore, 2008), research does imply that relationships exist between the gender of leaders and the perceived effectiveness of their leadership (Adams & Hambright, 2004). The findings from this study do not provide conclusive evidence of a consistent relationship.

	Language Arts	Mathematics	Science	Social Studies
Instructional Improvement	•			•
Curricular Improvement			•	
Providing a Model	•	•	•	•
Identifying a Vision	•		•	
Fostering Group Goals	•			

Figure 2. Linear regressions: Principal leadership factors explaining variance on student test scores

This study found that school SES explained variance for three of the four student achievement scores. Cuban (1988) and others have noted that principals operate in different contexts and that these contexts place constraints on leadership behavior. The results of this study reinforce the hypothesis that a variety of school contextual factors, such as school SES, shape the particular needs for leadership that may exist within a school. Hallinger and Heck (1996) cautioned, "Context, particularly facets of the school's socio-economic environment, appears to influence the type of leadership that principals exercise" (pp. 37-38).

Principal Leadership Is Linked to Student Achievement

Linear regression techniques were also used to examine possible relationships between principal leadership factors and student achievement. When the nine leadership factors were combined with the school and principal demographic variables (Table 4), the model produced an estimate of the relationship between the nine leadership factors and student achievement above and beyond the relationship between demographic variables and student achievement. Five of the nine leadership factors explained variance on student test scores while accounting for school and principal demographic variables. Figure 2 visually depicts the patterns of significant relationships between leadership factors and student achievement.

One factor of instructional leadership, instructional improvement, explained variance in language arts and social studies scores, whereas the other factor, curricular improvement, explained variance in science scores. These two factors of instructional leadership refer to the influence the principal has on instruction and curricular issues in the school through a command of the knowledge base, effective supervision, and a commitment to quality instruction based on an articulated, outcome-based curriculum (Valentine & Bowman, 1988).

Three transformational leadership factors most frequently explained variance in student achievement scores. "Fostering group goals" explained variance in language arts scores, whereas "identifying a vision" explained variance in language arts and science scores and "providing a model" explained variance in student scores in all four subject areas. These three transformational factors include behaviors by the principal that set an example for staff members to follow consistent with the values the leader espouses, inspiring others with his or her vision of the future, and fostering a group set of goals that transcend personal ambitions (Jantzi & Leithwood, 1996). These factors are really about the competence of the principal to lead the school with a vision and a mission. In the high schools in this study, when the principal modified leadership behaviors, established a collaborative direction, and generated support to move forward in new directions, student achievement was higher.

A Model for Effective Principal Leadership

The findings of this study clearly indicate that leadership behaviors of high school principals can influence student achievement. All nine of the tested principal leadership factors in this study were significantly associated with achievement to some degree. Five of the principal leadership factors explained variance in student achievement scores in a regression equation, and each of the factors were linked to significant differences in school achievement scores. Therefore, this analysis suggests that the nine factors form the basis for a conceptual model (Figure 3).

Principal educational level was significantly related to all nine of the leadership factors, suggesting that the principal's education level affects teachers' perceptions of the principal's effectiveness as a leader. Additionally, the educational level of the principal was associated with three of the four student achievement subtest scores when school and community variables were controlled in a linear regression. Therefore, principal education level is a component of the conceptual model.

Principals also operate within school and community contexts that place constraints on leadership behavior and affect student achievement. SES clearly affects school outcomes; but obviously, some schools are highly successful in spite of contextual challenges. In this study, five of the nine principal leadership factors were associated with student achievement scores when school SES was accounted for in linear regression estimates. While school context can influence student academic success, principal leadership can ameliorate some of the impact of contextual challenges.

We propose a broad conceptual model of effective principal leadership behavior within school and community contexts (Figure 3). The three distinct principal leadership perspectives (managerial, instructional, and transformational) that emerged over the latter part of the 20th century were examined as separate models in this study. However, results of the study indicate that no single set of leadership behaviors can be discerned to be effective to the exclusion of the others. All nine of the principal leadership factors exhibited an effect on student achievement scores to a varying degree. Additionally, the nine factors displayed significant relationships among each other (Prater, 2004),

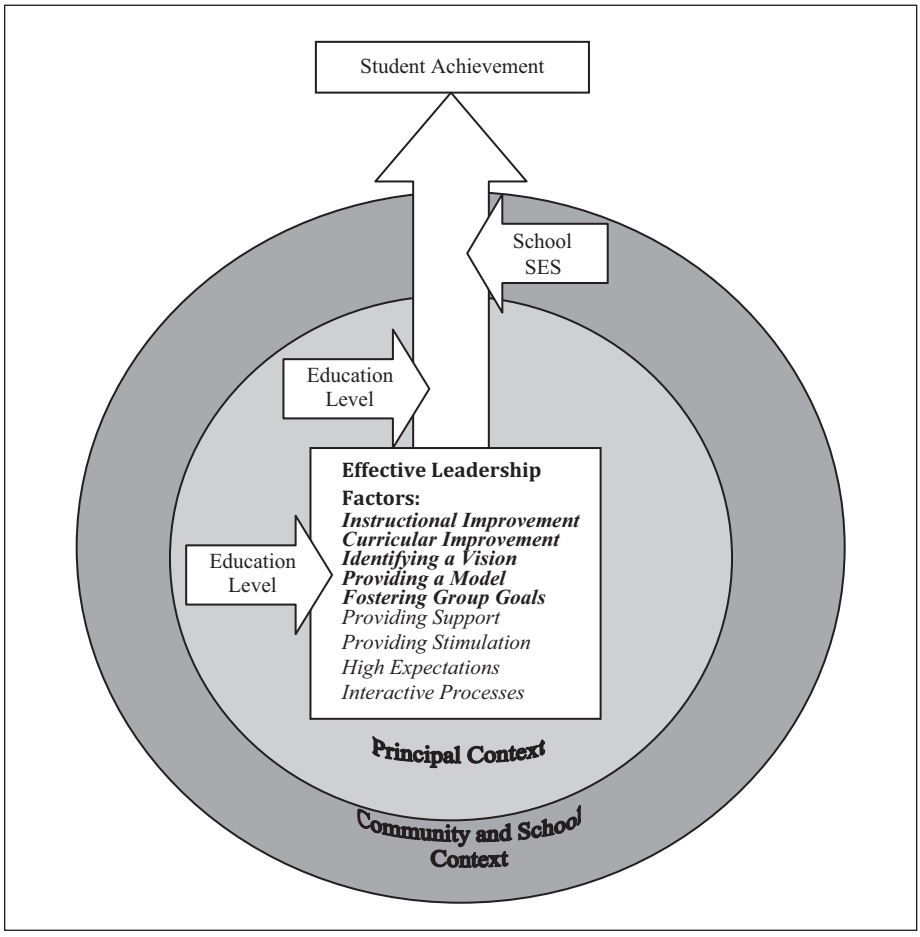

Figure 3. A model for principal impact on student achievement in a contextual setting

Note. SES = socioeconomic status.

indicating that they form an overall valid conceptual model of effective principal leadership.

Our model portrays each of the nine leadership factors as influences on student achievement. In our study, five of the nine factors were found to be significant in both the tests of differences and the regression. Those five factors are shown in our model in boldface because they influence student outcomes to a greater degree than the others. The principal leadership factors operate within a context of demographic variables that influence principal effectiveness. The principal and demographic components of the model operate within the larger context of the school and community variables that exert influence on the student learning processes.

In this conceptual model, SES is the only significant school demographic variable to influence achievement. Educational level, however, was related to perceived principal competence on each of the nine leadership factors, and it was significantly related to student achievement scores in the regression equation, therefore, educational level is included twice in the model.

Discussion of Findings for High School Principals

The results from this study should serve as encouragement to practitioners and others interested in the effect of school leadership on student achievement since the preponderance of evidence support an affirmative answer to the question "Can principal leadership enhance student achievement?" It is clear that principals who were perceived to be more competent influenced student achievement in spite of the school and community contexts in which they operated. The study points to several areas of competence that can serve to inform principals who wish to become more effective.

All nine factors of principal leadership were linked to student achievement to some degree, indicating that the effective principal will exhibit traits found in the previously described model. Day-to-day managerial skills such as effectively organizing tasks and personnel, developing rules and procedures, evaluating employees, and providing appropriate information to staff and students are vital to a successful school operation and cannot be overlooked when discussing a comprehensive model of principal leadership. Without maintaining student discipline in the school, for example, few principals are perceived as effective leaders. The day-to-day operation of the school is essential to overall school success. Teachers, students, and the extended school community must have confidence that the daily operation of the school will proceed smoothly. The ship's sails must be trimmed and all hands must be on deck effectively organizing and fulfilling daily tasks. That consistent organizational efficiency is foundational to an effective school.

The findings from this study also support the importance of competence in instructional and curriculum leadership. Just as the lawyer must be well versed in legislative and case law, the principal must have a strong working knowledge of best instructional and curricular practices. There is a certain core knowledge that separates the profession of education from other professions. The two factors of instructional and curricular leadership refer to the influence the principal has on issues in the school through a command of the knowledge of and commitment to best practices, and a participative leadership to support the implementation of those practices.

Effective principals know about and understand teaching and learning theory, and they are knowledgeable about the latest educational trends. Effective principals are available to teachers to help critique these new trends and teaching practices and to determine their applicability to the classroom. It can be argued that a primary objective for principals is to collaboratively, with teachers, examine and analyze classroom engagement and learning and develop strategies for instruction.

Principals today make a difference in student success by emphasizing student achievement. The instructional leader gives attention to coordinating the curriculum

and monitoring student progress. Hallinger and Heck found that effective principals coordinate curriculum by ensuring that students receive appropriate instruction and monitoring student progress both within individual classrooms and across grades. Especially in this day of increased accountability, the effective principal works with teachers to read and interpret district-standardized and criterion-referenced test information, as well as develop intervention procedures to support students' strengths and to remediate weaknesses.

Transformational leadership practices, which were found in this study to have the greatest relationship with student achievement, depend on social interactions and relationships. Leithwood (1994) highlighted "people effects" as a cornerstone of the transformational leadership model and suggested that although "first-order" activities focusing on improving school achievement outcomes are important, effective principals are also involved in "second-order" changes that facilitate the growth of teachers through establishing a vision and emphasizing a collaborative approach to decision-making and governance processes. Such models acknowledge that principals do not affect individual students directly in the manner that teachers do through classroom instruction but that activities of the principal have a trickle-down effect on teachers and students (Leithwood, Louis, Anderson, & Wahlstrom, 2004; Marzano, 2000; Waters, Marzano, & McNulty, 2002).

Three transformational leadership factors, "providing a model," "identifying a vision," and "fostering group goals" most frequently explained student achievement scores in this study. The three factors involve behavior on the part of the principal that sets an example for staff members to follow consistent with the values the leader espouses, inspiring others with his or her vision of the future, and fostering a group set of goals that transcend personal ambitions. Principals exhibiting these factors are able to genuinely interact with people to lead by doing rather than by simply telling. For example, during group and individual encounters that require problem-solving skills, transformational principals demonstrate the value of examining multiple perspectives and model problem-solving techniques that others can use in their own work (Jantzi & Leithwood, 1996).

The transformational principal is not the primary source of expertise. He or she uses the expertise and leadership of teachers and gives them the sense that they are an integral part of the success of the school. Inherent in this approach is the principal's belief that collective decision making is a stronger response to solving the larger, nonroutine problems, while choosing to exercise managerial leadership skills to make routine decisions. This highlights the effective principal's ability to work collaboratively with staff in group problem solving (Leithwood & Mascall, 2008). Principals who are transformational spend a significant proportion of their time working collaboratively with staff to solve the key issues of school improvement. Transformational leaders invest significantly in the development of individuals, particularly teacher leaders. They build leadership capacity throughout the school and develop a culture of collaborative problem solving. They inspire through their personal efforts and their support and encouragement of others. Their daily behaviors communicate respect of others and expectations for success. Those observing the transformational leader see the fit between the leader, the collaborative decisions, and the school's vision.

Another key finding of this study involved the relationship of the educational level of the principal to school effectiveness. In this study of high school principals, the education level of principals was clearly linked to student achievement, regardless of school and community demographics. Bamburg and Andrews (1991) noted, "Research and experience leads us to believe that one's style is not changed easily: however, leaders can change their behaviors" (p. 178). An individual's personal values, beliefs, and that to which they are committed can evolve constructively through an expansion of one's knowledge base. As principals, or principals-to-be, build a deeper and more encompassing understanding of leadership, effective school practices, and change processes, and it is logical that their personal perspective will mature. Therefore, it is not surprising that among the 131 high school principals in this study, faculty members identified the most effective principals as those with the most formal education. Noteworthy is the fact that educational level was a significant factor, but neither years of experience as a principal nor years of experience in the current school were significantly linked to student achievement data. Clearly, the effective high school principal of today must be concerned with the ongoing development of a substantive knowledge about leadership, best educational practices, and change. In particular, today's high school principal must understand the influences of his or her behavior on achievement, including the nine leadership factors described in this study.

Appendix A

The Audit of Principal Effectiveness

Factor: Interactive processes. The principal organizes tasks and personnel for the effective day-to-day management of the school, including providing appropriate information to staff and students, developing appropriate rules and procedures, and setting the overall tone for discipline in the school. This factor has a reported reliability coefficient (Cronbach's alpha) of .92.

1. The principal keeps teachers informed about those aspects of the school program of which they should be aware.
2. When the principal provides teachers with the information about school operations, the information is clear and easily understood.
3. When teachers are informed of administrative decisions, they are aware of what the principal expects of them as it relates to the decision.
4. The principal is able to organize activities, tasks, and people.
5. The principal develops appropriate rules and procedures.
6. The principal uses systematic procedures for staff appraisal, for example, retention, dismissal, promotion procedures.
7. The principal establishes the overall tone for discipline in the school.
8. The principal establishes a process by which students are made aware of school rules and policies.

9. The principal communicates to teachers the reasons for administrative practices used in the school.

Factor: Instructional improvement. The principal influences positively the instructional skills present in the school through clinical supervision, knowledge of effective schooling, and commitment to quality instruction. This factor has a reported reliability coefficient (Cronbach's alpha) of .86.

1. The principal is knowledgeable of the general goals and objectives of the curricular area.
2. The principal is knowledgeable of the varied teaching strategies teachers might appropriately use during instruction.
3. The principal possesses instructional observation skills that provide the basis for accurate assessment of the teaching process in the classroom.
4. The principal actively and regularly participates in the observations and assessment of classroom instruction, including teaching strategies and student learning.
5. The principal has effective techniques for helping ineffective teachers.
6. The principal maintains an awareness and knowledge of recent research about the learning process.
7. When criticizing poor practices, the principal provides suggestions for improvement.
8. The principal is committed to instructional improvement.

Factor: Curriculum mprovement. The principal promotes an articulated, outcome-based curriculum through diagnosis of student needs and systematic program review and change. This factor has a reported reliability coefficient (Cronbach's alpha) of .90.

1. The principal promotes the development of educational goals and objectives that reflect societal needs and trends.
2. The principal promotes the diagnosis of individual and group learning needs of students and application of appropriate instruction to meet those needs.
3. The principal administers a schoolwide curricular program based on identification of content goals and objectives and the monitoring of student achievement toward those goals and objectives.
4. The principal participates in instructional improvement activities such as program and curriculum planning and monitoring of student learning outcomes.
5. The principal uses objective data such as test scores to make changes in curriculum and staffing.
6. The principal has a systematic process for program review and change.
7. The principal encourages articulation of the curricular program. (Valentine & Bowman, 1986)

Appendix B
The Principal Leadership Questionnaire

Factor descriptors.

1. *Identifying and articulating a vision:* behavior on the part of the principal aimed at identifying new opportunities for his or her school staff members and developing, articulating, and inspiring others with his or her vision of the future. This factor has a reported reliability coefficient (Cronbach's alpha) of .88.
2. *Providing an appropriate model:* behavior on the part of the principal that sets an example for the school staff members to follow consistent with the values the principal espouses. This factor has a reported reliability coefficient (Cronbach's alpha) of .86.
3. *Fostering the acceptance of group goals:* behavior on the part of the principal aimed at promoting cooperation among school staff members and assisting them to work together toward common goals. This factor has a reported reliability coefficient (Cronbach's alpha) of .80.
4. *Providing individualized support:* behavior on the part of the principal that indicates respect for school staff members and concern about their personal feelings and needs. This factor has a reported reliability coefficient (Cronbach's alpha) of .82.
5. *Providing intellectual stimulation:* behavior on the part of the principal that challenges school staff members to reexamine some of the assumptions about their work and rethink how it can be performed. This factor has a reported reliability coefficient (Cronbach's alpha) of .77.
6. *Holding high performance expectations:* behavior that demonstrates the principal's expectations for excellence, quality, and high performance on the part of the school staff. This factor has a reported reliability coefficient (Cronbach's alpha) of .73.

Questionnaire items. The principal has

1. Both the capacity and the judgment to overcome most obstacles
2. Commanded respect from everyone on the faculty
3. Excited faculty with visions of what we may be able to accomplish if we work together as a team
4. Made faculty members feel and act like leaders
5. Given the faculty a sense of overall purpose for its leadership role
6. Led by "doing" rather than simply by "telling"
7. Symbolized success and accomplishment within the profession of education
8. Provided good models for faculty members to follow
9. Provided for our participation in the process of developing school goals
10. Encouraged faculty members to work toward the same goals

11. Used problem solving with the faculty to generate school goals
12. Worked toward whole faculty consensus in establishing priorities for school goals
13. Regularly encouraged faculty members to evaluate our progress toward achievement of school goals
14. Provided for extended training to develop my knowledge and skills relevant to being a member of the school faculty
15. Provided the necessary resources to support my implementation of the school's program
16. Treated me as an individual with unique needs and expertise
17. Taken my opinion into consideration when initiating actions that affect my work
18. Behaved in a manner thoughtful of my personal needs
19. Challenged me to reexamine some basic assumptions I have about my work in the school
20. Stimulated me to think about what I am doing for the school's students
21. Provided information that helps me think of ways to implement the school's program
22. Insisted on only the best performance from the school's faculty
23. Shown us that there are high expectations for the school's faculty as professionals.
24. Not settled for second best in the performance of our work as the school's faculty.

(Adapted from Jantzi & Leithwood, 1996, pp. 533-534. Used by permission.)

Appendix C

Head Principal Demographic Data (n = 131)

Category	Variability Code for Analysis	Number	Percentage
Gender			
Male	0	104	79.4
Females	1	27	20.6
Educational level attained			
Masters degree	1	9	6.9
Masters degree + hours	2	44	33.6
Educational specialist	3	35	26.7
Educational specialist + hours	4	19	14.5
Doctorate	5	24	18.3
Total years head principal experience			
4-10	1	94	71.8
11-20	2	28	21.3
>20	3	9	6.9
Years principal head experience in current school			
4-10	1	112	85.5
11-20	2	18	13.7
>20	3	1	0.8

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