
Exploring the Principal's Contribution to School Effectiveness: 1980–1995*

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ABSTRACT

This article reviews research from 1980–1995 exploring the relationship between principal leadership and student achievement. The focus is on the substantive findings that emerged from the review. Earlier reports focused on conceptual and methodological issues. The general pattern of results drawn from this review supports the belief that principals exercise a measurable, though indirect effect on school effectiveness and student achievement. While this indirect effect is relatively small, it is statistically significant and supports the general belief among educators that principals contribute to school effectiveness and improvement. Moreover, the review suggests that previously described discrepancies in research results may be explained by the conceptual and methodological tools employed by researchers. We also emphasize the limitations of these studies. Even taken as a group they do not resolve the most important theoretical and practical issues concerning the means by which principals achieve an impact on school outcomes and how contextual forces influence the exercise of leadership in the schoolhouse. It is concluded that while substantial progress has been made over the past 15 years in understanding the principal's contribution to school effectiveness, the most important scholarly and practical work lies ahead. In addition to this qualified, we assert that scholars are better equipped conceptually and methodologically to address these challenges than in 1980.

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One of the fundamental tenets of research and practice in the school improvement community concerns the apparently powerful impact of principals on processes related to school effectiveness and improvement. Research findings from diverse countries and school contexts draw a similar conclusion. Schools that make a difference in students' learning are led by principals who make a significant and measurable contribution to the effectiveness of staff and in the learning of pupils in their charge (Andrews & Soder, 1987; Bossert, Dwyer, Rowan, & Lee, 1982; Murphy & Hallinger, 1992).

The international chorus of support for this belief has, however, occasionally been broken by discordant voices questioning the empirical validity of this claim (Miskel, 1982; Rowan, Dwyer, & Bossert, 1982). Despite the supposedly dispassionate perspective of the scholarly community, those who call this particular dogma into question have not always received a fair hearing. At a professional meeting some years ago Professor Cecil Miskel (1992) presented a rigorous assessment of the empirical basis for claims of principal effects. His presentation was subsequently derided by a senior scholar whose negative critique was based not on the quality of Miskel's analysis, but on Miskel's questioning of the orthodox position.

More recently, research in the Netherlands further explored the basis for claims concerning principal effects (van de Grift, 1987, 1989, 1990). Expecting to confirm positive findings of principals from North America and the United Kingdom in the Netherlands, van de Grift and colleagues conducted their own empirical studies (van de Grift, 1989, 1990). Surprisingly, however, they found few significant effects of principal leadership on student achievement or school outcomes.

They speculated on the basis of this discrepancy in results in the Netherlands. Their explanations included context differences in school settings, variation in the principal's role, alternative theoretical models, and methodological differences in how analyses were conducted. This discrepancy has presented a puzzle for researchers. The puzzle grows into a challenge when we consider that the actual results of empirical studies in the U.S. and the U.K. are not nearly as consistent in size and direction as rhetoric would have us believe (Bossert et al., 1982; Bridges, 1982; Cuban, 1988; Hallinger & Leithwood, 1994; Miskel, 1982; Rowan et al., 1982).

In this article, we review the empirical literature on principal effects that emerged during the period from 1980 to 1995. This was a period of significant activity in policy, research and practice in educational administration. Stimulated by early studies of school effectiveness and a matur-

ing research base in school improvement, researchers turned their attention to examining the impact of school administrators, particularly principals. A series of research reviews appearing early in the 1980s further encouraged researchers to focus on the effects of principal leadership (Bossert et al., 1982; Bridges, 1982; Leithwood & Montgomery, 1982; Murphy, Hallinger, & Mitman, 1983; Shoemaker & Fraser, 1981).

The purpose of the current review is to examine the body of empirical research on principal effects conducted between 1980 and 1995. We seek to understand what has been learned about the substance of claims that principals' leadership practices make a difference in school effectiveness. We also explore explanations for the discrepant findings concerning principal effects that have emerged internationally over the two past decades.

This review builds explicitly on two related papers in which we reviewed this same body of studies (Hallinger & Heck, 1996a, 1996b). The earlier reviews focused on conceptual (Hallinger & Heck, 1996a) and methodological (Hallinger & Heck, 1996a) issues that emerged from this research. Little attention was given in those analyses to the means by which principal leadership appears to influence the school and its outcomes for students.

In this paper, we focus primarily on the *substantive findings* from empirical studies conducted during this period. We only address conceptual and methodological issues as they impinge on assessing the validity of the substantive results or help make sense of the pattern of findings. We believe the framework drawn from this knowledge base could form the basis of the next generation studies on the principal's role.

We begin the article by presenting the method for the review and briefly outlining the conceptual framework used to organize the review. We then discuss the substantive findings from the review. Finally, we suggest how the results from this latest period help frame the next generation of studies of principal effects.

METHOD OF THE REVIEW

Any attempt to integrate a body of research into a coherent framework that summarizes empirical, conceptual and methodological issues must begin with an acknowledgement of its limitations. First, while this review was conducted at a particular point in time, the field's conceptualization of organizational processes, including the school leadership construct, is constantly evolving. Thus, characterizations of the field that emerge from a single review focus on a target that is moving even as the review is

being conducted. This was certainly the case here as normative notions of principal leadership continue to evolve surprisingly rapidly in response to new environmental demands.

Second, we know of no universal paradigm or theory for examining organizational behavior that is valid in all societal or organizational contexts. This point is especially salient for the current review since we include studies conducted internationally and at different levels of schooling.

Third, a variety of frames have been proposed for studying school leadership (e.g., Leithwood, 1994; Ogawa & Bossert, 1995; Slater, 1995) as well as leadership more generally. This conceptual diversity has not, however, been borne out via substantial empirical inquiry. This presents a challenge for a review seeking to summarize the effects of educational leadership.

Conceptual diversity also came into play in another respect. As we shall note shortly, our decision to focus this review on quantitative studies of principal effects excluded some empirical explorations that would have incorporated quite different epistemological assumptions and conceptualizations of leadership (e.g., distributed leadership; see Heck & Hallinger, in press).

Finally, proposed theories often become problematic when they seek to model the actual detail and richness of life in organizations (Bossert et al., 1982; Hallinger & Murphy, 1986). The complexity of extra- and intra-organizational processes in schooling represents a challenge for researchers who seek to study causal relationships (Bossert et al., 1982; Boyan, 1988; Pitner, 1988). Social scientists who seek to develop valid theoretical models and apply appropriate analytic techniques to assess how those models work in the world confront a formidable set of tasks.

Within the context of these constraints, the approach taken in this review is to conduct a critical synthesis of the literature. We focus specifically on the substantive findings and interpreting their meaning for the field. We discuss methodological issues as far as they impinge on understanding trends in the substance of the findings.

Selection of Studies for Review

We began this review with the assumption that the number of studies to be included would not be so large as to require a sampling strategy (Bridges, 1982). This was borne out despite the fact that we conducted an extensive search for studies. We first searched the *ERIC* (Resources in Education) and *Current Journals in Education* (CJIE) databases. We used the resulting sources as well as our personal knowledge of published and presented research to identify additional studies.

Three criteria guided our selection of studies for review. First, we were interested in studies that had been designed explicitly to examine the school principal's beliefs and leadership behavior. The research must have clearly conceptualized and measured principal leadership as an independent variable. We did not require any specific conception of educational leadership for inclusion in the review.

Second, the studies also had to include an explicit measure of school performance as a dependent variable. Most often performance was measured in terms of student achievement data, but occasionally other definitions such as effectiveness were used. It was also our desire, though not a necessary condition for inclusion, to identify studies that examined the principal's impact on teacher and school level variables as mediating factors.

The dual focus on processes and outcomes reflects the priority that we assign to student outcomes as the goal for school improvement as well as to the importance of classroom and school-level variables in contributing to school effectiveness. We did not, however, include studies that examined principal impact on intervening variables if they did not also incorporate a measure of school outcomes. This criterion shifted the focus of the review towards quantitative studies of principal effects, as opposed to studies about the nature of the principal's work.

Third, given the growing interest in international perspectives on school improvement, we made an extra effort to seek out studies that examined the impact of principals conducted in a variety of countries. We were reasonably successful in attaining this goal. Eleven of the studies reviewed were conducted outside of the United States. Although we do not undertake comparative analysis in this chapter, we have included studies conducted in a diverse set of cultural contexts including the United States, Canada, Singapore, England, Netherlands, Marshall Islands, Israel, and Hong Kong.

Consequently, the review includes 40 published journal articles, dissertation studies, and papers presented at peer-reviewed conferences. We are reasonably confident that the chapter has captured most empirical studies of principal impact on school effectiveness disseminated internationally between 1980 and 1995. We owe particular debts to the earlier efforts of Bossert and colleagues (1982), Boyan (1988), Bridges (1982), Leithwood, Begley, and Cousins (1990), and Pitner (1988) for laying the groundwork for this review.

CONCEPTUALIZING THE PRINCIPAL'S ROLE IN SCHOOL EFFECTIVENESS

Pitner (1988) identified a range of approaches that could be used to study administrator effects through non-experimental research methods: direct-effects, antecedent-effects, mediated-effects, reciprocal-effects, and moderated-effects models (105–108). These models offer a comprehensive set of different perspectives for viewing the effects of the school context on administrative behavior and the influence of administrative behavior on the school and its outcomes.

Of course, these are not the only theoretical perspectives from which leadership can be studied (e.g., Ogawa & Bossert, 1995; Slater, 1995). Pitner's framework does, however, offer one useful means for conceptualizing and organizing studies on administrative effects. We adapted Pitner's framework for classifying the studies collected for this review (Figure 1).

We employed variations on three of these models to classify the studies: direct effects (i.e., where the principal's actions influence school

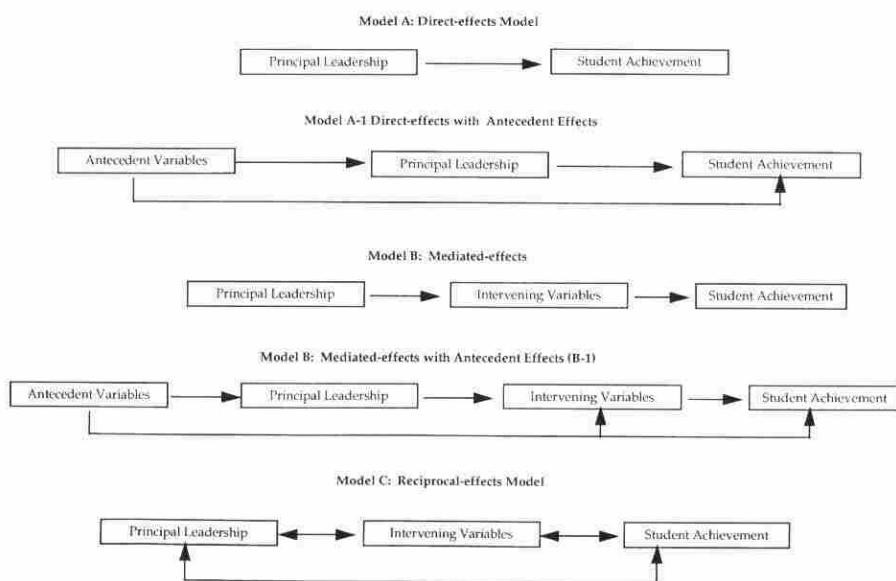


Fig. 1. Modeling principal effects on school effectiveness (adapted from Pitner, 1988, pp. 105–108).

outcomes); mediated effects (i.e., where principal actions affect outcomes indirectly through other variables); reciprocal effects (e.g., where the principal affects teachers and teachers affect the principal, and through these processes outcomes are affected). These theoretical frameworks can also be combined with the antecedent-effects model proposed by Pitner (1988). The simplest combination model integrates antecedent and direct-effects frameworks (see Figure 1, Model A-1). A more complex theoretical model results when antecedent effects are combined with the effects of leadership on in-school processes and indirectly on school outcomes (see Figure 1, Model B-1).

Using this conceptual framework, we categorized and analyzed the content of the empirical studies listed in Table 1. Working independently, we classified the studies by model. After comparing our completed schemes, we resolved several discrepancies and triangulated our results with previous reviews (Bridges, 1982; Erickson, 1967; Pitner, 1988). Note that Table 1 actually includes 41 studies. The additional study represents our revised analysis of data drawn from one of the studies that we reviewed (Braughton & Riley, 1991). In this case we re-analyzed the data using an alternative conceptual model (Table 1).

As is apparent from Table 1, the studies most frequently employed variations of direct-effects and mediated-effects models. Furthermore, there is a chronological pattern in the results. Over time researchers have moved from employing relatively simple direct-effects frameworks (Models A, A-1) to the use of more complex models (Models B, B-1, C). Even among the mediated-effects studies, for example, the later studies tend to use more comprehensive models involving both antecedent and mediated effects.

Direct-effects Models

Direct-effects models (Figure 1, Model A) propose that the leader's practices can have effects on school outcomes. Moreover, this approach assumes that these effects can be measured reliably apart from other related variables. Thus, researchers using this model do not typically seek to control for the effects of other in-school variables such as organizational climate, teacher commitment, instructional organization.

At the same time, recognition of the fact that other variables may have a prior effect on school outcomes led several researchers to include variables such as socioeconomic status and/or previous test scores. However, these were not hypothesized as variables interacting with leadership construct or mediating its effects on the selected outcomes.

Direct-effects models are quite common among the studies listed in Table 1. Most of the studies in this group were conducted during the

Table 1. Characteristics of Principal Effects Studies.

Study Author	Sample Type	Dependent Variable	Analytic Technique				Effects
			Descriptive	Correlation	T-test χ^2	Anova Regression	
Model A: Direct-effects							
Broughton & Riley, 1991*	70 tch/20 es	1				x	none
Cantu, 1994	96 teachers, 6 es	2			x		none
Glasman & Biniamimov, 1981	29 studies	1		x			none
Glasman, 1983	210 pr & tch	2	x				yes
Glasman, 1984	302 pr	2	x				none
Glasman & Heck, 1992	35 pr	2	x				yes
Glasman & Fuller, 1992	20 pr	2	x				yes
Hunter, 1994*	52 ms; 331 t, 52 pr	2		x			mixed
O'Day, 1983*	140 tch/19 es	1		x		x	none
Ruczieska, 1988*	155 tch/11 es, ms	2		x			mixed
van de Grift, 1989	182 pr	1		x			none
van de Grift, 1987	139 pr	1		x			mixed
van de Grift, 1990*	104 es	1				x	none
Model A-1: Direct with antecedent effects							
Andrews & Soder, 1987	33 es	1		x			yes
Blank, 1987	32 hs	1,5			x		mixed
Brewer, 1993	2070 hs st	1				x	yes
Cheng, 1991	64 hs	4			x		yes
Cheng, 1994	190 es	1,3		x			mixed
Dilworth, 1987	77 tch	1				x	none
Krug, 1986	193 tch/11 es	2		x			mixed
Ramey et al., 1982	193 tch/19 es	1					none
Rowan & Denk, 1984	142 es	1				x	mixed

Model B: Mediated-effects

Jackson, 1982*	8 Elem	2	x	x	yes
Biester et al., 1984	8 Elem	2	x		mixed
Crawford et al., 1985*	94 Elem, MS, HS	1		x	mixed
Eberts & Stone, 1988*	300 pr	1		x	yes
Sitlins, 1994*	265 pr	3		x	yes

Model B-1: Mediated with antecedent effects

Bamburg & Andrews, 1990	61 es	1	x		yes
Goldring & Pasternak, 1994	34 es	1		x	yes
Hallinger & Murphy, 1986	10 es	2			N.A.
Hallinger et al., 1996	87 es	2			yes
Heck et al., 1990	200 teachers/30 el, hs	2		x	yes
Heck et al., 1991	71 tch/4 es	2		x	yes
Heck, 1993	138 tch/26 hs	2		x	yes
Hallinger & Heck**	70 tch/20 es	1			yes
Jones, 1987	27 hs	1		x	none
Leithwood et al., 1993	770 tch/272 sch	3		x	yes
Leithwood, 1994	varied	3			yes
Ogawa & Hart, 1985	275 es, hs	1		x	yes
Scott & Teddlie, 1987	250 tch/76 es	1			none
Weil et al., 1984	20 es	1, 2, 6		x	mixed

Model C: Reciprocal-effects

Hallinger et al., 1996	87 es	2		x	N.A.
Heck et al., 1990	200 teachers/30 el, hs	2		x	N.A.

Note. Key for Dependent Variables: 1 = student achievement; 2 = school effectiveness; 3 = teacher perceptions of school effectiveness; 4 = organizational effectiveness; 5 = attendance; 6 = student self-concept.

* Antecedent variable(s) were limited to controlling for exogenous effects on achievement.

** Reanalysis of Braughton & Riley, 1991.

earlier period of this review. Prior to around 1987, they represented the norm among principal effects studies (Hallinger & Leithwood, 1994).

Though common, Model A studies have been criticized for making untenable assumptions about the nature of leadership and its effects on school outcomes (e.g., Hallinger & Heck, 1996b; Pitner, 1988; Rowan et al., 1982). In such studies, the process by which administrators achieve an impact on school effectiveness is hidden in a so-called *black box*. A relationship is empirically tested, but the findings reveal little about how leadership operates.

The methods of analysis used to investigate direct-effects models are mainly bivariate (e.g., O'Day, 1983). Researchers using this approach typically use correlation, *t* tests, or chi square types to analyze principal effects (see Table 1). Recently, however, more sophisticated analytic techniques such as structural equation modeling have also been more employed to assess the direct relationship between leadership and school outcomes (e.g., van de Grift, 1990). Interestingly, the degree of sophistication in analytic techniques appears unrelated to the trends in results when using a direct-effects model (Hallinger & Heck, 1996a, 1996b).

The results of direct-effects studies of leadership effects are surprisingly clear. Researchers adopting this model have been unable to produce sound or consistent evidence of leadership effects on student outcomes (e.g., Braughton & Riley, 1991; Cantu, 1994; Cheng, 1994; Krug, 1986; O'Day, 1983; van de Grift, 1990). A finding of no significant relationships has been most common, with occasional findings of mixed or weak effects. This overall finding supports the critiques offered by Bridges (1982) and Miskel (1982) as well as empirical findings from research in the Netherlands (van de Grift, 1987, 1989, 1990)

By way of illustration, Cheng (1994) found many significant differences between weak and strong principal leaders in terms of organizational and teacher performance indicators. However, the results with respect to principal effects on student outcomes were mixed. Cheng only found differences in two of seven student-perceived outcomes: attitudes to school and attitudes to learning.

The direct-effects models (A, A-1) have limited utility for investigating the effects of principal leadership. They have not demonstrated conclusive results with respect to principal effects. Even when employing sophisticated statistical methods such as structural modeling, this approach suffers from severe conceptual limitations. In the future, such studies offer little hope as a means of contributing substantially to our understanding of questions concerning either if or how leadership influences student outcomes.

Mediated-Effects Models

A mediated-effects framework (Model B, Figure 1) hypothesizes that leaders achieve their effect on school outcomes through *indirect paths*. Leadership practices contribute to the outcomes desired by schools but the contribution is almost always mediated by other people, events, and organizational factors such as teacher commitment, instructional practices, or school culture (Leithwood, 1994). This conceptualization is consistent with the proposition that leaders achieve their results primarily through other people. Mediated-effects studies, therefore, offer concrete indications of possible means through which leadership may achieve an impact on the school's outcomes and effectiveness.

Notably, these studies also produced a consistent pattern of results, though of a different sort. As seen in Table 1, studies employing a mediated-effects model produced either mixed or consistently evidence of positive effects of principal leadership on school outcomes. When combined with antecedent variables, the more complex model (Model B-1, Table 1) shows an even more consistent pattern of positive indirect effects of principal leadership on school effectiveness.

Table 1 extends the trend implied in our discussion of the direct-effects model concerning the relationship between methods and results. Mediated-effects studies have employed more sophisticated analytic methods than did the direct-effects studies. Researchers initially relied upon multiple regression analysis in which the strength of indirect effects are implied through the use of interaction effects. More recently they have begun to use more powerful variations of path analysis in which the strength of direct and indirect effects can be calculated simultaneously (Hallinger, Bickman, & Davis, 1996; Heck, Larson, & Marcoulides, 1990; Leithwood, 1994).

These analytic methods are necessary to cope with the more complex relationships framed in mediated-effects models. It is interesting to note that greater consistency in findings of principal effects only emerged after these methods began to be used by researchers. This reinforces the importance of bringing conceptual and methodological power to the study of leadership effects.

Reciprocal-Effects Models

A third conceptual approach to understanding administrator effects is the reciprocal-effects model (Figure 1, Model C). Scholars have proposed that relationships between the administrator and features of the school and its environment are interactive. This proposition is not, however, captured in either the preceding models, A or B. A reciprocal-effects

framework implies that administrators adapt to the organization in which they work, changing their thinking and behavior over time.

Principals enact leadership in the school through a stream of interactions over a period of time. In doing so they address salient features of the school such as the current and changing states of student outcomes or staff morale or commitment. Alternatively, they may initiate changes in the school's curriculum program or instructional practices. These actions may cause changes in the conditions of the school. This subsequently produces feedback that causes reciprocal effects in the originating variable, leadership. This is an example of a reciprocal process.

By way of illustration, a principal might enter a low performing school that has severe problems of discipline and order. In response, the principal might take highly directive measures to establish control. Once the school has achieved a level of stability, the principal may adopt a quite different way of thinking about both goals and actions for school development. To the extent that leadership is viewed as an adaptive process rather than as a unitary independent force, the reciprocal-effects perspective takes on increased salience. When employing this type of model, the researcher further entertains the possibility that causal relationships may be multi-directional, change over time, and even be nonlinear.

As seen in Table 1, few studies were conducted with this model type; in fact, none were specifically designed to model reciprocal effects. The ability to adequately test reciprocal effects has been limited by the types of data collected and the analytical methods employed by researchers. Analyzing how leadership processes and their effects unfold over time is demanding from a methodological standpoint. Up until a few years ago, the necessary methodological means to analyze reciprocal relationships quantitatively (e.g., structural equation modeling) or trend data were not widely accessible.

Cross-sectional data can give an impression that a certain type of principal leadership has an impact on other processes, as in Models A or B. However, it is also possible – even likely – that this form of leadership “worked” only at that certain point in time, or that effects go in both directions. Cross-sectional studies and related conceptual models do not capture the dynamic relationships that may exist among variables, especially with respect to how these may change over time.

A more complete representation, therefore, would require the assumption that the reciprocal effects will only become apparent over time. Thus, in order to specify such models completely, longitudinal data are preferred, and these are in short supply. Further development and exploration of this model represents a profitable area for future research. As

research questions are framed within this type of conceptual framework, it will undoubtedly lead to revised conceptual models and corresponding methods of analysis.

Conceptualizing Educational Leadership

Although this review focuses primarily upon the issue of principal effects, we must briefly discuss the range of leadership conceptualizations represented in this body of research. The field's conceptualization of principal leadership has evolved considerably over the past 25 years (Hallinger, 1992). This was aptly demonstrated in these investigations as researchers employed at least six distinctly different leadership frameworks to study principal effects.

Although a variety of conceptual models were employed in these studies, two major approaches have predominated in the study of principal effects over the past fifteen years: instructional leadership and transformational leadership. Studies from the early to late 1980s were dominated by an instructional leadership conceptualization drawn from the effective schools literature (e.g., Andrews & Soder, 1987; Biester, Kruse, Beyer, & Heller, 1984; Hallinger & Murphy, 1986; Jackson, 1982; Jones, 1987; Krug, 1986; O'Day, 1983; Scott & Teddlie, 1987). Though defined in a variety of ways, 31 of the 41 studies conceptualized the principal's role in school effectiveness in terms of instructional leadership.

Since 1990, researchers have begun to shift their attention to leadership models construed as more consistent with evolving trends in educational reform such as empowerment, shared leadership, and organizational learning. This evolution of the educational leadership role has been labeled as reflecting "second order" changes (Leithwood, 1994) as it is aimed primarily at changing the organization's normative structure. The most frequently used model of this variety has been transformational leadership (e.g., Jantzi & Leithwood, 1993; Silins, 1994).

Transformational leadership focuses on increasing the organization's capacity to innovate. Rather than focusing specifically on curriculum and instruction, transformational leadership seeks to build the organization's capacity to select its purposes and to support the survival of changes to the school's core technology. The core theoretical and empirical work on this model has been conducted by Leithwood and his colleagues at the Ontario Institute for Studies in Education. Three studies examined transformational and transactional leadership constructs (Jantzi & Leithwood, 1993; Leithwood, 1994; Silins, 1994).

Several other leadership frameworks were used in these investigations. In one study Cheng (1994) adapted Bolman and Deal's (1992) popular

conceptualization of organizational leadership. This framework conceives of four frames – political, structural, symbolic, human resource – for viewing the role of leadership in organizations. Given its widespread use in administration preparation programs, it was surprising to see that so few studies used this framework in the study of principal effects.

We would be remiss if we did not note that the epistemological breadth of conceptualizations included in this corpus of studies was limited by the decision to focus specifically on *principal effects on school effectiveness and achievement*. This decision immediately limited the range of alternative conceptualizations likely to appear in the review. For example, it meant that scholars who conceptualized effectiveness via non-quantitative approaches would not be captured by the review. It also meant that scholars who focused on intermediate-level variables such as academic learning time or other classroom- or school-level process variables would not be included. Finally, it meant that we would miss studies by scholars who employed measures of leadership that did not focus on the principal. These considerations all led, in our view, to the relatively narrow range of conceptualizations embedded in this set of studies.

In this instance, the predominate paradigm of the 1980s – school effectiveness – drove the review. Consequently, our definition of scope for the review – principal effects on school effectiveness and achievement – biased the study towards certain ways of seeing leadership effectiveness and also towards certain methodological approaches. We acknowledge this as a limitation of the review with the result that the full range of principal leadership studies is not represented here (see Heck & Hallinger, in press, for an analysis of the broader range of conceptual models being employed). At the same time, we assert the appropriateness of carefully defining the scope of a research review and the validity of focusing on the school effectiveness paradigm in this review.

In the following section, we discuss the substantive results from studies employing these educational leadership models. Although we discuss the overall trend of findings among the studies, we focus primarily on those studies that found administrative effects. Since these studies tend to be found among the more complex models (B, B-1), that is where we give the greatest attention.

RESULTS

In this section we examine the results that emerged from the substantive findings of the studies. The findings are organized into three sections

representing the main leadership model components: in-school processes, antecedents, outcomes.

Avenues of Influence of Principal Leadership

Given these varying conceptualizations of the principal's leadership role, we needed a more general framework that could encompass the specific models of principal leadership that were investigated. We chose to organize the presentation of our findings around Leithwood's (1994) as well as Ogawa and Bossert's (1995) theoretical leadership frameworks for exploring leadership effects. These represent recent thinking about how school leadership operates within an organizational context and we found considerable overlap in their conceptualizations of leadership effects.

These frameworks hypothesize four areas through which leadership may influence the organizational system: (1) purposes and goals; (2) structure and social networks; (3) people; (4) organizational culture. In the current image of school organization, therefore, leadership not only influences individuals – it influences the organizational system in which individuals (e.g., teachers, students, parents) work. After we examine the findings along the four identified domains, we discuss how antecedent effects interact with the mediated-effect model.

Purposes and goals

The most consistent findings among the studies support the view that principals' involvement in framing, conveying and sustaining the schools purposes and goals represent an important domain of *indirect* influence on school outcomes. This focus on goals reflects the popularization of vision, mission, and goals in the management literature of this period. Primarily through mediated-effects studies, researchers studied the principal's impact on the staff's educational expectations, the framing of educational purposes, the substance of the school's mission, consensus on goals, and the principal's role in goal-setting processes (e.g., Andrews & Soder, 1987; Bamburg & Andrews, 1990; Brewer, 1993; Cheng, 1994; Goldring & Pasternak, 1994; Hallinger et al., 1996; Hallinger & Murphy, 1986; Heck et al., 1990; Leithwood, 1994; Scott & Teddlie, 1987; Silins, 1994).

For example, Brewer (1993) noted that principal leadership affected both the selection and motivation of teachers in terms of their classroom goal-setting. After controlling for a variety of environmental influences, Brewer found higher academic gains in high schools where principals held high academic goals and selected more of the teachers. Conversely, where principals held lower academic expectations and selected fewer

teachers, lower test score gains resulted. While the methodology of this study was limited in its ability to clarify fully the relationship among these variables, it reinforces the potential importance of the school culture. It suggests both the importance of the principal's expectations for achievement and staff selection as a vehicle for increasing the school's focus.

Goldring and Pasternak (1994) similarly found that the principal's role in framing school goals, establishing a clear mission, and gaining staff consensus were stronger predictors of school outcomes than other instructional or managerial activities (e.g., allocation of time, control or influence). Notably, within their framework, goals were conceived more broadly than simply as academic achievement. The important variables included emphasizing good citizenship, personal growth, good work habits and learning skills among students and securing staff agreement about educational goals.

Hallinger and colleagues (1996) found that establishing a clear school mission was a key avenue through which principals influence school effectiveness. In their study principal leadership was significantly related to the variable, clear school mission. It was through this avenue that principals shaped teachers' expectations and students' opportunity to learn in the school. Again both academic focus and staff consensus were conceptualized as part of a constellation of systemic variables. This path of *indirect effects* had a measurable impact on the reading achievement at the elementary school level.

Additional supporting evidence for the importance of this component of our model is provided by Leithwood (1994) and Heck (1993). Their data support the key role principals play in identifying and clarifying the meaning of school's vision. Both studies reinforce the importance of coordinating the school's goals with its curriculum. Moreover, as in the Brewer (1993) and Hallinger et al. (1996) study, high performance expectations again emerge as a potentially potent source of influence. These variables were related to the principal's ability to stimulate innovation and flexibility as well as to higher productivity in terms of restructuring the organization's goals and achieving school outcomes.

It is important to draw a conceptual distinction between the role of goals as employed in the instructional leadership models and the transformational leadership models. Goal setting within the instructional leadership tradition emphasized the principal's capacity to focus staff on the school's academic improvement. Within this model, goals are viewed as an instrumental agent used by instructional leaders to narrow the attention of staff, parents and students on a limited range of activity.

This distinction was highlighted by Hallinger and Murphy (1986) in their study of effective and typical elementary schools. They noted that even within the instructionally effective schools, there were differences between how principals employed goals. Some used explicitly defined school goals as instruments for coordination and control. Other principals sought to establish and maintain a general direction for the school, but they employed goals in a more generative manner building upon and reinforcing important purposes that emerged from the staff and community. These observed differences appeared to be related to contextual characteristics of the school such as socioeconomic status of students.

Within the transformational leadership model, as conceived by Leithwood (1994) and Silins (1994), the goal-setting function of the leader is somewhat different. Here the leader seeks to stimulate people to arrive at new (and higher) goals for personal and professional development. Leithwood suggests that the strongest influence of transformational leadership on outcomes is through vision building and fostering commitment to group goals. These in turn lead to an increased capacity for innovation.

Leithwood and colleagues (Leithwood, Jantzi, Silins, & Dart, 1993) provide evidence of small effects of principal behavior in this domain. They find that principal vision, group goals, high expectations, and individual support have effects on several in-school processes such as goal formulation, school culture, teachers, policy and organization. In turn these influence school improvement outcomes including achieving school reform goals, policy and organizational change.

Thus, goal framing and mission-building, though critical in both leadership models, take on different emphases. Despite differences in how the principal's leadership role is conceptualized, however, both frameworks do emphasize the importance of vision and goal cohesion within the school. Additional research is needed to unpack how goals operate in fostering school improvement. However, these findings offer strong evidence of this domain's validity in terms of the leader's role in school effectiveness and improvement.

Structure and social networks

A second domain of leadership influence involves the interplay between organizational structures and social networks. Theorists suggest that leadership is linked to organizational roles and the network of relations among roles because it is this network that comprises the organizational system. Ogawa and Bossert (1995) propose that leadership enhances organizational performance and survival by affecting social structures, the regularized aspects of relationships existing among participants in an organi-

zation. Hence, leadership can be distributed across organizational roles. The concern in this dimension is with how leadership is exercised (e.g., centralized or dispersed) and what are its basic aims with respect to other people in the organization.

Evidence from the mediated-effects studies provides strong support for this view. In an early paper, Weil et al. (1984) found that principal support of teachers and a proactive stance on problem solving were areas separating effective from more typical elementary schools. In a more-recent effort, Silins (1994) determined that transformational leadership (i.e., actions aimed at providing support, challenging work, and sense of vision and mission of the school) produced significant effects on a variety of teacher-perceived reform processes as well as on school, program, and student outcomes. The effects of a contrasting model, transactional leadership (i.e., focusing on fulfilling basic needs and supplying extrinsic rewards) were much less pervasive.

Positive effects of transformational leadership on in-school processes and a range of teacher-perceived outcomes have also been reported by Leithwood and his colleagues (Leithwood et al., 1993; Leithwood, 1994). The areas of transformational leadership that primarily affect this domain are providing support for individual teachers, fostering cooperation, and assisting them to work together toward the fulfillment of identified school goals. Leithwood suggests that principals' transformational leadership affects three psychological dispositions of teachers (i.e., their perceptions of a variety of school characteristics, their commitment to school change, and their capacity for professional development). In turn, Leithwood argues that leadership indirectly affects the organizational outcomes of restructuring initiatives and teacher-perceived student outcomes, but had little effect on student participation in school activities and student grades.

Several studies across a variety of national contexts indicated that more involvement from a variety of stakeholders in decision making is characteristic of higher-producing schools. Weil et al. (1984) determined that collaboration in decision making was an area separating effective and more typical elementary schools. This was the case for both teacher and parent participation in decision making (also see Heck, Marcoulides, & Lang, 1991).

It is interesting to note that this finding receives support from cross-national research. For example, Heck (1993) found that more collaborative decision making and more flexible rule structures were associated with higher-achieving secondary schools in Singapore. Cheng (1994) found that strong primary school principal leaders in Hong Kong schools tended to promote participation in decision making, stronger and more cohesive

social interactions, attitudes about work, commitment, and higher morale. In a Canadian study, Leithwood (1994) also suggests greater implementation of a variety of primary school change outcomes where decision making power is shared, principals provide relative autonomy to teachers, and where collaboration is used in decision making, and time is provided for all of these activities.

As implied above, parental involvement may be another area in which principals exercise an indirect effect on outcomes. For example, Weil et al. (1984) noted that parents in effective schools in the study also perceived themselves to be more involved in the school and in participating in decision making about the school. Similarly, in a study conducted in Israel, Goldring and Pasternak (1994) noted that highly-effective elementary principals emphasize involving parents in the school. Controlling for community background variables, Heck et al. (1990) also found that principals encouraged greater levels of parental involvement in highly-effective elementary and high schools. As we also note later, parental participation and expectations have a corresponding impact on principals.

People

It seems clear from several proposed leadership frameworks (e.g., Bossert et al., 1982; Leithwood, 1994; Ogawa & Bossert, 1995) that administrative activity is largely directed at people in the organization (i.e., students, teachers, parents and community, district personnel). Ogawa and Bossert (1995) argue that social interaction among people within the school community is a primary building block of leadership. As they note, leadership requires the use of personal resources, for example, responsibility, cooperation, and commitment.

The evidence from the last 15 years of research on educational leadership provides considerable support concerning the importance of this domain of principal influence. In a synthesis of several studies of the impact of the principal from a transformational leadership perspective, Leithwood (1994) highlights "people effects" as a cornerstone of the transformational leadership model. Within the model proposed by Leithwood and colleagues (e.g., Jantzi & Leithwood, 1993; Leithwood et al., 1993; Leithwood, 1994; Silins, 1994), many of the outcomes of interest in terms of restructuring schools are teacher effects (e.g., changes of behavior, adoption of new programs, teaching techniques). Thus, they suggest a major impact of principal efforts is to produce changes in people.

More specifically, Leithwood (1994) found that principal effects are achieved through fostering group goals, modeling desired behavior for others, providing intellectual stimulation, and individualized support (e.g.,

toward personal and staff development). In these schools, principals were better at supporting staff, providing recognition, knowing problems of school, were more approachable, follow through, seek new ideas, and spent considerable time developing human resources. A conclusion drawn from Leithwood's studies is that transformational leadership has an impact on teachers' perceptions of school conditions, their commitment to change, and the organizational learning that takes place. With respect to outcomes, leadership had an influence on teachers' perceptions of progress with implementing reform initiatives and teachers' perceptions of increases in student outcomes.

Other studies using an instructional leadership model also provide considerable support for principal effects on people as a means to affect outcomes indirectly. Heck et al. (1990) found that teachers in higher-producing elementary and high schools spent more time than their counterparts in low-producing schools in the direct classroom supervision and support of teachers, as well as in working with teachers to coordinate the school's instructional program, solve instructional problems collaboratively, help teachers secure resources, and provide in-service and staff development activities.

Similarly, in our re-analysis (see next section) of the Braughton and Riley (1991) study, we discovered that principals were much more directly involved in the classroom supervision and support of teachers who had lower skills in teaching reading. Principals' classroom involvement with teachers had a significant indirect effect on school outcomes. Goldring and Pasternak (1994) found that effective elementary schools had greater staff consensus about educational goals than less-effective schools. Eberts and Stone (1988) argued that the principal's role in resolving conflicts within the school is an area of impact on school achievement (in more effective schools teachers perceived conflicts were resolved adequately). Together these findings suggest that more effective (or higher-producing) schools have greater educational and social cohesiveness (e.g., Heck, 1993).

Organizational culture

Recent theories of school leadership emphasize the influence of organizational culture on the meaning people associate with their work and willingness to change (Bolman & Deal, 1992; Leithwood, 1994; Ogawa & Bossert, 1995). As Ogawa and Bossert (1995) argue, leaders operate within environmental (i.e., societal) and organizational cultures and affect how other participants interpret organizational events and thus influence how they behave. This focuses on the importance of developing shared meanings and values.

Relative to societal cultures, few of the studies in the past 15 years were designed to compare leadership across cultural contexts. In one such study, Heck et al. (1991) noted likely differences in principal leadership associated with the cultural context of the schools in which the study is conducted. Others were simply case studies of the principal's role within a variety of different cultural contexts.

There is less support in this particular empirical literature concerning the principal's role with respect to organizational culture and learning outcomes than the other three domains. At least in part this results from the newness of this construct as a focal point for research on the principal role. Even within the wider organizational and management literatures, this has been related to disagreement about the conceptual components of the construct.

Similarly, in the earlier effective schools studies, culture was perceived as "climate". For example, the original Bossert et al. (1982) framework used the term climate. Weil et al. (1984) found that effective and typical schools differed in several important respects in their organizational processes. They termed these processes school learning climate (e.g., mission, opportunity to learn, expectations), organizational climate (e.g., collaborative processes, open communication), social climate (e.g., sense of community, student involvement). Teachers in the study suggested that effective schools tended to emphasize group processes in solving problems, the promoted instructional improvement, curriculum and testing were aligned, and principals were seen as more supportive of teachers. Moreover, in effective schools the learning climate appeared to be solely a function of the leadership climate.

Heck et al. (1990) also found that principals' efforts in improving the educational environment of the school (e.g., communication processes, high expectations for students and teachers, increasing morale) were indirectly related to school outcomes. Although they labelled this construct "school climate", it also emphasizes elements of the school's value structure (e.g., high expectations). In both of these studies, school climate seemed to reflect values processes that we consider to be important facets of organizational culture.

A few years later, Leithwood et al. (1993) conceptualized school culture as widespread agreement about norms, beliefs, and values. They proposed that school culture was central to achieving the coordination necessary to implement change. Principals were found to impact school culture which, in turn, impacted a range of restructuring outcomes including program, policy, teacher behavior, and students.

Useful distinctions can be drawn, however. In one attempt to clarify the relationships between these constructs, Heck and Marcoulides (1996a)

described climate as participants' perceptions about "how things are" (e.g., work conditions) on a day-to-day basis as opposed to deeper values and structures that affect socialization and norms governing subsequent actions within the organization. In clarifying the relationship between the two constructs, climate, therefore would be expected to change more readily – depending, for example, on the actions of administrators – than the entire system of variables comprising the school's culture (e.g., its structure, value system, managerial processes).

Antecedent Effects on Leadership

The model discussed above focused on the impact of principal leadership on in-school variables and school outcomes. This body of research also focused on a variety of antecedent and context effects on principals. This relationship was investigated through both direct-effects and mediated-effects studies.

Despite a range of conceptual and methodological problems, one interesting finding is suggested by several studies. Socioeconomic factors in the school and community appear to influence principal leadership and its impact on school effectiveness (e.g., Andrews & Soder, 1987; Hallinger & Murphy, 1986; Rowan & Denk, 1984). For example, Andrews and Soder (1987) reported that principal leadership affected reading and math outcomes in elementary schools. When controlling for SES and ethnicity, however, the effects of principal leadership on reading and math outcomes tended to disappear in high SES or predominately Caucasian elementary schools. They remained significant in predominately African-American or low SES schools. This supported their hypothesis of context effects on the leadership exercised by principals.

Hallinger and Murphy (1986) found that community SES affected how elementary school principals perceive their work. For example, the school mission was defined differently in low and high SES effective schools, with low SES schools stressing the mastery of basic skills. Consequently, in these schools a greater percentage of time was allocated to basic skills instruction with frequent, extrinsic rewards for success. Moreover, principals in low SES schools tended to define their leadership role more narrowly in terms of curriculum coordination, control of instruction, and task orientation.

Similarly, Scott and Teddlie (1987) identified a link between SES and elementary school principal expectations. Principals' expectations, in turn, affected their responsibility; however, they determined that principal responsibility was not directly related to outcomes. Although untested by Scott and Teddlie, we noted a possible indirect effect (likely statistically

significant) of principal expectations on school outcomes through principal responsibility.

Antecedent influences were also found to impact upon principal behavior with respect to structures and social networks. Hallinger and Murphy (1986) found that SES impacts how principals go about developing such linkages. For example, they noted that school linkages to the home and parent involvement were weak and limited in low SES effective schools. In contrast, linkages to the home and parent involvement were strong and pervasive in high SES schools. Parents contributed time as classroom aides, their money supported expansion of school programs, and they assisted in organizing schoolwide festivals.

In the lower SES schools, principals acted as buffers between the school and home, controlling access to the school and protecting the school's program from outside influences that might dilute its effectiveness. In higher SES schools, however, the principal acted as a boundary spanner, constantly seeking ways to involve community members who had great interest and stake in the school's operation.

These findings hint at the relationship between wider community cultural context and corresponding school culture. The different extent of contact between school staff and community is important because teacher and administrator attitudes appear to be shaped by expectations and beliefs of the wider community (e.g., Hallinger & Murphy, 1986; Ogawa & Bossert, 1995). Outside of this relationship to the wider community (e.g., expectations), Hallinger and Murphy found that effective schools in high- and low-SES also had similarities in terms of their instructional and organizational arrangements – a clear mission, emphasis on achievement results, high expectations, a well-coordinated curriculum, and principal behavior that was concerned with instruction. Of course, effects of principal behavior with respect to culture is a topic that needs further empirical study.

Cheng (1994), noted that other contextual factors (e.g., school size, teacher background) were not generally found to exert any important influence over principal leadership in secondary settings. Heck (1992) found differences in principal discussion of instructional issues and problems and discussion about how instructional techniques impact student achievement to be similar across school level, with principals in both effective elementary and high-school schools more involved with these variables than their counterparts at low-achieving schools. There is an interaction with level, however, with principals in effective elementary schools more heavily involved than principals in effective high schools. Heck (1992) also noted that principals in elementary schools (controlling

for effectiveness) spend more time attempting to communicate goals to teachers and others than principals in secondary schools. The findings from Heck's (1993) secondary school study tend to corroborate Leithwood's studies with primary schools in this area, although the leadership constructs employed are different.

Unit of Analysis and Multilevel Effects

Closer inspection of Table 1 reveals that previous research on the principal's role has been conducted using widely different units of analysis. For example, these include principals, individual teachers, teacher responses aggregated to the school level, and various sub-groupings of students. This issue introduces additional complexity into the discussion of principal effects on school processes and school outcomes.

At each *level* of the organizational system different effects can be conceptualized. Students bring individual abilities to their classrooms. Teachers shape the children's classroom environment. Principals monitor teachers within their schools. Superintendents develop improvement plans for their districts. Thus, within a given organizational system the effects of actors (or groups of actors) at different *levels* must be taken into account.

Theoretically, this has been referred to as a "nested structure" and represents an example of a hierarchical data structure (Bossert et al., 1982). Most of the mediated-effects studies that found a relationship between principals' leadership, school processes, and outcomes focused on teachers' perceptions of organizational processes, measured variables either at the individual or school level (e.g., Hallinger et al., 1996; Heck et al., 1990; Leithwood et al., 1993). A smaller number of studies finding positive effects of leadership studied principals directly (e.g., Eberts & Stone, 1988; Silins, 1994). One issue raised by different units of analysis is the extent to which various role groups perceive the principal's leadership similarly.

When studying the interrelationships among principal, teacher, and student-level variables, therefore, the structural features of educational organizations take on particular importance. Principals are likely to influence the school level of the organization more directly than classroom (e.g., how teachers organize instruction) or student levels (e.g., the motivation of particular students). Unfortunately, in the past such issues were often blurred in the transformation of conceptualizations into operational measurement.

One illustration of this problem for example, can be seen in the conceptualization of school learning climate, a popular variable measured in

these studies. It remains a point of contention whether constructs such as school climate (or principal leadership) are basic properties of the organization or merely perceptions of the individuals. If we accept the former conceptualization, perceptions should be measured at the school level. In the latter case, they would more appropriately be measured at the individual teacher or student level.

Earlier studies on principals seldom addressed the problem of variables such as student achievement that are impacted by multiple levels of the organization. In such studies, for example, the unit of analysis tended to be either the individual level (e.g., teachers and principal as individuals without regard to their school setting) or the school level. In the latter case, teacher responses were summed to create school means. The researchers would then compare schools within the sample.

Neither solution is completely satisfactory. A limitation of a school-level analysis is that every individual in the school is assumed to hold the same perception about the principal. Individual level analyses do not allow us to assess accurately the effects of different levels of the organization on the relevant outcome of interest. For example, if quality of teaching is hypothesized to affect student learning, then we know that some students in our sample of individuals have the same teacher and, further, differ in the quality of teaching that they receive. To ignore this, we violate the assumption of independence of observations that is basic for classical statistical techniques. That is, systematic groups of students in our sample would have the same value on all variables at the classroom level (Bryk & Raudenbush, 1992).

Several promising analytic techniques have been developed over the past few years (e.g., structural equation modeling, hierarchical linear modeling) that allow the investigation of these effects across organizational levels. These techniques were not, however, used to investigate multilevel effects in the studies we reviewed. For example, Heck et al. (1990) developed separate structural models at the individual and school levels and compared the estimates. Yet, this approach did not bring together one set of within- and between-level estimates.

To address this shortcoming in principal leadership studies further, Heck and Marcoulides (1996b) recently reanalyzed an earlier study to assess the effects of multilevel data on the assessment of principal leadership and its effects. This analysis revealed several new findings. Hierarchical linear modeling (Bryk & Raudenbush, 1992) was employed to separate the variance accounted for in principal leadership practices into within-school and between-school components. First, most teacher perceptions of principal leadership were individual properties; that is, vari-

ance in leadership practices across several dimensions (governance, instructional supervision, culture and climate building) was roughly 70% to 80% within each school. This suggests that individual-level analyses do manage to capture most of the inherent variation in the data. Therefore, we should not discount the findings of previous studies conducted at the individual level of analysis. Second, the analysis revealed that in all leadership domains investigated, principals rated their direct involvement more highly than their teachers did.

The 20 to 30% variation in leadership practices across school, however, suggests that there are substantial differences in principals' leadership practices at the school level as well. In the Heck and Marcoulides (1996b) study, this variation was accounted for by the level of the school (i.e., with high school principals being perceived as less actively involved in various leadership activities) and the achievement context of the school (with principals in high-achieving schools more actively involved in leadership activities).

Thus, the caution here is that between-school studies treat the smaller amount of variation due to differences in leadership among the set of schools as if it were 100% of the variation in the data. This has the potential to alter the findings. Interestingly, another such study (Rowan, Raudenbush, & Kang, 1991) determined that most of the variance in teacher perceptions about principal leadership (roughly 75%) was also the result of within-school variation in how teachers view the principal's actions. Of course, this variation would be lost if measurements were simply aggregated to school level means, and those school-level means used in a between-school analysis. Therefore, studies that do not account for within-school variation can run the risk of overemphasizing (or underemphasizing) differences in leadership between schools.

Now that several techniques are available to estimate multilevel effects, one alternative solution proposed through hierarchical linear modeling is to develop a within-school model to determine the relative effects of various factors (e.g., gender, backgrounds of teachers) on teachers' perceptions about the principal's leadership. The approach is illuminating for many research situations in that it allows the variability in important dependent variables (e.g., outcomes, leadership) to be decomposed across different levels of the organization. In this manner, we can also determine whether leadership has been measured with sufficient reliability and validity within each school to permit a school-level analysis of differences in principal leadership.

Impact of School Leadership

As noted at the outset, one purpose of this review was to explore possible explanations for the ambiguity and inconsistency in findings of principals' effects. The conceptual organization of the studies (see Table 1) began to offer clues for the discrepant findings. As noted earlier, the finding of positive effects to be associated with the conceptual model used by the researcher. That is, mediated-effects studies yielded more consistent findings than did the direct-effects studies that were popular earlier in the decade.

The contrasting findings between mediated- and direct-effects studies led us to re-analyze one of the direct-effects studies to see if formulating a different theoretical model might affect the nature of the findings concerning leadership and school outcomes. We used available data (through inclusion of a correlation matrix) that had employed direct-effects models and found no principal effects on student outcomes (Braughton & Riley, 1991).

We formulated antecedent with mediated-effect models using their available observed variables and, in the case of the Braughton and Riley (1991) study, applied a different analytic method. For this analysis, we used structural equation modeling. The usefulness of this approach is that it forces the researcher to propose a specific theoretical model before actually testing the model against the data and allows for complex tests of direct, indirect, and total effects involving several dependent (and mediating) variables in one analysis. Moreover, the analysis provides several measures of fit of the hypothesized model to the actual data. This allows the determination of whether the model may be considered a plausible representation of the data.

In the structural equation approach to data analysis, there are two basic steps. First, a series of latent constructs (i.e., unmeasured constructs such as leadership practices) are defined in terms of several observed variables. This hypothesized set of relationships may then be fit against the actual data. After successfully defining the measurement properties of the relations, the structural parameters among latent constructs are then investigated. Through illustrating this approach using previous studies, we hope to raise the possibility of uncovering "hidden" effects in the data by applying a different system of theoretical relations.

In the Braughton and Riley (1991) study, the authors found no effects of a variety of variables measuring principals' knowledge and supervisory actions on students' fourth grade reading scores. The model was originally cast as a regression model with several indicators of principal and teacher knowledge and actions as predictors of fourth grade reading. The

only significant predictors they found were the students' second grade scores and fourth grade teachers' knowledge of reading processes.

We recast their regression model into a mediated-effects with antecedent framework as follows. Drawing on earlier research by Glasman and Fuller (1992), we assumed that student test scores affect principal behavior. We then hypothesized that second grade reading scores might help explain principal behavior in terms of their decisions in supervising teachers' classroom work with the four grade classes. We, therefore, defined a latent construct measuring principal involvement in supervision and another latent construct measuring teacher classroom reading practices.

We then tested this newly-proposed model with LISREL 8 (Jöreskog & Sorbom, 1993) using the authors' correlation matrix as input (Braughton & Riley, 1991). First, our model fit the data quite well. Using several common indicators of model fit (chi-square/df ratio, goodness of fit index, root mean square residual) we concluded that our proposed model had a good fit with the data. The chi-square/df ratio was 1.3 ($p=.064$), the goodness of fit index was .90 (values of .9 are considered evidence of acceptable fit), and the root mean square residual was .08.

After establishing the fit of the model, we examined the standardized structural coefficients (not tabled). We found a significant relationship (.34) between grade two reading scores and teacher practices with these children in grade four. Principal supervisory activities affected teacher practices significantly (-.38) and outcomes indirectly through their supervision of grade four teachers (.23). Consistent with Braughton and Riley's (1991) own results, we found a direct effect of grade two reading scores on grade four outcomes (.70), and no direct effect of principals' actions on outcomes (.09). Thus, the effects of principal leadership on school outcomes were almost completely indirect through supervising teachers' classroom practices (e.g., with the negative coefficient reflecting greater supervision in classroom where teachers were weaker).

A cautionary note

While we believe that this reanalysis provides a useful and valid approach to understanding the meaning of these findings, we must also acknowledge several limitations. First, it is important to remember that in any test of a model the evidence of a good fit to the data does not mean that other models cannot fit the data equally well or better. Failure to reject a particular model as ill-fitting only indicates that this is one of many possible models that might describe the data. We therefore encourage researchers

to use theory to enhance the specification of their model tests and when possible to consider testing competing models.

Second, we recognize Jöreskog and Sorbom's (1993) caution concerning the use of a correlation matrix as input data. For example, if equality constraints are used when making comparisons, they may modify the model. Use of the correlation matrix as input data may also produce incorrect chi-square values and standard errors. Despite these limitations, the same authors also note that in many social science applications the units of measurement in the observed variables have no definite meaning (Jöreskog & Sorbom, 1993). When this is the case, in practice, it is neither uncommon nor incorrect to analyze correlation matrices for interpretational purposes. Of course caution must be exercised and alternative interpretations considered.

We cautiously interpreted the new findings in our re-analysis, as well as the consistent findings from the set of mediated-effect studies in Table 1. Despite continuing limitations in the actual use of these more recent research methods, we conclude that convincing empirical evidence suggests that principals do affect school outcomes. The impact is, however, achieved primarily through complex indirect relationships with other external environmental forces (e.g., community) and in-school processes.

CONCLUSIONS

The bulk of research, policy and practice in education has assumed the stance that principals make an important difference in school effectiveness. Over the past 15 years, however, several respected scholars have raised questions concerning the validity of this conclusion (Bridges, 1982; Miskel, 1982; Rowan et al., 1982; van de Grift, 1990). This review was initiated in part to see whether persisting questions concerning the effects of principal leadership might be illuminated by the recent proliferation of research into this domain of educational administration.

The review yielded a number of interesting findings that derive from the interplay among methodology, theory, and results. First, we were surprised by the number of empirical investigations (over 40 studies) into principal effectiveness conducted since 1980. Given Bridges' (1982) finding of relatively few studies of administrator effects or impact conducted in the immediately preceding period of time (1967-1980), this increase was heartening.

Moreover, the conceptual and methodological trends that emerged from the studies was equally encouraging. We observed a pattern of increasing

sophistication in the research during the period under review. This enhanced our confidence in the reliability and validity of the overall findings (Hallinger & Heck, 1996a, 1996b). It also offered evidence that scholars in the field had heeded the recommendations encompassed in earlier critiques of research in this domain of educational administration (e.g., Bossert et al., 1982; Bridges, 1982; Leithwood & Montgomery, 1982; Leithwood et al., 1990; Murphy et al., 1983; Pitner, 1988; Rowan et al., 1982).

The general pattern of results drawn from this review supports the belief that principals exercise a measurable, though indirect effect on school effectiveness and student achievement. While this indirect effect is relatively small, it is statistically significant, and we assert, meaningful. Moreover, the review suggests that it is possible that previously described discrepancies among research results may be explained by the conceptual and methodological tools employed by researchers. Both our own reanalysis of the Braughton and Riley (1991) study and the more general trend in which more sophisticated investigations tended to generate more findings of positive results support this hypothesis.

Despite this generally positive assessment of the literature, we must also emphasize the limitations of this body of research. Even as a group the studies do not resolve the most important theoretical and practical issues entailed in understanding the principal's role in contributing to school effectiveness. These concern the means by which principals achieve an impact on school outcomes as well as the interplay with contextual forces that influence the exercise of school leadership.

As we suggested earlier, part of this issue is related to the unit of analysis problem (e.g., teachers, principals, individual-level or group-level) and the multilevel nature of schooling (i.e., individual children nested in classrooms, in schools and districts). In the latter case, we provided a re-analysis of one of our studies to illustrate possible findings about leadership processes related to multilevel analyses. Thus, our assessment is that the field has made substantial progress over the past 15 years and is now equipped conceptually and methodologically to address the important substantive issues in this domain.

For example, we discovered an evolving sophistication in thinking about the principal's role in this group of studies. This was observable in the theoretical and methodological frameworks used by researchers into principal effects. We view this as suggestive of what Kuhn (1970) described as a change in paradigms – the constellation of beliefs, values and techniques that guide scientific inquiry within a community of scholars.

During the early years of this review, 1980 to 1987, the complexity of the relationship between principal leadership and school outcomes often

overmatched the conceptual and methodological tools in use by researchers. Over time, however, we noted a movement from simple to more complex models. Specially, researchers began to move from using direct effects to mediated-effects conceptualizations of the principal's role. There was a simultaneous pattern of progress in terms of the application of increasingly robust analytic methods. Other recent literature also has begun to explore leadership as a distributed variable, not simply assuming that it resides primarily in the person or is enacted only through the behavior of the principal.

Concurrently, during this 15 year period, the question being asked by researchers shifted subtly. During the early years bounded by the review, researchers focused on answering a relatively simple question, "Do principals make a difference?" More recently, researchers have extended the bounds of this inquiry. They have sought to understand not only if principals have effects on school outcomes, but more particularly the paths through which such effects are achieved (including within- and between-school analyses).

This review revealed several paths that begin to describe the means by which principal leadership influences student learning outcomes. These included school goals, school structure and social networks, people, and organizational culture. In particular, the principal's role in shaping the school's direction through vision, mission and goals came through in these studies as a primary avenue of influence. While the state of this research is still evolving, these variables represent both a reasonable focus for principal practice and also for future research into school effectiveness and improvement.

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