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ABSTRACT

Leadership may come from many different sources in a school. This paper examines the relative effects of leadership provided by principals, teachers, and those in other roles. A study based on surveys of 2,727 teachers and 9,025 students in 110 elementary and secondary schools (Ontario, Canada) analyzed the effects of "total leadership," including the transformational and transactional forms of leadership. Five questions were addressed: 1) what is the relative influence on the school of leadership that is provided by those in different roles?; 2) how much variation in school conditions and student outcomes is accounted for by teacher leadership as compared with principal leadership?; 3) does the total amount of leadership exercised in a school account for significant variation in school conditions and student outcomes?; 4) does the total amount of transformational leadership exhibited in schools account for significant variation in school conditions and student outcomes?; and 5) which school and classroom conditions mediate the effects of leadership on student outcomes? Results suggest that teacher and principal leadership effects are modest, largely indirect, and account for comparable amounts of variation in student engagement. Findings indicate that both transformational and transactional approaches to leadership account for modest amounts of student engagement. (Contains 90 references and five tables featuring statistical findings.) (RJM)

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Distributed Leadership And Student Engagement In School

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Abstract

Leadership may be offered by many different people in a school, and may also arise from non-personal sources. This study examined the relative effects on student engagement in school of leadership provided by principals, teachers, and those in other roles. Also examined were the effects of "total leadership", and both transformational and transactional forms of leadership. Data for the study were survey responses from a total of 2727 teachers and 9025 students in 110 elementary and secondary schools in one large Ontario school district. Path models tested with this evidence suggested that teacher and principal leadership effects are modest, largely indirect, and account for comparable amounts of variation in student engagement. A negative relationship was reported between the total amount of leadership from all personal sources in the school and student engagement. Finally, this evidence suggested that both transformational and transactional approaches to leadership account for modest amounts of student engagement, transformational forms accounting for the larger proportion.

Distributed Leadership And Student Engagement With School

In 1996, Hallinger and Heck published two separate analyses of quantitative principal effects studies undertaken between 1980 and 1995. One paper emphasized substantive results (Hallinger & Heck, 1996a), and the other focused primarily on methodological issues (Hallinger & Heck, 1996b). Among the most significant unintended lessons from these papers is that, without the imposition of unreasonably stringent selection criteria, and with explicit efforts to encompass as many international sources as possible, only 40 studies could be found for review. This amounts to an average of about 2.5 quantitative studies of principal effects per year reported during the most dynamic period of school reform in history (e.g., Chapman et al, 1996), and during a period in which a very large proportion of the reform initiatives assumed a key role for principal leadership (e.g., Caldwell, 1993)! Such a modest accumulation of evidence about such a potentially important school variable clearly needs to be addressed.

The work reported in this paper, undertaken to help redress this surprising lack of evidence, built directly on Hallinger and Heck's reviews in several ways. First, Hallinger and Heck discovered that the common professional and public assumption of large principal leadership effects on school outcomes, an assumption accounting for the key role assumed by school reform initiatives, was not warranted. Instead, their analyses suggested that principal effects were small and usually required exceptionally sophisticated research designs to detect. Results of these reviews demonstrated that most principal leadership effects on students were indirect, leading to the recommendation that more attention be given to school conditions through which such leadership influence flowed. Results also suggested that future research measure the moderating influence on leadership of key

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context variables such as the socio-economic status of the school population. This study built on these findings by using what Hallinger and Heck termed a "mediated effects with antecedent effects" (1996, a, p. 16) research design.

Hallinger and Heck's analyses also found that in almost all of their 40 principal effects studies student achievement, mostly basic math and language scores on standardized achievement tests, was used as the dependent variable. While an obviously important, and some would say "preeminent" set of outcomes, they are by no means the only important outcomes for which schools are accountable. Evidence available at present, however, sheds little light on the consequences for leadership of important, non-achievement student outcomes, and whether the avenues of leadership influence differ depending on type of student outcome. This singular focus on achievement as the dependent variable in most previous principal effects studies led to the adoption for this study of an alternative, non-achievement, dependent variable -- student engagement with school.

Finally, the Hallinger and Heck reviews stimulated us to consider just how narrowly school leadership is usually conceived. Research on school leadership is heavily oriented to the principalship. And if there are only approximately 40 acceptable, empirical studies of principal leadership spread over a 15 year period, it is safe to assume that the effects of other sources of school leadership are greatly understudied. This led to the inclusion of a focus on several sources of leadership in addition to principal leadership in this study.

Arising from by these issues identified in the Hallinger and Heck (1996 a, b) analysis, this study addressed five questions. What is the relative influence on the school, as a whole, of the leadership offered by those in different roles? How much of the variation in school conditions and student outcomes is accounted for by teacher as compared with principal leadership? Does the total amount of leadership exercised in a school account for significant variation in school conditions and student outcomes? Does the total amount of transformational leadership exercised by all sources of leadership in schools account for

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significant variation in school conditions and student outcomes? and Which school and classroom conditions mediate the effects of leadership on student outcomes?

Framework

Six constructs and the relationships among them, conceived of as a path model for the purposes of data analysis, served as the framework for this study. In this model leadership directly affects students, as well as school and classroom conditions, and both sets of conditions directly and indirectly affect student engagement with school. The effects of leadership, as well as school and classroom conditions are moderated by family educational culture, which also has a direct effect on student engagement with school. This section summarizes research relevant to each of the variables in the framework indicating how that research influenced our approach to each of the five research questions.

Leadership

The effects of three different conceptions of leadership were examined, including role-specific leadership, leadership conceived of as an organization-wide phenomenon, and leadership viewed as a selected set of practices.

Role-specific leadership. The two most frequently examined sources of school leadership are principals and teachers. While substantial literatures have developed about each (touched on below), there is available almost no evidence concerning their relative effects. As a consequence, we know little about such critical matters as how these two sources of influence interact in schools, how they might work synergistically to add value to the school, or what would be the most cost-effective distribution of scarce leadership development resources.

The independent literatures concerning principal and teacher leadership are primarily concerned with the forms and effects of such leadership. About the forms of principal leadership, there is a considerable body of literature. For example, a recent review of

literature (Leithwood & Duke, in press) was able to located a total of 121 articles addressing forms of primarily principal leadership in just four prominent educational administration journals within the past decade alone. These articles described 20 distinct forms of leadership which the reviewers further classified into 6 generic leadership approaches. Distinguished by their basic foci, key assumptions, and nature and locus of leadership power, these approaches included instructional, transformational, moral, participative, managerial, and contingent leadership. Notwithstanding this considerable attention to forms of principal leadership, as well as the influence typically attributed to some of these forms by qualitative studies (e.g., Hannay & Ross, 1997), quantitative evidence about principal leadership effects remains surprisingly tentative (Hallinger & Heck, 1996a).

Teacher leadership may be either formal or informal in nature. Lead teacher, master teacher, department head, union representative, member of the school's governance council, mentor - these are among the many designations associated with formal teacher leadership roles. Teachers assuming these roles are expected to carry out a wide range of functions: representing the school in district-level decision making (Fullan, 1993); stimulating the professional growth of colleagues (Wasley, 1991); being an advocate for teachers' work (Bascia, 1996); and improving the school's decision-making processes (Malen, Ogawa & Kranz, 1990). Those appointed to formal leadership roles also are sometimes expected to induct new teachers into the school, and to positively influence the willingness and capacity of other teachers to implement change in the school (Fullan & Hargreaves, 1991; Whitaker, 1995).

Empirical evidence concerning the actual effects of either formal or informal teacher leadership are limited in quantity and report mixed results. For example, many of the more ambitious initiatives establishing formal teacher leadership roles through the creation of career ladders have been abandoned (Hart, 1995). And Hannay and Denby's (1994) study of department heads found that they were not very effective as facilitators of change largely

due to their lack of knowledge and skill in effective change strategies. On the other hand, Duke, Showers and Imber (1980) found that increased participation of teachers in school decision making resulted in a more democratic school. Increased professional learning for the teacher leader also has been reported as an effect of assuming such a role (Wasley, 1991; Lieberman, Saxl, & Miles, 1988).

The concept of leadership does not take on different meanings when qualified by the term teacher or principal: it entails the exercise of influence over the beliefs, actions, and values of others (Hart, 1995). What may be different is how that influence is exercised and to what end. In a traditional school, for example, those in formal administrative roles have greater access than teachers to positional power in their attempts to influence classroom practice, whereas teachers may have greater access to the power that flows from technical expertise about teaching and learning. Traditionally, as well, teachers and administrators often attempt to exercise leadership in relation to quite different aspects of the school's functioning, although teachers often report a strong interest in expanding their spheres of influence (Taylor & Bogotch, 1994; Reavis & Griffith, 1993). These are reasons for expecting different effects from principal and teacher leaders, exercised through different conditions in the school.

Leadership as an organization-wide phenomenon (total leadership). The idea that leadership is not confined to those in formal managerial or leadership roles is at least 60 years old (Pounder, Ogawa, & Adams, 1995; Barnard, 1968). Recent interest in distributed leadership has been promoted by "substitutes for leadership" theory (e.g., Kerr, 1978), and institutional theory which argues that leadership is an organization-wide phenomenon (Ogawa & Bossert, 1995; Pounder, Ogawa & Adams, 1995). Organizational restructuring initiatives have stimulated inquiry about distributed conceptions of leadership, also, as flatter, team-based, more organic structures began to be favored over hierarchical structure (Banner & Gagné, 1995), a trend that swept through educational organizations in the form of site-based management (Murphy & Beck, 1995). And teacher leadership in the

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form of mentoring, career ladders, and greater participation in school decision making, as discussed above, has become one of the central pillars in recent school reform initiatives (Hart, 1995), further stimulating interest in non-managerial, distributed forms of leadership.

While support for the idea of distributed leadership is widespread, empirical evidence concerning its nature and effects in any organizational context remains extremely thin (Bryman, 1996). To illustrate, Ogawa and Bossert (1995), in arguing for the promise of an institutional approach to research on leadership, fail to cite a single empirical study in their consideration of implications for such research. A decade after the idea of substitutes for leadership was first published, Jermier and Kerr (1997) observe that "...we do not have much research on the processes through which the substitutes themselves exert their effects". Similarly, the literatures on site-based management, shared decision making, and teacher leadership offer skimpy insights about the effects of those distributed forms of leadership about which they are centrally concerned (Leithwood & Menzies, 1998; Conley, 1993; Little, 1995).

When leadership is viewed as an organization-wide phenomenon, it has many potential sources, in addition to teachers and principals. Parents and students are other obvious sources, for example, as are those non-personal, organization qualities identified in the "substitutes for leadership" literature such as task clarity and certainty, intrinsic sources of teacher rewards, formalization of the curriculum (Pitner, 1986), state regulation of instruction, and teacher peer groups (Firestone, 1996). A largely unexplored expectation that arises from viewing leadership as an organization-wide phenomenon is that the total amount of leadership from all sources in the school may account for significant variation in school effects (Bryman, 1996, p. 284). But we are unaware of empirical tests of this implication in school contexts. Our study provided one such test limited, however, to a focus on personal sources of leadership only.

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The model of transformational leadership which has developed from our own research in schools, including factor analytic studies, describes transformational leadership along six dimensions which were measured in this study: building school vision and goals; providing intellectual stimulation; offering individualized support; symbolizing professional practices and values; demonstrating high performance expectations; and developing structures to foster participation in school decisions (Leithwood, 1994; Leithwood, Jantzi, & Steinbach, in press). Each dimension is associated with more specific leadership practices and the problem-solving processes used by transformational leaders also have been described (Leithwood & Steinbach, 1995).

Most models of transformational leadership are flawed by their under representation of transactional practices (which we interpret to be "managerial" in nature). Such practices are fundamental to organizational stability. For this reason, we have recently added four management dimensions to our own model based on a review of relevant literature (Duke & Leithwood, 1994). These dimensions, also measured in this study, include: staffing, instructional support, monitoring school activities, and community focus.

School And Classroom Conditions Mediating Leader Effects

As Hallinger and Heck (1996a) note:

> ...principal leadership that makes a difference is aimed toward influencing internal school processes that are directly linked to student learning. These internal processes range from school policies and norms (e.g., academic expectations, school mission, student opportunity to learn, instructional organization, academic learning time) to the practices of teachers" (1996a, p. 38).

Because the largest proportion of principal effects on students are mediated by conditions or characteristics of the school, a significant challenge for leadership research is

to identify those alterable conditions known to have direct effects on students, and to inquire about the nature and strength of the relationship between them and leadership. Hallinger and Heck (1996) found evidence of only one mediating variable, school goals, consistently interacting with principal leadership. One reason for such limited results may be insufficient importance attributed by researchers to their choices of mediating variables. Leadership typically is "...abstracted from the organizational processes of which it is a part [rather than being viewed] as a special kind of organizing activity" (Hosking & Morley, 1988, p. 92-93).

Mediating school conditions included in this study were selected from a wide-ranging reviews of theoretical and empirical literature concerning classroom, school and district effects (Leithwood & Aitken, 1995). Results of this review were sorted into seven categories reflecting elements often associated with the design of formal organization (Galbraith, 1977; Daft, 1988; Banner & Gagne, 1995).

Mission and goals. These are what members of the school understand to be both the explicit and implicit purposes and directions for the school. Evidence suggests that such purposes contribute to school effectiveness, to the extent that members are aware of them, and to the extent they are perceived to be clear, meaningful, useful, current, congruent with district directions, and to reflect important educational values. This variable bears close similarity to what Stringfield and Slavin (1992) refer to as "meaningful goals" and what Reynolds et al (1996) label "shared vision and goals".

Culture. This variable consists of the norms, values, beliefs, and assumptions that shape school members' decisions and practices. The contribution of culture to school effectiveness depends on the content of these norms, values, beliefs, and assumptions (e.g. student centered). It also depends on the extent to which they are shared, and whether they foster collaborative work. This variable shares elements of Reynolds et al (1996) "learning

environment" and the "consensus and cooperative planning" to which Scheerens (1997), and Creemers and Reetzig (1996) refer.

School planning. The explicit means used for deciding on mission and goals, and on the actions to be taken for their accomplishment is the meaning of this variable. Planning processes contribute to school effectiveness to the extent that they bring together local needs and district goals into a shared school vision (Mortimore, 1993; Hargreaves & Hopkins, 1991).

Instructional services. These are interventions by teachers with students aimed at stimulating students' learning. Practices associated with this variable include, for example, instructional planning, the consideration of learning principles, clarification of appropriate instructional goals, decisions about curricular content, selection of instructional strategies, and the uses of instructional time. A large literature supports the important contribution to school effectiveness of these and closely related variables (Reynolds et al., 1996; Creemers & Reetzig, 1996) and suggests that classroom-level variables are a much more powerful source of achievement variation than are school-level variables (e.g. Bosker et al, 1990).

Structure and organization. This variable is defined by the nature of the relationships established among people and groups in the school and between the school and its external constituents. Such relationships contribute to school effectiveness, evidence suggests, when they support the purposes of the curriculum, and the requirements for instruction. Structure and organization also contribute to school effectiveness when they facilitate staffs' work, professional learning, and opportunities for collaboration. This variable includes elements of what Reynolds et al. (1996) include in "shared vision and goals", as well as in school ethos or "learning environment".

Information collection and decision making. The nature and quality of information collected for decision making in the school and the ways in which members of the school use that information and are involved in decisions also influences school outcomes.

Schools benefit when information for decision making is systematically collected, varied, and widely available to most school members for decisions. This variable is reflected in the importance attached to "monitoring student progress" (Reynolds et al., 1996; Mortimore, 1993) although it extends considerably beyond this focus.

Policies and procedures. Guidelines for decision making and action in the school is the meaning of this variable. These guidelines contribute to school effectiveness when they are student oriented, encourage continuous professional growth among staff, and encourage the allocation of resources to school priorities without stifling individual initiative. Evidence for the importance of this variable can be found in the concept of "high expectations", "consistency" and "control" (Mortimore, 1993; Creemers, 1994).

Student Engagement With School

The non-standard measure of student outcomes chosen as the dependent measure in this study, student engagement with school, was conceptualized, after the work of Jeremy Finn (1989), as having both behavioral and effective components. Extent of students' participation in school activities, both inside and outside of the classroom, is the behavioral component. The affective component is the extent to which students identify with school and feel they belong, an internal state found to mediate a wide range of achievement and behavioral outcomes among students. As it was defined and measured in this study, student engagement is quite similar to the "social cohesion" variable used by Oxley (1997) as a dependent measure for her test of the effects of community-like school qualities on students.

Student engagement was chosen as the dependent measure for several reasons. Expanding our understanding of leadership effects beyond basic math and language achievement was one of the reasons. The second reason was that it measures, directly and indirectly, educationally significant variables. For example, for many students, dropping out of school is the final step in a long process of gradual disengagement and reduced

participation in the formal curriculum of the school, as well as in the school's co-curriculum and more informal social life. Reversing such disengagement is a necessary requirement for achieving the ambitious outcomes advocated by most current school reform initiatives. Variation in schools' retention rates are likely to be predicted well from estimates of student participation and identification (Finn, 1989). Second, some factors giving rise to students becoming at risk are to be found very early in the child's pre-school and school experiences. Patterns of student participation and identification are sensitive to the consequences of these factors as early as the primary grades. Change in a student's participation and identification is a reliable symptom of problems which should be redressed as early as possible (Lloyd, 1978). Finally, at least a modest amount of evidence suggests that student engagement is a reliable predictor of variation in such typical student outcomes as social studies, math, and language achievement (Finn & Cox, 1992; Dukelow, 1993).

Family Educational Culture

In this study, family educational culture, a moderator variable, was used in place of more commonly used socio-economic status (SES) measures to represent contributions to student outcomes from home and family sources. Historically, SES has been the most powerful predictor of student success at school (e.g., Coleman et al., 1966; Bridge, Judd, & Moock, 1979). And it also has been shown to influence the form of leadership exercised by principals (Hallinger, Bickman & Davis, 1997). But SES is a crude proxy, masking a host of family interactions which have powerful educational consequences. These interactions vary widely across families, often without much relation to family income, for example.

The content of family educational culture includes the assumptions, norms, values, and beliefs held by the family about intellectual work, in general, school work in particular, and the conditions which foster both. Six literature reviews were used as the sources of seven

dimensions of either the family's educational culture or resulting behaviors and conditions demonstrably related to school success (Bloom, 1984; Walberg, 1984; Scott-Jones, 1984; Finn, 1989; Rumberger, 1983; 1987). Taken as a whole, these dimensions represent what Walberg (1984) referred to as the "alterable curriculum of the home". This curriculum, twice as predictive of academic learning as SES according to Walberg's analysis, includes:

- Family work habits: students benefit from a home environment which includes a reasonable degree of routine, emphasis on regularity in the use of space and time, priority given to school work over other activities, and adult models of a positive attitude toward learning;
- Academic guidance and support: student growth is fostered by the quality and availability of parental discussion, help and encouragement in relation to school work and by the provision of conditions which support such school work (e.g., study aids);
- Stimulation: aside from school work, students benefit from a home environment which provides opportunities to explore ideas, events and the larger environment. These opportunities may arise, for example, during meal conversations, in response to news events, as part of family travel and the like;
- Language development: student growth is assisted by opportunities in the home for developing correct and effective use of language and by speaking the language of school instruction in the home. Especially among young children, cognitive development is assisted when adult language is relatively elaborated and when messages are made explicit and context-free;
- Academic and occupational aspirations and expectations: school achievement and school completion are strongly related to parents' aspirations and expectations. Such aspirations and expectations have their most positive effect when they are both realistic and high for the individual child, and when they manifest themselves in specific standards for school achievement established with the child;

- Providing adequate health and nutritional conditions: ensuring a balanced diet and adequate sleep are minimum conditions to be fostered by the family;
- Physical setting: it is important to provide personal space for students which is sheltered from excessive social stimulation. Excessive noise also has been linked to reading disorders, impaired auditory discrimination and poor performance on visual search tasks.

Research Methods

Data about leadership, school conditions, student engagement, and family educational culture were collected through surveys in one large school district in the Canadian province of Ontario. The district, serving a population of approximately 58,500 urban, suburban, and rural students, was located in the south-central part of the province and employed a total of 4456 teachers, and 201 principals and vice principals in 100 elementary and 16 secondary schools.

Instruments

Two survey instruments were developed, one to collect data from teachers on school conditions and leadership, the other to collect evidence from students on their engagement with school and their family's educational culture.

School Conditions and Leadership Survey. This instrument contained 284 items measuring five sets of school conditions, two sets of classroom conditions. the nature and sources of school leadership, and the extent to which transformational and transactional forms of leadership were being exercised in the school.

Items measuring school conditions (148), classroom conditions (69), and the nature of school leadership (53), stated in their most desirable form, were rated on a five-point Likert scale ("strongly disagree" to "strongly agree" that the statement was true for their school, with a "not applicable" response option also available).

Teachers also indicated whether or not (yes/no/not applicable) each of 7 potential sources provided leadership, and the extent of influence on activities in the school of each source of leadership (a four point scale ranging from minimal to very strong). Categories of leadership sources available for both questions included principal, vice principal, department heads, individual teachers providing leadership on an informal basis, teacher committees/teams set up especially to provide leadership, students, parents and/or other members of the community.

Student Engagement and Family Culture Survey. This instrument contained 61 items measuring student participation in school activities (34), student identification with school (17), and students' perceptions of their family educational culture (10). Students responded to each item on the same five-point scale used by teachers ("strongly disagree" to "strongly agree") that the statement was true for them, with a "not applicable" response option also available.

Sample

Teachers. The extensive number of survey items required for the study necessitated the use of a matrix sampling plan for distribution of three versions of the School Conditions and Leadership Survey for elementary teachers and four versions for the secondary teachers. Each version collected data on at least three sets of school conditions with leadership items included in two elementary and three secondary versions. The 1818 elementary and 909 secondary teachers who completed the surveys were 61% of the 4456 teachers within the district. Data for all the variables in this study were complete for 94 elementary and 16 secondary schools, a 95% response rate for the 116 district schools. Six elementary schools with a total of 50 teachers were dropped from the analysis due to missing data, a 1% reduction in the teacher sample.

Students. The student instrument was administered to all students in grade 5, 6, or 7 depending upon which of these grades was highest in a particular school. All grade 11

students in the 16 secondary schools received the survey. The 6490 elementary and 2535 secondary students who completed the surveys in the 110 sample schools reflect a response rate of 88% for the 10,311 students surveyed.

Data Analysis

Data were the responses of individual teachers and students to the surveys described above, aggregated to the school level. SPSS was used to aggregate individual responses by school and then to calculate means, standard deviations, and reliability coefficients (Cronbach's alpha) for all scales measuring the variables. A factor analysis was used to examine the extent to which the variables included in the School Conditions and Leadership Survey loaded on the factors they were intended conceptually to measure. Principal components extraction with varimax rotation was used to analyze the seven school conditions to estimate the number of factors measured by the specific conditions. A second factor analysis was done on the 53 items measuring nature of school leadership to estimate the number of factors those items measured. Items in the two scales loaded on different factors; the 32 transformational leadership items loaded on four factors and the 21 school management items loaded on three factors. Items measuring a specific dimension of leadership, transformational or transactional, loaded as a group on the same factor. The results of this analysis reinforced the decision to treat transformational and transactional leadership separately for subsequent analysis. Pearson-product correlation coefficients were used to estimate the strength of relationships between all of the variables measured in the study. Two-tailed T-tests were conducted on measures of leadership influence from various sources to compare mean ratings of teachers in elementary and secondary.

The LISREL 8 analysis of covariance structure approach to path analysis and maximum likelihood estimates (Joreskog & Sorbom, 1989) was used to assess the direct and indirect effects of leadership on student engagement. This path analytic technique tests the validity

of causal inferences for pairs of variables while controlling for the effects of other variables.

A series of regression analyses were also used to estimate the extent to which each of the mediating variables included in the study were influenced by the different conceptions of leadership measured, and the extent to which each of the mediating variables, in turn, contributed to student engagement.

Results

Evidence collected for the study was used to examine the relative influence, on schools and students, of leadership offered by those in specific roles, the influence of leadership conceived of as an organization-wide phenomenon, and the influence of a transformational approach to leadership. Also examined were the variables mediating leadership influence. Tables 1, 2, 3, and 4 as well as Figures 1, 2, and 3 summarize the results of the analysis carried out to examine these three issues.

Table 1 reports the means and standard deviations of teachers' ratings, aggregated to the school level, of the perceived degree of influence on the school of six different roles, along with teachers acting in committee. Means and standard deviations are reported for the total sample of schools (N=110), as well as for the elementary school (n=94) and secondary school (n=16) samples separately. Results of t-tests conducted to determine the significance of differences between elementary and secondary school ratings indicated that all such differences were statistically significant ($p<.05$) except those concerning student leadership.

[Insert Table 1 about here]

Table 2 reports school-level aggregations of teachers' responses (means and standard deviations) to all scales included in the School Conditions and Leadership Survey. Comparable information about student responses to items included in the three scales of

the Student Engagement and Family Culture Survey appear in the last three rows of this Table. The far right column indicates that the internal reliability of all scales was acceptable (.76 to .96).

[Insert Table 2 about here]

Sub headings appearing in the left column of Table 2 reflect the results of the factor analysis reported in Table 3. The seven school conditions included in the original framework for the study loaded on two factors. One of these factors included most items concerned with school-wide conditions. The second factor included most items concerning classroom practices, as well as policies about such practices. Table 4 reports correlations among variables included in Table 2.

[Insert Tables 3 and 4 here]

Figures 1, 2 and 3 display three path models resulting from LISREL analyses testing a version of the initial framework for the study. Figures differ only in respect to how leadership was conceptualized. Three additional path models were computed (but are not displayed in figures) to test our initial framework without inclusion of family educational culture. Each of these models parallel the models in Figures 1, 2 and 3, and are described in the text below.

The three models that did not include family educational culture, with acceptable fit with the data[1], demonstrated the following similarities:

- the total amount of explained variation is modest with respect to student identification (from 23 to 26%) but substantial with respect to student participation (from 75 to 79%);
- the direct relationship between school conditions and student identification is significant or approaching significance (.28 to .47).

[1] The chi square was 0 for each of the three models not displayed, indicating a perfect fit. In Figures 1, 2, and 3, the ratios for chi square to degrees of freedom were 1.9, .39, and .68, respectively. The goodness of fit indices for Figures 1, 2, and 3 were .99, 1.00 and 1.00 with adjusted goodness of fit indices of .86, .97, and .95.

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- the direct relationships between both school and classroom conditions and student participation are not significant and in some cases are negative. With coefficients ranging from .79 to .82, student identification appears to mediate effects on student participation;
- leadership variables are significantly related to school conditions (.32 to .48) but weakly and often negatively related to classroom conditions (-.19 to .05).

Differences among these models were largely to be found in the total direct and indirect effects on participation and identification of the different leadership variables. One of the models demonstrated weak, nonsignificant, positive effects of principal leadership on both participation and identification (.10 and .14 respectively). Teacher leadership, in contrast, had significant, and moderate to strong total effects on both aspects of student engagement (.50 and .35). Total leadership had weak, negative, direct and indirect effects combined on both aspects of student engagement. The total effects of transformational leadership practices on both aspects of student engagement were strong and positive (.60 and .51) whereas these effects were weak, negative, and nonsignificant (-.25 and .12) in the case of transactional leadership practices. In sum, evidence from the three path models that did not include family educational culture suggested that leadership has important consequences for student engagement especially when its source is teachers and its form is transformational.

When family educational culture is introduced into the path models as an exogenous variable, the results are shown in Figures 1, 2, and 3. In all three models, family educational culture is linked to school conditions and both student engagement variables. In Figures 1 and 2 it also is linked to leadership. There are a number of similarities in the results displayed across these three models:

- the total amount of explained variation in both aspects of student engagement is substantial: about 65% in the case of student identification, and 83% in the case of student participation;

- the direct relationship between school conditions and student identification is significant or approaching significance (.23 to .17) except the Figure 3 model, where it is quite weak (.06);
- the direct relationships between both school and classroom conditions and student participation are not significant and in some cases are negative. With coefficients ranging from .47 to .52, student identification appears to mediate effects on student participation;
- leadership variables are significantly related to school conditions (.36 to .48). They are weakly and often negatively related to classroom conditions (-.19 to .05).
- the total leadership variable is the weakest of the leadership variables with total effects of .-07 and -.02.
- the combined direct and indirect effects of all leadership variables on both aspects student engagement are not significant.

[Insert Figures 1, 2, and 3 here]

A comparison of path models with and without family educational culture included indicates potentially important similarities in the direction but considerable differences in the strength of some results. The increased explanatory power for student identification in particular achieved by adding family educational culture to the models dilutes the total effects of all leadership variables on both student engagement variables. Transformational forms of leadership still have the greatest combined effects on both aspects of student engagement (.16 and .11) but, as the Figure 3 model indicates, these effects are neither statistically significant nor much greater than some of the other leadership variables. Combined direct and indirect effects of total leadership remain negative and not significant, but adding family educational culture to the models marginally reduces these negative effects (from -.14 and -.09 to -.07 and -.02). The relative influence of teacher and principal

leadership is more ambivalent in the Figure 1 model as compared with its counterpart omitting family educational culture. Total effects of teacher leadership are no longer significant, and while not significant either, the total effects on student identification are marginally greater for principal than teacher leadership (.08 vs. -.04).

In sum, evidence presented in Figures 1, 2, and 3 indicates that family educational culture significantly moderates the effects of all sources of leadership, as well as transformational and transactional forms of leadership. It suggests, as well, that the influence of principal and teacher leadership may not be as different as the results summarized in path models not including family educational culture.

A series of regression analyses was conducted in order to determine which classroom and school conditions mediated leadership effects on student engagement. One series examined the extent of variation in each classroom and school condition explained by each of the leadership variables in the study. A second series examined the extent of variation in each of the two student engagement variables explained by each school and classroom condition.

Table 5 reports partial results of the first series, in this case to determine the extent of variation in each school and classroom condition explained by principal and teacher leadership. The adjusted R^2 statistics indicate that both forms of leadership explained significant proportions of variation in all but one mediating variable (instruction). Although principal and teacher leadership explained similar amounts of variation in school conditions overall (36% vs. 34%), the percentage of explained variance in specific mediating variables differs for principals and teachers: planning (32 vs. 39), mission (26 vs. 18), culture (26 vs. 15), structure and organization (18 vs. 29), information collection and decision making (15 vs. 12). Both leadership forms explain about 9% of the variation in policies and procedures guiding classroom practice.

Three additional sets of regression equations were computed in this first series to examine the amount of variation explained by transformational leadership, transactional leadership, and total leadership (space prevents us from reporting the results in table form). With only minor differences in percentages of explained variation (a bit more), results for transformational and transactional leadership were virtually identical with one another and with the results reported in Table 5. Total leadership, in contrast, explained a much smaller proportion of variation, and an amount that was significant only for planning (12%), mission (11%), structure and organization (4%), and culture (4%).

The second series of regression analyses was conducted to determine the amount of variation in student participation and identification explained by each classroom and school condition. Once again, these results are summarized in the text but not presented in tables. Neither classroom condition (policies, instruction) accounted for any significant variation in either student engagement variable, while four school conditions did explain significant variation. School conditions combined explained 14% of the variation in both student participation and identification with mission, culture, information collection, and decision-making processes each explaining a small, but significant, proportion of an additional 17% of variance.

Summary and Discussion

Using path analytic techniques, survey data from 2677 teachers and 9025 students in 110 schools in one large district were analyzed in order to address questions about the relative effects on organizational conditions and student engagement of leadership provided by those in different roles. These data were used, as well, to inquire about the effects of leadership conceived of as an organization-wide phenomenon, and the effects of transformational approaches to leadership.

Principal And Teacher Leadership

Results of the study provide evidence of principal and teacher leadership effects considered separately, as well as the relative effects of these two sources of leadership. One finding was that the effects on student engagement of both sources of leadership are substantially moderated by family educational culture. This moderating effect is especially strong for teacher leadership. A plausible implication of these findings is that high levels of student engagement reduce teachers' perceived needs for teacher or principal leadership. Student engagement could be conceived of as a substitute for leadership (Howell, 1997), as well as a student outcome.

A second important finding is that neither source of leadership - principal or teacher - had statistically significant effects on student engagement, at least when family educational culture was included in the analyses. Two quite different interpretations of these results are possible. The most obvious interpretation is that student engagement in school is not affected in any important way by school leadership, an interpretation fundamentally in contradiction with the assumptions of most school professionals, normative assertions about the role of leadership in schools (e.g., Hudson, 1997; Foster, 1989), and the results of most school effectiveness studies (e.g., Mortimore, 1993). This might be termed the "romance of leadership" interpretation, after Meindl's (1995) argument that leadership is a convenient, phenomenologically legitimate, social construction which, nonetheless, masks a complex, multi-sourced bundle of influences on organizational outcomes.

A second interpretation of these results, after Hallinger and Heck (1996b), cautions against dismissing, as not meaningful, the admittedly small effects of principal and teacher leadership on student engagement. The relationships between these two sources of leadership and school conditions are moderately strong, explaining 66% of the variation in school conditions, a proportion that does not change by adding family educational culture to the analyses. Their total effects on student engagement are just as strong as the total effects of school conditions and stronger than classroom conditions.

To put this interpretation in a broader context, recent reviews of empirical research on school effectiveness suggest that educational factors for which data are available explain, in total, something less than 20% of the variation in student cognitive outcomes (very little evidence is available concerning such non-cognitive outcomes as the one used in this study). Reynolds et al (1996) suggest 8-12% for research carried out in the United Kingdom, while Creemers and Reetzig suggest 10-20% for studies carried out "in the Western Hemisphere...after correction for student intake measures such as aptitude or social class..." (1996, p. 203). Variation within this range from study to study may be explained by, for example, school size, type of student outcome serving as the dependent measure, nature of students, and department and subject matter differences.

While these relatively small amounts of explained variation are now considered to be both meaningful, and practically significant, a school is not a single variable. It is an aggregate of variables - the so-called correlates of effective schools, or the school and classroom conditions used as mediating variables in this study. Some of these variables most likely contribute more strongly than others to school's effects, although they have yet to be unpacked empirically, except for distinguishing between classroom and school level factors (Creemers & Reetzig, 1996; Scheerens, 1997). Efforts to do the unpacking, however, realistically begin with very modest amounts of variation to be explained, especially if it is assumed (reasonably) that at least a handful of factors contribute to explained variation. This was Ogawa and Hart's (1985) argument in claiming importance for their finding that principal leadership explained 2-8% of the variation in student performance. Under such circumstances knowing the relative explanatory power of a variable will be at least as interesting as knowing the total amount of variation it explains.

Finally, the results suggest that teacher leadership effects far outweigh principal leadership effects before taking into account the moderating effects of family educational culture. When this variable is taken into account, teacher leadership effects are reduced considerably, but remain at least as strong as principal leader effects. More teacher

leadership has been advocated over the past decade for several reasons but without much evidence that it has the potential its advocates claim. Evidence from this study is similar to Heller and Firestone's (1995) conclusion that principal leadership does not stand out as a critical part of the change process.

Results of multiple regression analyses further suggest that the effects of both principal and teacher leadership are mediated by most of the same school and classroom conditions. Only in relation to mission, culture, and structure and organization were there differences of any consequence in the amount of variation explained by each source of leadership. Principal leadership explained more variation in mission and culture, whereas teacher leadership explained more variation in structure and organization. On the basis of this evidence it seems that teacher and principal leadership exert largely the same amount of influence on many of the same school and classroom conditions. This challenges the wisdom of current policies governing the allocation of leadership development resources within many districts and provinces/states. Disproportionate amounts of these resources are allocated to the development of leadership capacities of those aspiring to, or already in, the principalship. Redistributing these resources more equally among those in teacher and administrator roles would appear to be more appropriate.

Total Leadership

While principals and teachers are obviously important sources of leadership in schools, there are longstanding and compelling reasons to inquire about other role-related and non-person sources of leadership (Barnard, 1968; Bryman, 1996; Jermier & Kerr, 1997). Conceiving of leadership as something that may be widely distributed throughout the school in persons, as well as in elements of the school's design, raises the largely unexamined possibility that the greater the total amount of leadership exercised, the better off is the organization.

The aggregated influence of seven role-related sources of leadership was used to construct a measure of total school leadership in our study. This measure was then introduced into two path models that estimated its total direct and indirect effects on student engagement: one path model estimated the moderating effects of family educational culture on student engagement, the other did not consider this variable. In the case of both models, total leadership had non-significant, negative effects on student engagement, both participation and identification. It also had significant, but much weaker relationships with school conditions than any of the other sources or types of leadership measured, except transactional leadership.

These results do not suggest a simple, linear, "more is better", relationship between total leadership and school effects. Indeed, should subsequent research confirm the negative effects of total leadership on student engagement (along with some other important outcomes), the most plausible hypothesis would be that the relationship is curvilinear. Beyond some as yet unclear, optimal level of total leadership, perhaps more leadership actually detracts from clarity of purpose, sense of mission, sufficient certainty about what needs to be done to allow for productive collective action in the school, and the like. Because robust, quantitative evidence about the effects on schools of leadership from sources other than teachers and principals is almost non-existent, we believe these results call for considerable caution on the part of those who argue that everyone should become a leader. However attractively egalitarian and democratic that may seem, perhaps schools benefit most from the leadership of a small number of easily identified sources.

Transformational Leadership

Transformational approaches to leadership were included in the study as a response to the lack of evidence about their contribution to school effects when exercised in a distributed fashion. These forms of leadership are theoretically appropriate to the demands of the restructuring contexts faced by schools in the study (Leithwood, 1994), and their

effects on a wide array of organizational and student outcomes when exercised by principals (Leithwood, Tomlinson & Genge, 1996) have been demonstrated.

Also examined in the study were transactional or managerial forms of leadership. While Bass' (Bass, 1985; Bass & Avolio, 1994) conception of transactional leadership suggests that it is a building block for transformational leadership, studies in school contexts have typically reported weak or non existent contributions (Leithwood, 1996). But because these findings may be explained by inadequately specified models of such leadership, this study examined the effects of a more fully specified model of transactional leadership. Even with such a model, however, no effects of transactional leadership were found. Indeed the total effects of such leadership practices on student engagement were sometimes negative. It is tempting to simply consider these results as one more reason to believe that transactional leadership is of no importance in schools. Yet schools could not function without the practices used to define such leadership in this study. One possible explanation for our results might be found in the strong correlations between transactional and transformational leadership. Our procedure for assessing transactional effects may have allowed transformational leadership to "siphon off" transactional effects.

Evidence from the study about the effects of teacher sources of leadership and transformational forms of leadership are very similar. Before considering the moderating effects of family educational culture, the total effects of both leadership variables on student participation were in the .5 to .6 range; effects on student identification were in the .3 to .5 range. The moderating effects of family educational culture reduced these effects to .10 to .16 for participation. Family educational culture weakened the effects on student identification of teacher leadership to -.04 whereas the comparable effect for transformational leadership was .11. None of the effects, with family educational culture considered, were statistically significant. Given earlier discussions about how large an effect must be in order to be considered important, however, distributed forms of transformational leadership still should be considered promising.

Variables Mediating Leadership Effects

The influence of principal and teacher leadership on all school conditions and one of the two classroom conditions was significant. This is in contrast to trends reported in Hallinger and Heck's (1996b) review, and confirm the value of the strategy we used to select these variables for our framework. At least two such strategies are available. One strategy is to adopt a set of mediating variables from a coherent theory. Pounder, Ogawa, and Adams (1995), in a study of leadership as an organization-wide phenomenon, illustrate the use of this strategy. The four mediating variables adopted for their study, as they point out, bear a close resemblance to the functions Parsons (1960) argued were necessary for organizational effectiveness and survival. These variables, conceptualized as mechanisms by which organizational leadership is projected to affect school performance, included goal achievement, integration, adaptation, and latency.

A second strategy for identifying promising mediating variables, the strategy adopted for this study, is to acknowledge promising theoretical variables but to require reasonable levels of empirical support for variables to be included in the study whether or not they are associated with theory. Results of this study, which attribute importance to most of the seven variables emerging from reviews of empirical literature, unevenly informed by theory, illustrate the main limitation of using theory alone as a basis for choosing mediating variables for research on leadership effects. In comparison with Pounder et al (1995), for example, the strategy we used identified variables that encompassed all four of their mediating variables but included other potentially important variables, as well. While generating mediating variables from a coherent theory potentially increases the explanatory power of results, one needs to be concerned that empirical evidence has not already outrun the power of the theory selected.

Conclusion

Our conclusions consist of a series of recommendations for subsequent research emerging from both methodological and substantive issues related to the study. Several methodological features of the study constrain the claims that can be made with the evidence. The first and most obvious constraint is that path analytic techniques provide only "soft" answers to the sort of cause - effect questions with which the study was concerned. Path models reported in the study estimate: the strength of the relationships among variables specified in an a priori framework; the extent to which there is support for the direction of the relationship specified among variables; the amount of variance in the dependent variable (student engagement) explained by all other model variables together; and the relative, total effect of independent and moderating variables in the model on the dependent variable.

While the limited ability of path analytic techniques to address cause - effect relationships is important to acknowledge, in the context of real social science research, the robustness of these techniques compares favorably with experiments and quasi experiments. Such designs can almost never be implemented in field settings without encountering enormous problems (Goldstein, 1997), including those arising from uncontrolled competing hypotheses or threats to the ecological validity of the data, for example. So, while we endorse Hallinger and Heck's call for more diversity in research designs, we disagree with their specific suggestion that greater use be made of quasi experimental designs in studies of principal leadership effects (1996b, p. 774).

Because data were collected at one point in time, as in most leadership research (Hunt & Peterson, 1997), the study was unable to take into account the contribution of leadership to changes in school conditions, classroom conditions, or student engagement, a second limitation of the study. Hallinger and Heck (1996b) point out the importance of longitudinal data when the direction of causality among variables is in doubt. As a minor illustration of

the value of longitudinal designs, there are at least good conceptual reasons for assuming the direction of influence indicated by the path models tested in this study, with the singular exception of school mission. Significant amounts of variation in this mediating variable were explained by both principal and teacher leadership. And this variable explained small but significant proportions of variation in student engagement. It was the only variable that demonstrated consistent effects in the Hallinger and Heck reviews. In this study, however, its relationship with student engagement was negative! Because we did not use a longitudinal design, we can only speculate about the meaning of such a relationship. Perhaps reduced levels of student engagement prompt greater effort by school staffs to clarify their missions and to create more consistency in their collective goals and priorities; high levels of student engagement may reduce the need perceived by staffs for sharply focused and widely shared school missions. Such a possibility is worth further exploration in the context of a longitudinal study.

Several additional, potential limitations of our study arise from analyzing data aggregated to the school level, a common procedure in leadership effects research. As Goldstein (1997) has pointed out, such analyses reveal nothing about effects on individual students, and relationships at the school level may be very different than those found at the student level. This point applies to the perceptions of leadership on the part of teachers, as well. Whereas, analyzing our data aggregated to the school level assumed that leadership was perceived in a similar fashion by all teachers within schools, there might have been more within- than across-school variation in such perceptions. To determine if this was the case, we conducted a one-way analysis of variance of teachers perceptions of leadership (not described in this paper) which indicated that it was not. Such a check would be useful to routinely include in subsequent research.

Additionally, aggregating data to the school level overlooks the possibility that variation in leadership effects on classroom conditions, and variation in classroom effects on student engagement may be greater between classes within schools than across schools. Rowe et al

(1995), Goldstein (1997), Stringfield and Slavin (1992), among others, argue that classroom conditions account for much more of the variation, in student achievement, than do school conditions. Student engagement, as distinct from achievement, may be less sensitive to variation in classroom conditions, however. This possibility may also reduce the severity of another limitation, our restricted specification of classroom conditions. Several such conditions found to be important contributions to student learning (opportunity to learn, for example) were not measured by our instruments (see Scheerens, 1997, for a review of these conditions).

Since the student outcome measure used in this study was not achievement, it is not clear how critical is this omission. But the weak associations reported in all path models between classroom conditions and student engagement suggest that marginal increases in the comprehensiveness of this variable, or changes in its nature, would not have significantly altered the results. The implication for future research is to assume that the choice of dependent variables has non-trivial consequences for the selection of mediating variables. It seems unlikely that there is one "best" set of such variables, although the influence of leadership on distinctly different categories of dependent variables (e.g., achievement, attitudes, values) may be mediated reliably by at least partly distinct sets of school and or classroom variables. Determining if this is so would be an important contribution toward better understanding the etiology of school leadership effects.

Finally, with respect to method, there is the possibility of several of the strongest relationships reported in the path models being a function of same-source bias. This possibility is strongest in the case of the relationships between family educational culture and student engagement, two variables which were measured using responses from the same students. Same-source bias is a possible but less likely explanation of the strong relationships reported between all conceptions of leadership examined in the study and school conditions because of the matrix sampling procedure that was used for collecting data about leadership, school conditions and classroom conditions. Whatever same-source

bias there might have been seems unlikely to have produced deceptively strong relationships between leadership and classroom conditions. Nevertheless, subsequent large scale empirical studies such as this one would be improved by ensuring independent sources of evidence about leadership variables, mediating variables, and dependent variables.

Additional recommendations for future research arise from the substantive results of the study. First, it would be useful to inquire in more depth, perhaps using qualitative techniques, about the nature of the interactions between leadership, from both teacher and principal sources, and family educational culture. Does family educational culture moderate leadership effects as our data implied? Should it? Or are their more positive effects to be realized when leadership influence is maintained, even in the presence of robust family educational cultures?

It would be useful, as well, to explore more fully the relationship between teacher and principal leadership, focusing in particular on the nature and effects of "synergistic leadership". While evidence from this study has identified mostly similarities in the extent of influence from these two sources of leadership and the variables which mediate this influence, common experience suggests very different leadership opportunities are typically available to principals and teachers. So it should be possible to design the exercise of teacher and principal leadership to be more than just mutually supporting or reinforcing. Describing leadership in schools which have managed to create synergistic teacher and principal leadership, and examining the consequences of such leadership, may lead to more complex and productive models of both principal and teacher leadership than are presently available.

Third, while results of this study suggest that total leadership makes especially weak, if not negative contributions to student engagement, this may be a function, in part, of how such leadership was conceptualized and measured. Particularly valuable would be research with a concept of total leadership expanded to include non-person sources ("substitutes for

leadership", for example) and research examining the relative effects on schools of each source, along the lines used to compare the relative influence of teacher and principal leadership in this study.

Finally, given the results concerning transformational and transactional leadership effects on student engagement, subsequent research more fully describing the nature of transformational leadership exercised by those in non-administrative roles would be useful. Because of the present lack of evidence, it would be especially helpful to better understand what such leadership consists of when exercised by teachers, and especially when exercised informally. Does variation in positional authority influence the nature of transformational leadership practices?

These recommendations for future research constitute an ambitious agenda aimed at broadening current conceptions of school leadership and pushing the quality of evidence about their effects to a significantly higher level.

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Table 1

Ratings of Leadership Influence within Schools by Leadership Source: Means and Standard Deviations

	Total Sample (N=110)		Elementary (N=94)		Secondary (N=16)	
	M	SD	M	SD	M	SD
Source of Leadership:						
Principal	3.23	.64	3.33	.60	2.63	.54
Vice Principal	1.74	1.48	1.62	1.55	2.43	.60
Department Heads	.53	.92	.16	.23	2.67	.32
Individual Teachers	3.06	.39	3.14	.33	2.63	.44
Teacher Committees	2.46	.63	2.59	.56	1.66	.42
Students	1.55	.53	1.54	.53	1.62	.51
Parents	1.40	.77	1.53	.74	.66	.36

[1] Rating Scale: 0 = No leadership from source, 1 = Minimal, 2 = Moderate, 3 = Considerable, 4 = Very Strong

Note: T-tests were conducted on the elementary and secondary mean ratings to compare the ratings by teachers in the two levels: all differences between mean ratings were statistically significant ($p<.05$) except between ratings of Student Leadership.

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Table 2

Teacher Ratings of School and Classroom Conditions and Transformational Leadership, as well as Student Ratings of Family Culture and Engagement
(N = 110 Schools)

	Mean	SD	Scale Reliability (Cronbach's Alpha)
Teacher Ratings of School Conditions:			
School Conditions (Aggregate)	3.82[1]	.31	.87
Culture	4.03	.31	.89
Information Collection & Decision Making	4.04	.33	.88
Mission	3.88	.49	.95
Planning	3.61	.40	.92
Structure & Organization	3.58	.40	.87
Teacher Ratings of Classroom Conditions:			
Classroom Conditions (Aggregate)	3.97	.22	.78
Policy & Procedures	3.77	.25	.79
Instructional Strategies	4.17	.22	.88
Teacher Ratings of Transformational Leadership:			
Transformational Leadership (Aggregate)	3.91	.41	.96
Transformational Leadership			
Symbolizing Professional Practice	4.00	.51	.93
Developing Collaborative Structure	3.83	.47	.93
Providing Individualized Support	3.95	.51	.90
Providing Intellectual Stimulation	3.68	.49	.94
Holding High Expectations	4.18	.39	.87
Fostering Development of Vision & Goals	3.71	.50	.93
Transactional Leadership			
Establishing Effective Staffing	3.94	.34	.76
Providing Instructional Support	3.54	.50	.85
Monitoring School Activities	4.10	.55	.92
Providing Community Focus	4.18	.41	.90
Student Ratings of Family Educational Culture:			
Family Educational Culture	4.02	.33	.79
Student Ratings of Engagement with School:			
Participation	3.49	.26	.81
Identification	3.94	.27	.93

[1] Rating Scale: 1 = Disagree Strongly; 5 = Agree Strongly

Table 3

Factor Pattern Matrix Resulting from Analysis of Teacher Ratings of Conditions within Their Schools

(N = 110 Schools)

	Factors	
	1	2
	School Conditions	*Classroom Conditions*
1. School Culture	.78	
2. Information Collection & Decision Making	.63	
3. School Mission	.79	
4. Planning	.84	
5. Structure & Organization	.84	
6. Policy & Procedures		.80
7. Instructional Strategies		.92
Eigenvalue	3.75	1.25
Percent of Explained Variance	53.6	17.9

Table 4

Relationships Among Leadership Sources, School and Classroom Conditions, Leadership Types, Family Educational Culture, and Student Outcomes
(N = 110 Schools)

	PL	TeL	ToL	SC	CC	TrL	TaL	FEC	Part	Ident
Principal Leadership (PL)	1.00	.26**	.40**	.60**	.24*	.70**	.78**	.21*	.23*	.24*
Teacher Leadership (TeL)	.26**	1.00	.23*	.59**	.28**	.55**	.43**	.52**	.53**	.39**
Total Leadership ToL)	.40**	.23*	1.00	.32**	.07	.38**	.42**	-.09	-.14	-.09
School Conditions (SC)	.60**	.59**	.32**	1.00	.42**	.81**	.81**	.38**	.43**	.44**
Classroom Conditions (CC)	.24*	.28**	.07	.42**	1.00	.25**	.26**	.22*	.26*	.29**
Transformational Lead. (TrL)	.70**	.55**	.38**	.81**	.25**	1.00	.89**	.34**	.38**	.40**
Transactional Lead. (TaL)	.78**	.43**	.42**	.81**	.26**	.89**	1.00	.25**	.28**	.33**
Family Educational Culture (FEC)	.21*	.52**	-.09	.38**	.22*	.34**	.25**	1.00	.85**	.78**
Participation (Part)	.23*	.53**	-.14	.43**	.26**	.38**	.28**	.85**	1.00	.86**
Identification (Ident)	.24*	.39**	-.09	.44**	.29**	.40**	.33**	.78**	.86**	1.00

**p < .01, *p <.05

Table 5

Effects of Principal and Teacher Leadership Influence on School and Classroom Conditons
(N = 110 Schools)

	Principal Influence		Teacher Influence	
Dependent Variables	Adj R^2	F Ratio	Adj R^2	F Ratio
School Conditions:				
School Conditions Mean	.36	61.18***	.34	56.33***
Planning	.32	51.96***	.39	72.13***
Mission	.26	39.71***	.18	25.49***
Culture	.26	38.74***	.15	20.24***
Structure & Organization	.18	24.88***	.29	45.24***
Information Collection	.15	19.37***	.12	15.37***
Classroom Conditions:				
Classroom Conditions Mean	.05	6.87**	.07	9.21**
Instruction	.01	2.06	.02	3.55
Policy & Procedures	.09	10.44**	.09	12.40***

*** $p < .001$; ** $p < .01$

Note: Each row in the table summarizes two separate regression analyses run to determine how much of the variation in the school or classroom variable was explained by principal leadership and how much was explained by teacher leadership. Degrees of freedom for F equations were (1,108).

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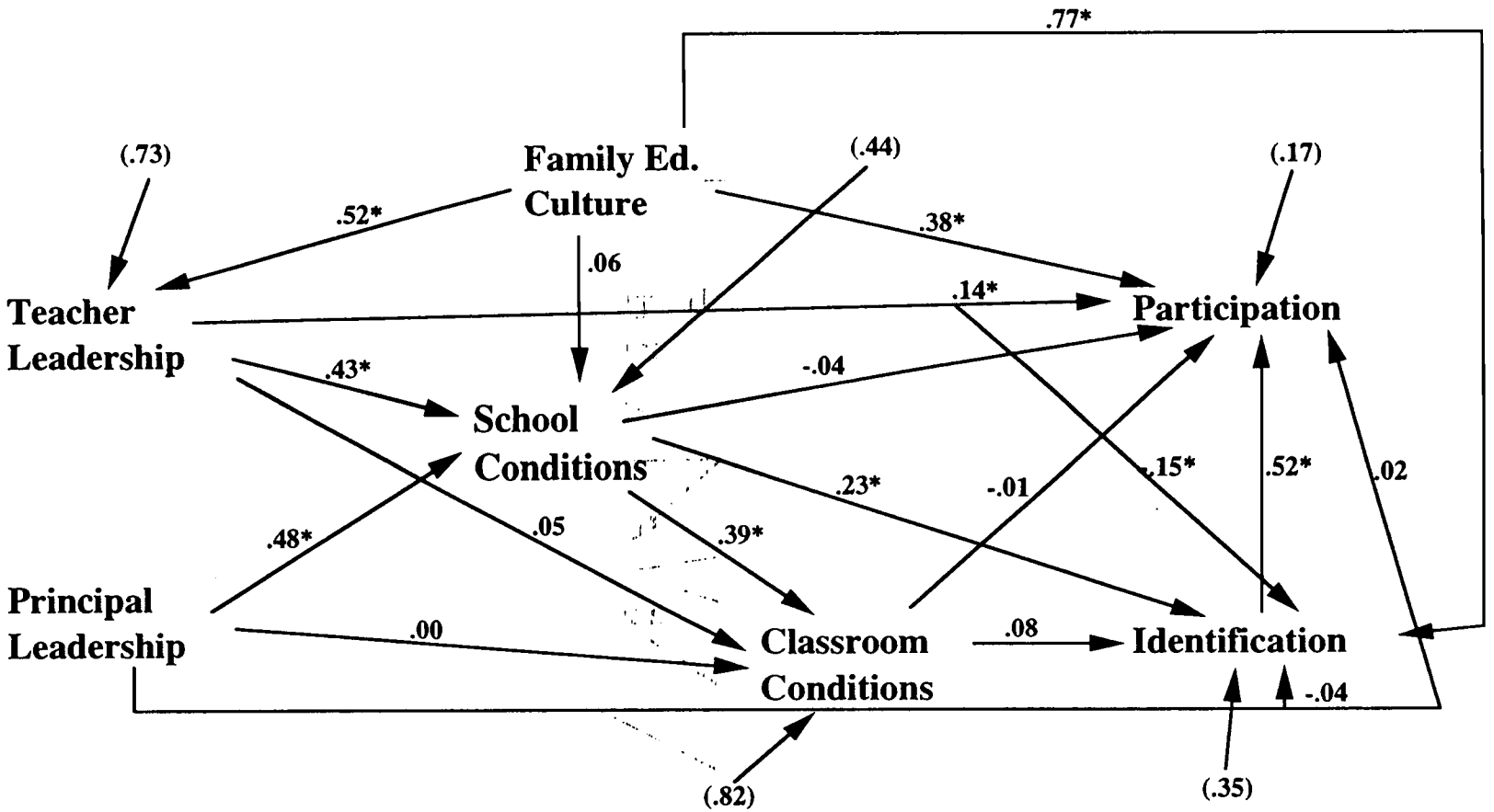
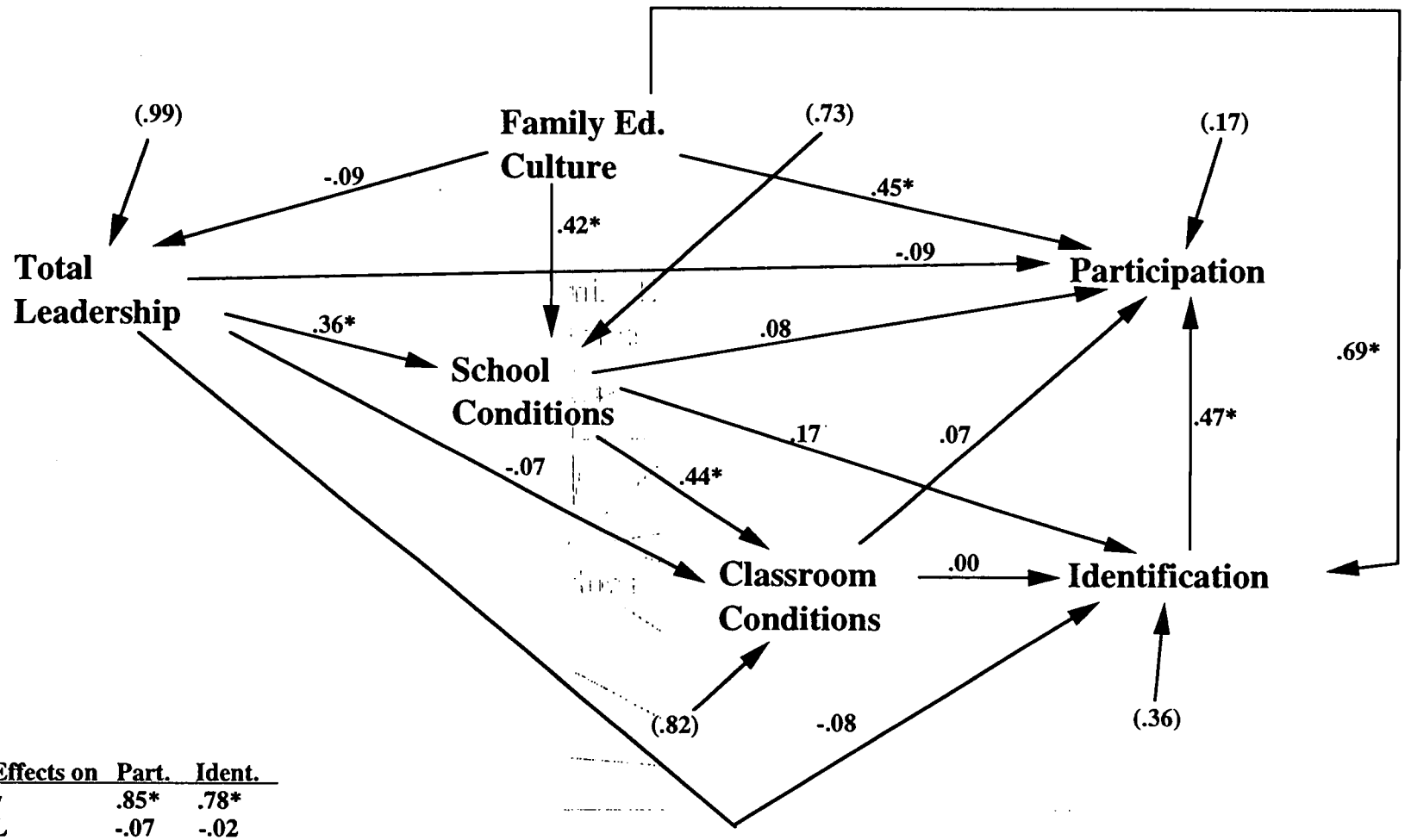


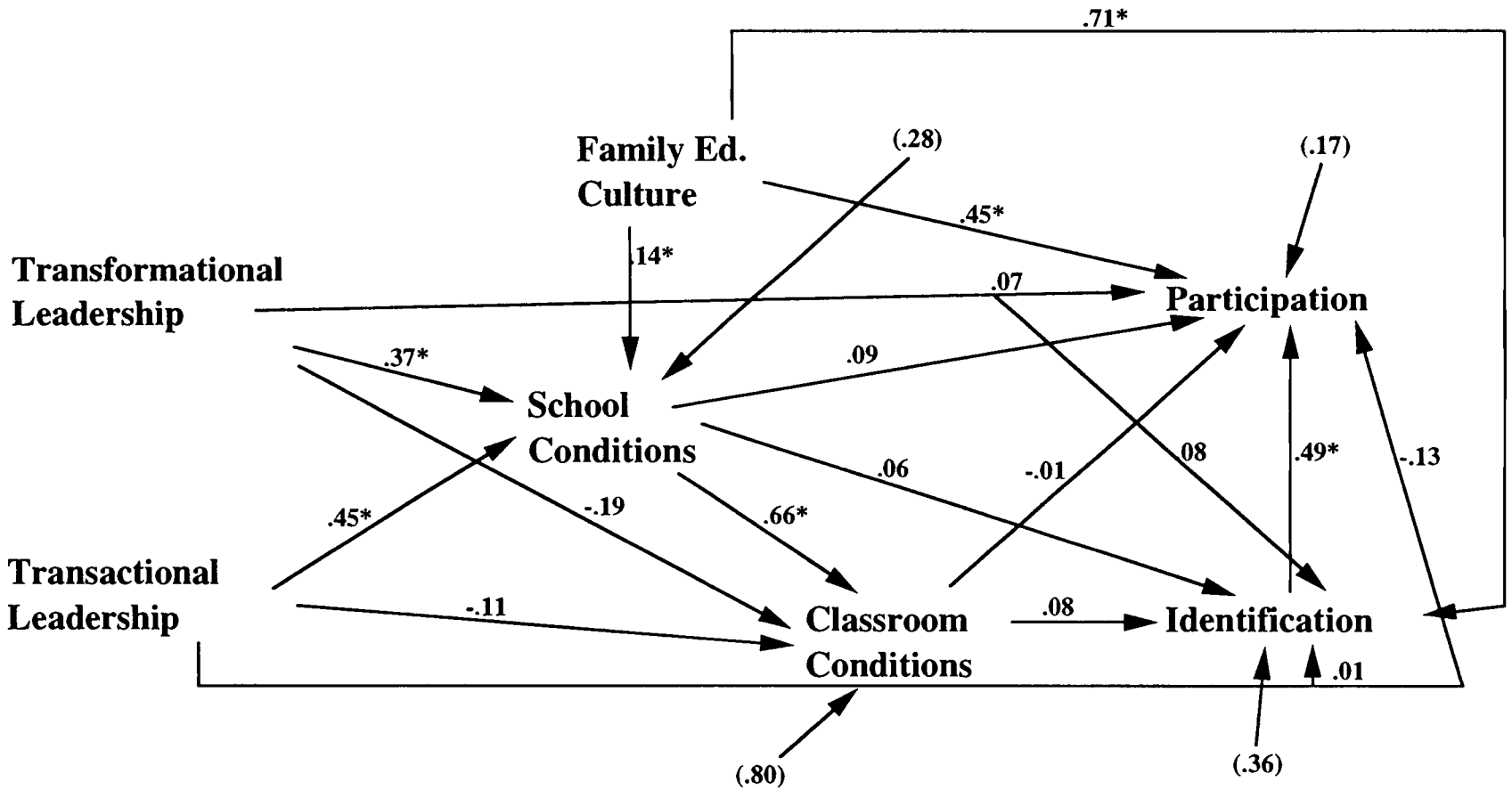
Total Effects on	Part.	Ident.
Family	.84*	.76*
Principal L	.04	.08
Teacher L	.10	-.04
Schl Conditions	.09	.26*
Class Conditions	.03	.08

Figure 1: Effects of principal and teacher leadership on student participation in and identification with school



Total Effects on	Part.	Ident.
Family	.85*	.78*
Total L	-.07	-.02
School Cond.	.17*	.20*
Classroom Cond.	.03	.07

Figure 2: Effects of total leadership on student participation in and identification with school



Total Effects on	Part.	Ident.
Family	.81*	.73*
TransformLdrshp	.16	.11
Transact Ldrshp	-.06	.05
School Cond.	.14	.11
Class Cond.	.04	.08

Figure 3: Effects of transformational and transactional leadership on student participation in and identification with school

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