Distributed Leadership in Schools: The Case of Elementary Schools Adopting Comprehensive School Reform Models

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Abstract: This is a study of distributed leadership in the context of elementary schools' adoption of comprehensive school reforms (CSR). Most CSRs are designed to *configure* school leadership by defining formal roles, and we hypothesized that such programs *activate* those roles by defining expectations for and socializing (e.g. through professional development) role incumbents. Configuration and activation were further hypothesized to influence the performance of leadership functions in schools. Using data from a study of three of the most widely-adopted CSR models, support was found for the configuration and activation hypotheses. Leadership configuration in CSR schools differed from that of non-CSR schools in part because of the addition of model-specific roles. Model participation was also related to the performance of leadership functions as principals in CSR schools and CSR-related role incumbents were found to provide significant amounts of instructional leadership. Further support for the activation hypothesis is suggested by positive relationships between leaders' professional development experiences and their performance of instructional leadership.

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Through the mid-1980's, research on school leadership focused on the activities of a single member of the school community—the school principal (Bridges, 1982). A well-known conclusion from this research was that strong principal leadership—and especially strong *instructional* leadership—is central to successful programmatic change and instructional improvement (see, for example, Berman and McLaughlin, 1978; Edmonds, 1979; Lipham, 1981; Leithwood and Montgomery, 1982; Bossert, Dwyer, Rowan, and Lee, 1982; Hallinger and Murphy, 1985). Another conclusion, however, was that strong instructional leadership is in short supply in most schools, largely because the typical principal's working day is consumed by managerial tasks having little or no direct bearing on the improvement of curriculum and instruction (see, for example, Kmetz and Willower, 1982; Elmore, 2002).

From the mid-1980's onward, the focus of school leadership research changed. With the rise of educational reforms such as site-based management, career ladders for teachers, and mentor teacher programs, researchers began to focus not only on the leadership activities of school principals, but also on the leadership exercised by teachers, external change agents, and others. Of course, this newer literature continued to emphasize the importance of principals to successful programmatic change and instructional improvement (see, for example, Weiss and Cambone, 1994; Anderson and Shirley, 1995). But increasingly, the conceptual models guiding research on school leadership came to focus on what Rowan (1990) called "network" patterns of control, where leadership activities are distributed widely across *multiple* roles and role incumbents (Hord and Huling-Austin, 1986; Smylie and Denny, 1990; Hart, 1995; Heller and Firestone, 1995). Out of this research has emerged a new vision of effective leadership, one in which multiple school members are seen as exercising powerful instructional leadership, sometimes in redundant fashion, in order to effect pro-

grammatic change and instructional improvement. Clearly, this is *not* a model of a single, "heroic" leader standing atop a hierarchy, bending the school community to his or her purposes. Rather, it is a model of "distributed leadership" (Ogawa and Bossert, 1995; Leithwood and Jantzi, 2000; Elmore, 2000; Gronn, 2000; Spillane, Halverson, and Diamond, 2001; Smylie, Conley, and Marks, 2002; Wallace, 2002).

The Problem

This paper is a study of distributed leadership in the context of one of the most dynamic trends in American education—the widespread adoption by elementary schools of externally-developed, comprehensive school reform (CSR) models (Datnow, 2000). The diffusion of CSR and other "whole-school" reform models to elementary schools over the past several years appears to be one of the more important educational reform initiatives to occur in American education in decades. Indeed, Rowan (in press) estimates that upwards of 20% of all elementary schools in the United States have adopted a CSR or similar whole-school reform model in recent years.

The study of distributed leadership presented here was conducted as part of *the Study of Instructional Improvement (SII)*, an ongoing program of research on the design, implementation, and instructional effectiveness of three of America's largest and most widely-disseminated CSR models—the Accelerated Schools Project (ASP), America's Choice (AC), and Success for All (SFA). In this paper, we analyze survey data gathered from samples of elementary school leaders during the second year of this study. These data are used to examine how implementation of the CSR models under study affects the leadership activities of those who occupy roles typically charged with exercising leadership in elementary schools. The sample includes principals, assistant principals, program coordinators, and those holding other "leadership" positions, most notably, new leadership positions created by the CSR models under study.

Like others who have studied leadership in the context of CSR implementation, we think schools implementing CSR models provide fruitful territory for studying distributed leadership (National Center for the Accelerated Schools Project, 1995; Datnow and Castellano, 2001; Supovitz and Poglinco, 2001). As we discuss in more detail below, the CSR programs under study require schools to create new leadership positions, including coaches and/or facilitators (whose main role is to assure program implementation), and, in AC and SFA schools, subject area facilitators (who are charged with instructional support and development functions in particular curricular areas). But these new roles are often added to the *existing* structure of administrative leadership in elementary schools, raising interesting questions about how leadership functions are distributed across multiple staff and line positions in the CSR schools under study and how this distribution compares to the distribution of leadership functions across similar positions in a sample of schools *not* participating in these CSR programs (but included in our study as "comparison" sites).

In examining this issue, we address three main questions. First, we ask whether the CSR schools in our sample have a greater number of formally-designated leadership positions than schools in our sample that are not participating in the CSR programs. In addressing this question, we control for a variety of other factors that previous research shows can affect leadership configurations in elementary schools. Second, we explore how a variety of leadership functions—including instructional coordination and improvement, building management, and boundary-spanning functions—are distributed across the formally-designated leadership positions in these schools. Here, we are interested especially in whether *instructional leadership* functions are distributed widely among the formally-designated leadership roles in schools or whether, in CSR schools, these functions tend to be concentrated in the positions newly created by CSR programs. Finally, we use data on each of these questions to explore whether schools participating in the CSR programs under study display the kind of widely distributed and redundant pattern of instructional leadership that previous re-

search on distributed leadership suggests promotes successful programmatic change and instructional improvement.

Our research is relevant to education policy in light of previous research on distributed leadership in the context of other reform initiatives such as site-based management, career ladder initiatives, and mentor teacher programs. A great deal of research suggests that these earlier education reform initiatives failed to realize their central purpose of distributing instructional leadership more broadly across members of the school community. The problem with these reforms, it appears, was not so much the failure to create new leadership positions or opportunities in schools, or even a lack of personnel ready and willing to exercise instructional leadership. Rather it seems that conditions within and around schools worked against the broad exercise of strong instructional leadership (Lieberman, 1988; Smylie and Denny, 1990; Little, 1995; Hart, 1995; Hoerr, 1996; Keedy, 1999). In particular, research on these earlier reform initiatives showed that expectations for instructional leadership on the part of principals and others were seldom clearly specified by reformers, that incumbents of the newly created school leadership roles seldom received explicit or extended training in instructional leadership practices, and that the various leaders within these schools often worked in isolation from one another, with little or no time to meet, work on, or even perceive the potential synergies and/or interdependence of their work roles (for a review, see Smylie, Conley and Marks, 2002). For these reasons, many schools engaged in site-based management, career ladder initiatives, or mentor teacher programs failed to develop strong instructional leadership, either from the principal or from other members of the school leadership team.

The guiding assumption of this study is that the CSR models studied here hold out promise for overcoming these problems. For one, these models not only provide additional formal opportunities for such leadership, but also, and more importantly, use a variety of strategies to communicate a firm and clear expectation that such leadership will be exercised broadly and redundantly by

multiple role incumbents within a school. Equally important, the CSR models under study make explicit arrangements for leaders to meet as a team and work on leadership activities jointly. And finally, each of the models studied here provides explicit training to school leaders—training that previous research suggests can help leaders acquire deeper knowledge of curriculum and teaching, and better strategies for promoting instructional improvement. For these reasons, we think the CSR models studied here have the potential to address factors that previous research identified as constraints on the broad exercise of instructional leadership in schools. However, the evidence base on leadership in schools participating in CSR is limited, and thus more research is warranted.

Approach

Like other studies of distributed leadership, we faced two immediate conceptual problems: (1) to identify the forms of leadership that are distributed among members of the school community, and (2) to identify the members to whom these leadership functions are being distributed. In addressing the first conceptual problem, we followed the lead of Firestone and colleagues (Firestone and Corbett, 1988; Firestone, 1989; Heller and Firestone, 1995) by defining leadership as a set of organizational functions that leaders might be expected to perform—including not only instructional leadership functions, but also functions related to broader school and building management, as well as boundary-spanning functions entailing the acquisition of resources and the establishment or maintenance of relationships with external constituents. In defining leadership in terms of functional tasks, we ignore alternative definitions of leadership—particularly the more cognitively-based definition developed by Spillane and colleagues (2001)—but we also follow a long line of research and theory that conceptualizes leadership in terms of organizational functions and then examines who within an organization performs these functions (e.g., Kerr and Jermier, 1978; Pitner, 1986; Heller and Firestone, 1995; Ogawa and Bossert, 1995).

The second conceptual problem is to define the organizational members to whom leadership can be distributed. In this paper, we focus narrowly on the distribution of leadership functions to members of the school community typically charged with exercising leadership—namely, line and staff administrative professionals such as principals, assistant principals, program and curricular area coordinators, mentor teachers and teacher consultants, and of course, the positions specially created by the CSR models under study. Obviously, research on distributed leadership need not be confined to just these positions and can be expanded to include the study of informal leadership exercised by individuals who are not in formally-designated leadership positions (Smylie, Conley, and Marks, 2002). Our choice to focus only on formally-designated leadership positions, however, was mostly a matter of convenience. Ours is a multi-purpose study, and in specifying the sampling frame for administration of school leadership questionnaires in schools, we were forced to limit the sampling frame to a small (but relatively complete) set of formally-designated leadership positions in order to limit respondent burden. As a result, we are not studying the distribution of leadership functions across both formal and informal leaders within schools, but rather examining the distribution of leadership functions in a more formal sense.

Having defined the kinds of leadership functions to be studied and the sample of leaders to be studied, we faced one additional conceptual problem—to delineate the *processes* by which leadership is distributed in schools. In this paper, we focus on two such processes. The first is called "configuration" and is defined narrowly here as the creation of an organizational structure that formally designates leadership statuses within a school.[1] The second process is called "activation" and refers to social processes that encourage incumbents of these formally-designated leadership positions to actively perform leadership functions. Our distinction between configuration and activation stems in part from Linton's (1936) classic contribution to role theory, where a distinction is made between the social status or position a person occupies and the role he or she performs within this

status. For Linton (1936), social statuses are distinct positions within a social structure, while roles are the specific behaviors expected of those who occupy the status. In this paper, we see the process of configuration as defining formal leadership statuses and the process of activation as defining the role expectations for incumbents of these statuses.

Both processes are at work in the implementation of CSR models in schools. For example, implementation of CSR programs can lead schools to reconfigure formally-designated leadership positions. This involves, among other things, the formal designation of new positions such as CSR coach or subject-area facilitator, but it can also involve the rearrangement of existing positions in the formal organizational structure. Activation occurs during CSR implementation as the role activities or duties associated with formally-designated leadership positions are formally defined (in formal documents), as incumbents are socialized (during staff development programs), and/or as expectations for role performance are communicated through evaluation or other social control processes (as when CSR model providers monitor implementation).

Consider how the twin processes of configuration and activation work in the CSR programs under study:[2]

- *Accelerated Schools Project (ASP):* This program requires that schools designate one or more ASP coaches (sometimes referred to as internal coaches or internal facilitators) within a school who might or might not be released from teaching. The program defines a coach's primary role to be guiding, supporting, and facilitating the use of ASP philosophical tenets so that a school community can transform itself. ASP coaches are expected to work closely with the principal, co-coaches, and other adults and students in a school's community in performing this function. A coach also might participate in a school's self-evaluation of ASP implementation, and/or support improvement efforts by observing classroom instruction or participating in staff development. These expectations are communicated in formal program documents, as are expectations for school principals and other

members of the school leadership team. During the first year of program participation, ASP coaches are expected to receive a minimum of nine days of professional development. The nature and frequency of ongoing professional development for school leaders varies by locale but can include regular meetings with coaches from other schools, gatherings of local networks of schools, and national ASP meetings and conferences. Leadership development in ASP is always focused on practicing the underlying principles and philosophy of ASP. Moreover, attempts are always made to make the format of professional learning experiences reflect the ideals of powerful learning—ASP's vision of optimal student learning.

- *America's Choice (AC).* This program currently requires schools to include two school-level positions: a Design Coach and a Literacy Coordinator. Both positions are filled by existing school faculty and incumbents are expected to provide professional development at the school. Design Coaches are expected to help the principal plan school improvement, organize faculty to analyze student performance data, instruct teachers how to analyze student work, and develop curricula and student assignments. The work of the Literacy Coordinator is expected to focus exclusively on assisting teachers with the implementation of the early grades literacy curriculum. Literacy Coordinators are expected to model instruction for teachers, and after teachers practice an instructional method or strategy, to further observe and discuss such practices with teachers. Both Design Coaches and Literacy Coordinators are expected to be in classrooms regularly in order to observe instruction and analyze student work. These expectations are communicated in formal program documents, as are expectations for school principals and other members of the school leadership team. In addition, Design Coaches and Literacy Coordinators participate in intensive week long trainings between three and four times each year. AC program staff also visit the school approximately eight times per year, and some of the interactions that occur during those visits constitute professional development for school leaders. In the professional development they receive, school

leaders learn how to perform instructional practices associated with the program; learn how to collect, interpret and use instructional data for instructional decision making; and how to provide professional development to teachers. AC also provides separate professional development for principals, which is much less intensive than that received by Literacy Coordinators and Design Coaches.

- *Success for All (SFA).* This program requires schools to create at least two new positions, a Reading Facilitator and a Family Support Coordinator. Our focus here is mainly on the Reading Facilitator, whose instructional leadership responsibilities are both operational and developmental. Operational responsibilities include administering quarterly reading assessments; grouping students and teachers for instruction on a quarterly basis; overseeing the SFA tutoring program; and managing instructional and administrative materials associated with the SFA reading program. Developmental responsibilities include providing technical assistance to teachers, either via modeling, one-on-one discussion, or participation in meetings involving teachers and the principal. For both operational and developmental responsibilities, the primary objective is to assure faithful implementation of the program. Schools implementing the Math Wings component of SFA also name Math Facilitators whose responsibilities are similar to those of Reading Facilitators with the exception of administering and using quarterly assessments to regroup students. Expectations for these new positions are communicated in formal program documents, as are expectations about the role of principal and the school leadership team in SFA schools. SFA Reading Facilitators receive 6.5 days of training before their school begins implementation of the program and Math Facilitators receive 3.5 days of such training. Principals are required to attend these initial "New Leaders" training sessions. After the first year of implementation, Facilitators continue to receive substantial professional development and support through site visits from SFA staff, conferences, and special "academies." Among other things, Facilitators' professional development focuses on SFA instructional methods,

quarterly assessment and student regrouping, the training of teachers, and monitoring implementation.

In addition to activating new roles, CSR programs also place new demands on existing leaders, particularly on principals. Principals are very often instrumental in bringing the program to the school in the first place. CSR programs therefore place demands on principals as instructional leaders, requiring them to monitor implementation and progress, and to keep faculty attention focused on school improvement goals. Principals also are expected to manage the human and financial resources of the school and the school's relationship with the central office in a way that is supportive of the CSR program.

In short, these brief descriptions suggest that implementation of CSR models can both reconfigure the formal structure of leadership positions within schools and activate particular leadership behaviors by incumbents of these positions. In particular, we are suggesting that CSR implementation might result in a particular distribution of leadership in schools, one that distributes instructional leadership functions broadly, and redundantly, to multiple members of the school community. In the next section, we describe the data and strategies we used to examine this hypothesis.

Data

Data for the study were collected during spring of 2002, the second year of the *Study of Instructional Improvement*. Data come from two instruments: the School Leader Questionnaire (SLQ) which was sent to 503 elementary school leaders, and the School Characteristics Inventory (SCI), which was given to principals in 114 schools (28 schools in the Accelerated Schools Project, 31 in America's Choice, 29 in Success for All, and 26 "comparison" sites). A total of 407 leaders completed the SLQ for an overall response rate of 81 percent. Our analyses required that leaders report a valid role on the SLQ. A small number of leaders (33) did not do so, and therefore were omitted from analyses, leaving a total of 374 leaders available for analysis. Special efforts were made to fol-

low up with principals yielding a response rate of 88 percent on the SLQ among that respondent group (100 out of 114). In addition, principals completed the SCI at a 96 percent response rate (110 out of 114).

Characteristics of Schools and Leaders

Schools were selected for the study in four steps. First, we compiled a list of all U.S. public elementary schools that had begun their affiliation with ASP, AC, or SFA in the 1998-1999, 1999-2000, or 2000-2001 school years. Initial inspection of this list indicated that schools participating in these programs were widely dispersed across the country. For cost purposes, it was necessary to identify geographic regions around the country which contained concentrations of schools in the three programs, thus minimizing data collection travel.

In the second step we selected a set of 17 geographic regions from which to sample schools. Regions were selected using ArcView®, a geographic information systems (GIS) program, to plot intervention schools on maps. Geographic regions were identified by drawing one hundred mile radii around zip codes containing program schools and by visually inspecting maps on which these radii and the program schools contained within them were plotted (most of the study regions roughly correspond with U.S. Census Bureau standard metropolitan statistical areas).

In the third step, intervention schools from the 17 geographical regions were selected. We attempted to balance the samples of schools from the intervention programs in two ways. First, we attempted to equalize the samples with respect to the length of time sample schools had been affiliated with the three programs. We did this by targeting equal numbers of schools from each program for each initial year of program affiliation, 1998-99, 1999-00 and 2000-01. We also attempted to "equate" selected schools from the three programs with respect to socioeconomic disadvantage. This was done by first classifying schools on a three-point index of socioeconomic disadvantage,

and then by targeting equal numbers of schools from each program from each category of the index (see Appendix B for a description of the Disadvantage Index and the three categories).

In the final step, a set of "comparison" schools was chosen from within the 17 geographical regions. In addition to coming from the same geographical areas as selected intervention program schools, comparison schools were also selected so that their distribution on the three-point disadvantage index matched that of selected intervention program schools.

Table 1 provides descriptive statistics for variables used in the analyses reported here and gives a descriptive picture of the schools and leaders studied.[3] The 114 schools in the sample were located in 45 different school districts, in 15 different states, and in 17 different metropolitan areas. The table shows that the schools served relatively high proportions of low income and minority students and had an average enrollment of 475 students. To get a sense of whether schools in the different CSR programs and comparison group were roughly comparable on these demographic variables, we tested both for equality of variances and equality of means in these variables across the sub-groups. Mostly, these tests revealed no statistical differences, though there were a few notable exceptions. Schools in the America's Choice program tended to be larger than schools in Success for All and tended to have more minority students than schools in the Accelerated Schools Project. America's Choice schools also had lower initial average reading and math achievement than Accelerated Schools and those in the comparison group. In addition, Success for All schools tended to serve more disadvantaged populations than Accelerated Schools. A detailed description of these variables is presented in Appendix B.

[Insert Table 1 about here]

Table 1 also includes descriptive data on two measures created to control for the state and district policy environments in which schools operate. The first measures the extent to which leaders in a school see themselves under strong accountability pressures and the second is a measure of

the extent to which school leaders report clear standards for teaching and learning. Each of these measures was based on individual school leaders' reports on the School Leader Questionnaire. Responses to the multiple items on each scale were factor analyzed and aggregated to form school-level scores for each measure. We found no differences in variances or means for these measures across sub-samples of schools. A more detailed description of these policy environment measures is also presented in Appendix B.

Finally, Table 1 includes descriptive statistics describing the leaders in the study. The 374 leaders in the sample were predominantly female, the majority of whom were White. The average school leader had about 17 years of teaching experience and had served 6 years in her current leadership role. A little more than one quarter of the leaders in the sample spent 75% or more of their time teaching, 60% worked at their leadership position full-time (or nearly so), while the remaining 10% or so held more evenly split appointments (e.g. 50% teaching, 50% leadership). In general, the background and demographic characteristics of school leaders did not differ substantially across school sample sub-groups, with one exception. Leaders in comparison schools had spent significantly more time in their roles than those in SFA schools. Descriptions of leader-level variables are provided in Appendix C.

Data on Leadership Configuration

Our first research question concerns the process of leadership configuration in the schools under study. In light of the CSR programs' designs for school leadership discussed earlier, we expect that, after controlling for factors that previous research suggests contribute to the expansion of leadership positions in schools, CSR schools in the sample will have: (a) more total leadership positions; (b) a greater proportion of staff serving as subject area and program facilitators; and therefore (c) greater administrative intensity, as measured by the ratio of teacher positions to formal leadership positions. To examine this conjecture, we used data from the School Characteristics Inventory.

This instrument, which was completed by a school principal or his or her designee, was designed to record data on the structural features of schools, including the Full-time Equivalent (FTE) appointments in various formally designated positions in schools. Respondents simply listed the number of FTE staff allocated to standard personnel categories used in past research on school organization.

Data on Leadership Functions

A second set of research questions concerned the extent to which incumbents of particular leadership positions were performing various kinds of leadership functions. To examine this problem, we used data from the School Leader Questionnaire, which was administered to a standard sampling frame in every school that included the principal, assistant principal, program coordinators/facilitators (including not just CSR programs, but any other funded or external programs at the school), subject area facilitators or coordinators, mentor/master teachers or teacher consultants, and other "auxiliary" professional staff such as family outreach workers.

On the School Leader Questionnaire, incumbents of any of these positions were asked to report on the priority they gave in their work and/or the amount of time they devoted to a variety of leadership activities during the current school year. Three broad classes of leadership functions were measured through leaders' responses to multiple items, resulting in three scales described in Appendix A. The three scales were (a) instructional leadership; (b) building management functions; and (c) boundary spanning functions. We also broke the larger instructional leadership scale into a set of four sub-scales, including scales measuring; setting instructional goals; developing instructional capacity; coordinating curriculum; and monitoring improvement. These scales also are described in Appendix A. The scales have alpha reliabilities ranging from .77 to .90 and contain items that resemble those used in previous research on schools to measure leadership functions.

The main analytic task using these measures was to investigate the extent to which respondents in different leadership positions reported giving priority to or engaging in these functions.

Positions held by respondents were also reported on the School Leader Questionnaire and were classified into the following categories: principal; assistant principal; CSR Coach (CSR-facilitators and subject area coordinators); and "Other" Leader (non-CSR subject area facilitators, program coordinators, master teachers, and mentor teachers). Our general hypothesis is that any of the roles just listed might perform the various leadership functions being measured, but that the priority respondents would give to enacting these functions would increase if these functions were being "activated" by the processes we discussed earlier. In the analysis, we assumed that a simple dummy or indicator variable assigned at the school level indicating which (if any) CSR model a school was implementing would index the extent to which role expectations for particular functions were formally defined, and because we assumed that the CSR programs under study tended to activate instructional leadership broadly across all leadership positions, we further assumed that incumbents of all types of positions in CSR schools would report giving more priority and time to instructional leadership than those occupying similar positions in the non-CSR schools in the sample (controlling for other factors, such as the policy environment and the education and experience of the respondent).

We also hypothesized that leadership roles would be activated by socialization processes—especially professional development experiences. We therefore developed three measures of the nature and extent of professional development experienced by respondents in the year of the survey, as assessed by their self-reports on the School Leader Questionnaire. These measures, described in Appendix C, index the total number of days of professional development a leader reported, the relative amount of such professional development that was devoted to learning about instructional issues, and the extent to which leaders reported that this professional development encouraged reflective practice on their part.

Results

The results of these analyses are presented in two sections. The first examines leadership configuration, examining whether schools implementing CSR models tend to have a different configuration of leadership positions than non-CSR schools, controlling for other factors. The second examines the process of activation, providing data on how the priority given to different leadership functions varies as a result of CSR participation, leadership position in a school, and the extent and nature of professional development.

Leadership Configuration

The first analysis presents data on how leadership configuration varies across schools in the study by CSR program, structural factors such as school size and demographic composition, and policy pressures. Three outcomes were measured, each taken from the School Characteristics Inventory: the total number of FTE line and staff administrative leadership positions in a school; the proportion of total FTE positions that are staff leadership positions (i.e., program/subject area facilitators or master/mentor teachers); and the ratio of FTE teachers to the total number of FTE line and staff leadership positions. The analysis involves fitting three OLS regression models to data on 106 schools for which we have complete data, estimating one regression model for each outcome. The results are reported in Table 2.

[Insert Table 2 about here]

As Table 2 shows, larger schools and schools serving more disadvantaged populations generally have larger administrative staffs.[4] Moreover, schools serving disadvantaged populations have proportionally more program and subject area coordinators and fewer teachers per administrator than other schools. The relationship of size to total number of administrators conforms to Blau's (1970) classic work on the relationship of organizational size to bureaucratization. The increased

size of administrative staffs in schools serving more disadvantaged students, their greater degree of administrative intensity, and their tendency to allocate more staff positions to program and/or subject area coordinator positions may reflect the increased administrative demands arising from participation in compensatory education programs, and the increased funding attached to such programs.

These initial results support the idea that schools implementing the CSR models under study configure leadership positions differently than non-CSR schools, although there also appear to be differences among the models in how formal leadership positions are configured. For example, Table 2 shows that schools implementing two of the three CSR models had a greater number of leadership positions than the comparison schools in the sample, even after controlling for other factors. Since the outcome here is the natural log of the total number of leadership FTEs in the school, we can get an estimate of the difference in the actual number of leaders by taking the exponent of the intercept and coefficient for each CSR program. Doing so indicates that on average, AC and SFA schools had about 1.6 times the number of leaders in comparison schools (i.e. AC and SFA schools had about four leaders while comparison schools had just two and a half leaders on average), while ASP schools had approximately the same number of leaders as comparison schools on average. Table 2 also shows that schools implementing the three CSR models allocated proportionally more of their total personnel resources to subject area and program coordinators than did other schools, a reflection of their designs. In contrast AC and SFA schools allocated more administrators per teacher than comparison schools. Specifically, while comparison schools typically had a teacher to leader ratio of 9 to 1, AC schools and SFA schools had ratios of 5 teachers to 1 leader.

We note that since our data are cross-sectional we can not infer a causal relationship between CSR participation and leadership configuration. Instead, we are limited to describing how patterns of configuration vary among CSR and non-CSR schools. Given the fact that these patterns

are consistent with changes in leadership specified by the intervention designs we can *tentatively* advance the idea that the CSR programs under study may configure leadership in schools differently from schools not participating in these models. For example, ASP schools in the sample had similar numbers of FTE leaders as comparison schools, but the distribution of positions was different with respect to the proportions of personnel working as program or subject area coordinators and master/mentor teachers. AC and SFA schools by contrast had more FTE leaders, proportionately more personnel working as program and subject area coordinators and master/mentor teachers, and a smaller ratio of teachers to leaders than comparison schools.

Activation of Leadership

In the second stage of the analysis, we investigated the extent to which the leadership functions carried out by incumbents of different leadership positions varied, both within schools as a function of the specific leadership position occupied, and across schools as a function of which (if any) CSR model was being implemented.

In this step of the analysis, *instructional* leadership is the leadership function of most interest to us, especially given the aims of the CSR programs under study. As a result, we begin by presenting data on the overall scale measuring the priority or time school leaders reported giving to instructional leadership (recall that scale is a composite of the four subscales measuring priorities given to setting instructional goals, developing instructional capacity, coordinating curriculum, and monitoring improvement).

Figure 1 presents a graph displaying the means on this instructional leadership composite by leadership position for each of the four sub samples of schools. The composite measure has been standardized to have a mean of zero and a standard deviation of one so that bars projecting above the zero reference line represent means that are higher than the overall average of all respondents,

and those projecting below the zero line represent means that are lower than the average of all respondents.

[Insert Figure 1 about here]

In Figure 1, the initial view of how instructional leadership is distributed suggests both redundancy and a division of labor across leadership positions. Principals, assistant principals, and CSR staff all report giving above average priority to instructional leadership functions suggesting that such leadership is distributed across these roles redundantly. But incumbents of these three roles also report spending more time on instructional leadership than individuals in other leadership positions also suggesting functional specialization among leadership team members. As a group, principals report engaging in more instructional leadership than leaders in all other roles. Evidence of the impact of CSR programs on the distribution of instructional leadership is shown by the priority and time given to instructional leadership by incumbents of positions specifically created by the CSR models—the CSR Coaches shown in Figure 1. Individuals occupying coach and facilitator positions in two of the three CSR programs AC and SFA, report giving about the same amount of time to instructional leadership as principals those same schools. ASP coaches, however, did *not* fit this pattern.

Contrasting the instructional leadership activities of CSR Coaches with those of leaders in the "Other" category in Figure 1 is also instructive. It is often assumed that incumbents of these "other" positions, which predominantly include staff such as Title I coordinators, master teachers, and subject area coordinators, are exercising strong instructional leadership in schools. As a group, however, CSR Coaches report giving much more priority and time to instructional leadership than do individuals working in "Other" positions in Figure 1. This suggests that the activation of instructional leadership from CSR coaches is an important process by which CSR models increase the

overall amount of instructional leadership over what would be present in a more traditional leadership configuration.

Modeling Leadership Activation

We note that many of the differences across roles in the performance of instructional leadership functions just discussed are quite large and statistically significant (as indicated by Tukey post hoc multiple comparison tests assessing differences in means for all role pairs). However, the inferences that can reasonably be drawn from these comparisons are very limited because they do not take into consideration any competing explanations of variation in instructional leadership, especially properties of role incumbents or schools that might affect the priority given by particular individuals to various leadership functions. Consequently, we undertook a set of more complex and complete analyses of these data which employed such controls and took into account the nesting of leaders within schools.

Models

In these additional analyses, we fit a series of two-level hierarchical linear models (HLM) in which leaders were nested within schools. The purpose of these analyses was to investigate the relationship of CSR participation and leadership position to all of the leadership function scales developed for this study. In these models, variation in the leadership scales is predicted from several types of independent variables. At the school level, predictors included characteristics of the policy environment, school size, and CSR model. At the person level, predictors included the gender, ethnicity, educational background, and experience of leaders; measures of the nature and extent of professional development experienced by leaders; and the leadership position occupied by a leader.

Formally, the Level-1 model is specified as:

$$Y_{ij} = \beta_{0j} + \beta_{1j}(X_{1ij} - \overline{X}_{..}) + \beta_{2j}(X_{2ij} - \overline{X}_{..}) + \cdots + \beta_{Qj}(X_{Qij} - \overline{X}_{..}) + r_{ij}; \quad r_{ij} \sim N(0, \sigma^2) \quad (1)$$

where Y_{ij} is a score on a leadership function scale for leader i in school j, β_{0j} is the adjusted mean for school j on that scale, coefficients β_{qj}, q=1, …, Q, express the relationship between person-level variables X_{qj}, q=1,…, Q, and the outcome, and r_{ij} is random variation associated with leader i. By centering Level-1 predictors X_{qj} around their grand means, β_{0j} can be interpreted as the expected outcome for a leader whose values on the predictor variables are equal to the grand means of those predictors. The random error term, r_{ij} is assumed to be normally distributed with a mean of 0 and variance σ^2.

At Level-2, we utilized a simple random-intercept model where the intercept parameter (β_{0j}) is allowed to vary randomly, but where the random effects for each of the slope parameters are fixed (Raudenbush and Bryk, 2002). Formally, the model is:

$$\begin{aligned}
\beta_{0j} &= \gamma_{00} + \gamma_{01}W_{1j} + \gamma_{02}W_{2j} + \cdots + \gamma_{0S}W_{Sj} + u_{0j} \\
\beta_{1j} &= \gamma_{10} \\
\beta_{2j} &= \gamma_{20} \\
&\cdots \\
\beta_{QJ} &= \gamma_{Q0}
\end{aligned} \qquad (2)$$

In this formulation, the adjusted school means β_{0j} , are modeled as a function of the grand mean γ_{00} and random school variation μ_{0j}. The slope coefficients β_{qj} are in turn modeled as functions of the overall slope averages γ_{q0} for q=1, …, Q. The slope coefficients were modeled as fixed because our primary interest in the Level-2 model was to examine the effects of school-level variables on adjusted school means, and, as will be made clearer below, because between-school variation was modest on most of the outcomes, thus limiting the amount of school-level prediction afforded by the data.

Results from Unconditional Models

We are interested in modeling the effects of variables measuring leadership activiation at both the leader and school levels. Fitting models with no predictors at either level (i.e. unconditional models) provides a useful diagnostic of the amount of variation available to be predicted at each level. Table 3 displays the results of fully unconditional models that partition variation in the building management, boundary spanning, and instructional leadership composite scales into "between" and "within" school components. The most striking result from these models is that the majority of the variation in the leadership scales lies *within* schools. While approximately 4 percent of the variation in the instructional leadership scale lies between schools, the comparable portion for boundary spanning was approximately 1 percent, and was less than 1 percent for the building management scale.

[Insert Table 3 about here]

To a significant degree, these results reflect the size of and degree of specialization within leadership teams in the schools studied. Inspection of the sampling frame used for the School Leader Questionnaire, which lists all formal leaders in sample schools, indicates the average school in the sample has approximately 4.6 formally-designated leaders, suggesting that formal leadership teams in elementary schools tend to be quite small.[5] The variance decompositions indicate that in addition to being small, leadership teams tend to be composed of role incumbents who are highly variable with respect to the performance of leadership functions. Under such conditions, estimates of school averages, especially those that do not account for between-role variation, will tend to be unreliable. We formally tested this idea by adding controls for leader role to the fully unconditional models. Adding these variables adjusts the estimates of school means (the intercepts) for differences among leadership team members within a school. As Table 3 illustrates, making this adjustment in-

creased the reliability of the intercepts for all three outcomes, with the reliability of the building management intercept increasing most substantially.

The preliminary results indicate that models that adjust for leader role provide more reliable baseline estimates against which to evaluate more complex models. These results also suggest the need for caution in modeling school-level predictor variables. Raudenbush and Bryk (2002) urge care in specifying level 2 predictors when, as in our sample, the amount of between-school variation is very small. However, they argue that preliminary inferential and descriptive statistics such as those presented in Table 3 should not be the *sole* determinants of whether to model such coefficients, especially when theoretical arguments or prior research suggest that certain school-level variables might be important predictors of the outcome of interest. In light of these preliminary results we will exercise care by only entering level 2 predictors about which we have strong a priori hypotheses, or which prior research suggests will have significant effects. We will also use the models that adjust for leader role as a baseline in evaluating more complex conditional models. But beyond our immediate concerns of model specification for this research, these preliminary results have implications for any researcher who is interested in looking at the effects of school level variables on leadership among small leadership teams, which our results suggest may be typical of many elementary schools across the country. [6]

Results from Conditional Models

Tables 4 and 5 present the results from the next stage of the analysis, where conditional models were fit by adding both person and school-level predictors to the base models which controlled only for leader role at Level 1. As Table 4 shows, the level-1 models estimated at this stage of the analysis controlled for a leader's gender, ethnicity, teaching experience, post-secondary education in literacy and mathematics, the number of years the leader was in his or her current role, and whether or not their role predominantly involved teaching.[7] Adding these predictors to the base

model accounted for approximately 24 percent of the within-school variation in the instructional leadership composite. These predictors also accounted for 5 percent and 11 percent of the within-school variation in building management and boundary spanning respectively. The school-level models controlled for school size, accountability pressure, the presence of clear standards, and CSR program participation. Adding these predictors to the base model accounted for 99 percent of the between-school variation in the instructional leadership composite. The corresponding figures for building management and boundary spanning were 37 percent and 88 percent respectively. Table 5 displays the results of multivariate hypothesis tests which test for differences among the three intervention programs and among the various leader roles.

Differences in Leadership Functions across Positions. The HLM results presented in Table 4 provide a more robust set of tests about the distribution of leadership functions across roles than portrayed in Figure 1. The middle of Table 4 under "Leader-level predictors" contains HLM coefficients expressing the difference between principals' average scores on the leadership scales and those of Assistant Principals, CSR Coaches, and Other leaders. We see that after controlling for all of the other variables in the analysis, principals (the contrast role group left out of the analysis) generally report engaging in higher levels of leadership on each of the three leadership functions under study than incumbents in any other position. Two exceptions to this pattern were that principals and assistant principals did not differ significantly in the amount of building management each reported, and CSR coaches reported performing about the same amount of instructional leadership as principals. The fact that principals perform all three functions at such a high level suggests that they are generalists—spreading their efforts across a range of leadership functions. Assistant principals also appear to be generalists, reporting high levels of all three functions, but generally at the same or slightly lower levels than principals.

[Insert Tables 4 and 5 about here]

The generalist nature of the principalship and assistant principalship contrasts with the roles of CSR Coaches and "other" leaders. Looking at Tables 4 and 5, we see that CSR Coaches specialize in instructional leadership, giving as much time and attention to this function as principals and assistant principals. In contrast, they report performing less building management and boundary spanning than principals and assistant principals. Leaders in the "other" category, primarily comprised of non-CSR subject area coordinators and master/mentor teachers, generally report performing lower levels of all three leadership functions, but they do not differ significantly from CSR coaches on the performance of building management and boundary spanning.

Effects of Staff Development on Leadership Functions. The results in Table 4 also lend credence to the idea that staff development can "activate" the performance of specific leadership functions. In particular, the effects of staff development were strongly related to the performance of *instructional* leadership. This is a logical consequence of the way we measured the staff development experienced by leaders, as well as the kind of staff development provided by the CSR schools in the sample. As discussed earlier, much of the professional development received by CSR Coaches and principals in our sample prepared them to teach the program to teachers and to guide, support, and monitor program implementation. Thus, as expected, the number of days of professional development received by leaders was positively associated with the provision of instructional leadership. The amount of professional development received was also positively related to boundary spanning, suggesting that working with multiple constituents within the school community may also have been a topic in some leaders' training. Beyond the sheer number of days of professional development received, leaders whose learning experiences provoked them to reflect on their practice also were more likely to provide instructional leadership in their school. This latter result suggests that it is not exclusively the number of professional development days received that affects leadership practice, but also whether those experiences spur leaders to think about their practice in a new light. Even though we conjec-

tured that leaders whose professional development had a greater focus on instruction would report higher levels of instructional leadership, the data did not support this idea.

Effects of Leader Background on Leadership Functions. Leaders' gender and ethnic background were unrelated to their performance of leadership functions. However, the amount of university coursework they had received in literacy and mathematics was a strong positive predictor of the provision of instructional leadership. This result may reflect a rational division of labor in schools, with staff members with stronger backgrounds in literacy and mathematics instruction being tapped in greater numbers to perform instructional leadership tasks, or, could simply indicate that staff with greater instructional expertise are more likely to put that expertise to use in the service of instructional leadership. Though we exercise caution in interpreting this result, we did find it striking that leaders' university course work was unrelated to the non-instructional leadership functions building management and boundary spanning. We find this result suggestive of a link between the substance of leaders' training and expertise, and the substance of the functions they perform or are asked to perform.

Effects of School-Level Variables on Leadership Functions. After controlling for leadership position and staff development experiences, we found a small number of differences across CSR and non-CSR schools in the three leadership functions. The average amount of instructional leadership reported in ASP schools was significantly lower than reported in schools in all other sub-groups, including comparison schools. This may reflect ASP's initial emphasis on organizational processes rather than explicit instructional strategies. The only other significant observed difference among the school sub-groups was that SFA schools reported higher levels of building management than AC schools. Recall that in these HLM models, we view the dummy variables measuring program participation as indicators of the extent to which role expectations are formally-defined by the program—for example in program documents, etc. The weakness of program effects in these models

suggest that socializing incumbents into expected role performances might be a more forceful strategy for activating roles than merely defining the roles.

Predicting Component Measures of Instructional Leadership. We conceptualized instructional leadership as having multiple components and thus were interested in separately predicting variation in each component. Tables 6 and 7 contain the results of HLM analyses in which the conditional models described earlier are used to predict the four instructional leadership sub-scales. Like the first three outcomes examined, fully unconditional models of the four component measures of instructional leadership indicated that the majority of the variation in these variables lies within schools.[8] As in the earlier models, controlling for leader role resulted in more reliable estimates of school means. Consequently, in modeling these four outcomes we exercised the same care in including Level 2 predictors as in the earlier analyses, and used models controlling for leader role as the baseline comparison point for more complex conditional models.

Examining variation in the component measures of instructional leadership by leadership position revealed the complex patterns by which instructional leadership functions are distributed in schools. Like previous analyses of the three broad leadership functions, principals generally reported performing instructional leadership functions at higher levels than those in other roles. An important exception to this general pattern is that CSR Coaches report spending more time than those in any other leadership position—including principals—on the scale we call "developing instructional capacity." The distinct focus of CSR Coaches in developing instructional capacity strikes us as sensible given that this is the primary function expected of such leaders by CSR model providers. While CSR Coaches tend to specialize in developing instructional capacity, principals appear to specialize in two other functions—setting instructional goals and monitoring improvement—reporting that they perform those functions significantly more than incumbents in any other leadership position.

This apparent split of instructional improvement functions between principals and CSR Coaches reflects, we think, a possible resolution of the role ambiguity inherent in many organizations, where those in "line" positions (such as the principalship) have a difficult time balancing the supportive role required to help people improve their performance and the more evaluative stance that needs to be taken when monitoring improvement. CSR coaches, freed of this evaluative function, can play a more supportive role. Thus, these results suggest that instructional leadership provided by CSR Coaches may provide a useful complement to that of principals with principals focusing on setting goals and expectations for instruction and its improvement and then monitoring whether goals are being met and improvement achieved, and with coaches working directly with teachers to reach instructional goals and effect improvement. Unlike principals and CSR Coaches, neither assistant principals nor "other" leaders exhibited a predominant focus on any particular instructional leadership function.

There were a number of other results of significance associated with leader role. The extent to which a leaders' role was devoted to teaching ("Predominantly teaching role") was significantly related to three of the four instructional leadership measures. For this predictor variable, leaders with more than 75 percent of their role devoted to teaching are coded "1" and leaders who spend less time teaching, and presumably more time on leadership are coded "0." This latter group of leaders reported spending *less* time setting instructional goals, and *more* time developing instructional capacity and monitoring school improvement efforts. Thus it appears that leaders who had more time freed up for leadership activities were more likely to spend that time helping teachers improve their practice and monitoring teachers' improvement efforts.

[Insert Tables 6 and 7 about here]

In addition to the leadership roles they played, the professional development experiences of leaders were found to affect their provision of instructional leadership in a variety of ways. In fact,

the professional development of leaders was found to be positively associated with *all* of the separate sub-scales measuring instructional leadership. In particular, the number of days of professional development received by leaders was positively and significantly related to each of the four component measures. The fact that days of professional development is strongly associated with all four instructional leadership functions is striking. This consistent pattern of relationships may indicate that leaders' professional development covered a broad range of issues in instructional leadership rather than focusing narrowly on only a few topics, though our data do not permit us to decipher this connection. As with the general instructional leadership measure, leaders' engagement in reflective practice was positively related to the developing instructional capacity measure.

The relationship between leader background and the performance of leadership functions was more complex in these models than in the earlier analyses. Unlike those initial models, leader ethnicity was associated with their performance of instructional leadership functions. In particular, compared to Whites/Others, Hispanic and African American leaders reported spending more time setting instructional goals and Hispanic leaders reported higher levels of coordinating curriculum. Thus, in the schools studied, being a member of an ethnic minority group is significantly and positively related to the provision of instructional leadership.

After controlling for all of the variables in the analysis, we found a number of differences in leadership activity due to participation by schools in one of the CSR programs. As Tables 6 and 7 show, leaders in ASP schools placed less of an emphasis on developing instructional capacity and monitoring improvement than schools in the other 3 sub-groups. ASP schools also placed less of an emphasis than comparison schools on setting instructional goals. In contrast, ASP schools placed a greater emphasis on coordinating curriculum than AC schools. Again, these findings appear to partially reflect the expectations AC and SFA set for their leaders (as described above), providing very explicit and substantial direction and support for leaders' development of instructional capacity and

the monitoring of school improvement efforts. In addition to the effects associated with CSR programs, we also found that schools in which leaders report that academic standards are clear tend to report higher levels of monitoring improvement efforts. This result may reflect higher stakes accountability environments in which clearer or stronger standards are driving more vigorous monitoring efforts, however, additional data would be needed to understand this result more conclusively.

Discussion

This is one of the first studies to provide evidence of distributed school leadership across a fairly large sample of elementary schools participating (or not) in different CSR programs. As a number of scholars have argued, and as a number of earlier studies have shown, elementary school leadership is provided by teams of individuals, rather than by a single person. Our results suggest that these teams are typically small, ranging from three to seven people, and typically very heterogeneous with respect to the predominant leadership functions performed by each team member. Though they are members of a team, principals (and to a lesser degree assistant principals) clearly stand out. On average, they are generalists, performing a broader range of leadership functions than other leaders, and usually at higher levels. In contrast, CSR Coaches specialize in instructional leadership in general, and in developing instructional capacity in particular, and perform smaller roles in building management and boundary spanning activities.

As expected, schools' implementation of comprehensive school reform models appears to be a significant factor that is associated with the way in which leadership is configured and the extent to which particular leadership functions get activated. As we have seen, one direct way CSR programs appear to affect the distribution of leadership is by configuring the size and composition of leadership teams. Beyond simply shaping the size and composition of the leadership team, however, it strikes us as plausible that CSR participation affected the amount and kind of leadership functions performed. As Figure 1 showed, CSR program participation is associated with much

higher levels of leadership that is directly supportive of the instructional program. A good deal of the overall levels of instructional leadership observed in CSR schools, however, is associated with the creation of the CSR Coach position, a position that our data suggest is devoted primarily to the performance of instructional leadership functions—and especially the instructional leadership function that we labeled as "developing instructional capacity."

However, modifying the size and composition of leadership teams is not the only way that CSR programs might be impacting the distribution of leadership functions across positions in schools. CSR participation also activates leadership practice through staff development. Here, for example, we found strong associations between leaders' professional learning experiences and their tendency to engage in particular leadership practices. The amount of professional development received by leaders was associated with higher levels of instructional leadership and boundary spanning in this study. Moreover, leaders whose professional learning experiences provoked them to reflect upon their practice were more likely to provide instructional leadership than were other leaders. Our analyses suggest that the configuration and activation processes found in CSR designs may hold some promise for overcoming the problems that have frustrated previous efforts to distribute instructional leadership across a broader set of actors in schools. These processes, which more clearly specify instructional leadership roles and provide explicit or extended training in instructional leadership practices, appear to be associated with higher levels of instructional leadership.

Our results further suggest that staff development may provide a relatively more effective means of encouraging instructional leadership than merely defining role expectations. Recall that in the HLM models, the dummy variables measuring program participation were viewed as indicators of whether or not leadership roles associated with the programs had been formally defined in the school. The direct effects of CSR programs on instructional leadership functions were generally weak in the HLM models while the effects of staff development were consistently strong. This pat-

tern suggests to us that a more *active* communication of expectations through staff development may be a more effective way of encouraging particular kinds of instructional leadership practice than the more *passive* means of role definition.

In reporting these results, we want to emphasize the limitations of our study and the provisional nature of our conclusions. One important limitation of this study was that all of the data on leaders' activities was based on self-report data. But another, very important limitation arises because we have used cross-sectional data to investigate phenomena that undoubtedly unfold over time. To truly understand how CSR programs reconfigure and activate leadership, one would have to observe changes in leadership activities through time, carefully controlling for the possibility that individuals pre-disposed to exercising particular forms of leadership didn't choose to be in CSR programs, or in particular leadership positions within schools. As a result of these fundamental problems of causal inference, we stress that we are advancing our conclusions tentatively, and more as hypotheses warranting additional investigation than as firm conclusions. Still, it is interesting to observe that the pattern of relationships in the data presented here are consistent with our initial hunches about how CSR programs reconfigure and activate particular forms of leadership. As a result, we believe the data provide interesting insights about how leadership functions are distributed across leadership positions in CSR and non-CSR schools.

While we recommend more research on how CSR and other schools configure and activate different forms of leadership, we also recommend additional research on the impact of different leadership configurations on teaching and learning. The logic of many CSR models appears to assume that by reconfiguring leadership positions, and activating instructional leadership more broadly, resources supporting implementation, as well as instructional capacity and student achievement will increase in schools. The research reported here does not address this issue, but

it lies at heart of any sound research agenda on school leadership and warrants attention in future studies.

APPENDIX A: School Leadership Function Factor Scales

Measure/Item (Cronbach's Alpha in parentheses)

Setting Instructional Goals (α= .83)

In your work during the current school year, how much priority did you give to each of the following issues?

- Setting explicit timelines for instructional improvement
- Examining the school's overall progress toward its school improvement goals
- Clarifying expectations or standards for students' academic performance
- Using the school's standardized, norm- or curriculum-referenced test results to plan instructional changes
- Framing and communicating broad goals for instructional improvement
- Working on plans to improve the teaching of specific curricular units or objectives

Developing Instructional Capacity (α =.81)

When working directly with teachers this year how often did you do any of the following?

- Share information or advice about classroom practices with a teacher
- Examine and discuss what students were working on during a teacher's lesson
- Demonstrate instructional practices and/ or the use of curricular materials in a classroom
- Examine and discuss the standardized norm-referenced or curriculum-referenced test results of students in a teacher's class

In your work during the current school year, how much priority did you give to each of the following issues?

- Examining and discussing exemplars of students' academic work
- Personally providing staff development

Coordinating Curriculum (α =.79)

In your work during the current school year, how much priority did you give to each of the following issues?

- Promoting instructional coordination across grade levels in the school
- Promoting instructional coordination across regular and compensatory/special education programs in the school
- Promoting alignment between the assessments used to evaluate the school's instructional program and what is taught in classrooms
- Promoting integration of the school's curriculum (e. g., Mathematics and science, or reading/ language arts and social studies)

Monitoring Improvement (α =.90)

When working directly with teachers this year how often did you do any of the following?

- Observe a teacher who was trying new instructional practices or using new curricular materials

How often do you engage in the following activities as part of your regular duties?

- I monitor classroom instructional practices to see that they reflect the school's improvement efforts
- As part of improvement efforts in this school, I observe in classrooms in order to examine what students are learning
- I monitor the curriculum used in classrooms to see that it reflects improvement efforts
- I evaluate teachers using criteria directly related to the school's improvement efforts

Instructional Leadership Composite (α =.86)

Setting Instructional Goals factor scale
Developing Instructional Capacity factor scale
Coordinating Curriculum factor scale
Monitoring Improvement factor scale

Building Management (α =.86)

During the current school year, about how often did you do any of the following?

Deal with emergencies and other unplanned circumstances
Work with students and their parents on discipline/ attendance issues
Monitor public spaces, such as the cafeteria, hallways, playgrounds, etc.
Supervise clerical, cafeteria, and maintenance staff

Boundary Spanning (α =.77)

During the current school year, about how often did you do any of the following?

Seek resources outside the school (e. g. from local businesses, school improvement programs, universities, or funding agencies)
Work with local community members or community organizations
Attend district- and board- organized meetings

Note: To create the leadership function scales, clusters of items from the school leader questionnaire were first grouped conceptually, according to the leadership function they were thought to measure, and then factor analyzed. Factor analyses were used to examine how well items within clusters fit together and to inform decisions about the final grouping of items. Once final item clusters were established, factor scores were created by forcing one factor solutions to the items within a cluster. Missing data at the item level was replaced with the sample mean on the item except in cases where leaders had responses for less than half of a factor's items; these respondents were coded as missing.

APPENDIX B: School-level Variables

Measure/Item (Cronbach's Alpha in parentheses)

Total FTE Leadership Staff is the school's total number of professional personnel who supervise teachers, coordinate some aspect of the school's instructional program, or provide instructional support to faculty and staff. The number, as reported on the study's School Characteristics Index (SCI), is measured in terms of full-time equivalent (FTE) staff positions, such that a coordinator who works one day per week in the school would be coded as 0.2 FTE. Principals or their designees were prompted to report the number of principals, assistant principals, program or subject area coordinators/facilitators, teacher consultants/mentor teachers and other leadership personnel. These categories were summed to represent the school's total number of leaders.

Proportion of total staff who are program and/or subject area facilitators or master/mentor teachers is the number of program or subject area coordinators/facilitators/master/mentor teachers in the school, again in terms of FTEs reported on the SCI, divided by the school's total number of FTEs across all staff positions. The total number of staff FTE positions includes leaders, teachers, specialists, student services and support staff. The measure represents the proportion of staffing resources nominally allocated to leadership of the instructional program.

FTE teacher to FTE administrator ratio is the number of regular classroom teachers in the school, again in terms of FTEs reported on the SCI, divided by the total number of leaders in the school. This measure is analogous to a student to teacher ratio.

School Size is the number of students enrolled at the school.

Disadvantage Index (α = .73) is a factor composite of the school's free and reduced price lunch percentage, minority percentage, and community disadvantage index (CDI). The CDI describes the 1990 census tract in which the school was located in terms of the proportion of individuals with less than a high school education, the proportion of working-age adults who are unemployed, the median household income, and the proportions of households with income below the poverty line, receiving public assistance income, and containing children that are headed by a single parent. A three category version of this variable was used to set school sampling targets. The disadvantage index was created for all public elementary schools in the U.S. The three categories were defined by the points in the index that marked 25th, 50th, and 75th percentiles on the national distribution of the disadvantage index. Thus schools in the first group fell between the 25th and 50th percentile on the national distribution, schools in the second group fell between the 50th and 75th percentiles, and schools in the third group fell between the 75th and 100th percentiles.

Free and Reduced Lunch Percentage is the percentage of students eligible for free or reduced price lunch at each school. We used data from both the study's School Characteristics Index and the 2000-2001 Common Core of Data (CCD) to construct this measure.

Minority Percentage is the percentage of students in the school who were African-American, Hispanic, Asian/Pacific Islander, American Indian, or other non-white race/ethnicity. We used data from both the study's School Characteristics Index and the 2000-2001 Common Core of Data (CCD) to construct this measure.

Reading/Language Arts Achievement is the school mean scale score on the reading and language arts subsections of the Terra Nova. Data come from students in kindergarten and third grades in the spring of the first year of the study. For phase one schools this was school year 2000-2001 and for phase two schools it was school year 2001-2002.

Mathematics Achievement is the school mean scale score on the mathematics subsection of the Terra Nova. Otherwise the measure is the same as the reading/language arts achievement measure.

Faculty Teaching Experience is the mean number of years of teaching experience reported by a school's teachers on the study's Teacher Questionnaire.
Faculty Tenure is the mean number of years teaching at their current school reported by a school's teachers on the study's Teacher Questionnaire.

Accountability Pressure (α = .70)

Staff here feel the school has a poor reputation
There is a great deal of dissatisfaction with student achievement among staff members at this school
Parents and/or community groups have demanded improvement at this school
During the current school year, was this school formally identified as "in need of improvement" or placed in a formal status requiring school improvement by any of the following agencies? The state education agency, the federal Title I program, the school district, other agency.
The mathematics program at this school needs major improvement
The reading/language arts program at this school needs major improvement

Clear Standards (α = .91)

The school district's assessment program provides specific and clear information about what students should know and be able to do
The school district's curriculum frameworks are specific and clear
District standards for student learning drive much of our improvement agenda
The school district's instructional policies give teachers clear information about what and how to teach
The state's assessment program provides specific and clear information about what students should know and be able to do
State curriculum guides or frameworks are specific and clear

Supportiveness of policy environment (α = .78) (All items are reverse scored)

The school district's improvement agenda makes it difficult for us to create a school improvement plan tailored to the specific needs of this school
The district's personnel policies and practices make it difficult to hire staff with the expertise and interest we need for school improvement
The state education agency's improvement agenda makes it difficult for us to create a school improvement plan tailored to the specific needs of this school
Central office policies and procedures change frequently in this district
Constant change in state education policies, procedures and/or personnel have made improvement difficult here
There is a great deal of turnover in the central office in the district

Accelerated Schools Project is a dummy variable indicating the school participates in the Accelerated Schools Project
America's Choice is a dummy variable indicating the school participates in the America's Choice program
Success For All is a dummy variable indicating the school participates in the Success For All program

APPENDIX C: Leader-level Independent Variables

Measure/Item (Cronbach's Alpha in parentheses)

Male is a dummy variable coded 1 if the leader is male.
African American is a dummy variable coded 1 if the leader is African American.
Hispanic is a dummy variable coded 1 if the leader is Hispanic.
Post-secondary Training in Literacy and Mathematics is the sum of the number of college/university classes the leader reports having taken in English or a related language arts field, methods of teaching literacy, mathematics, and methods of teaching mathematics.
Teaching Experience is the number of years the leader has worked as a teacher.

Days of Professional Development is the sum of the number of days the leader spent in organized professional development activities (e.g., workshops, institutes, seminars) planned and organized by a school district, state education agency, intermediate education agency, professional association, university/college, school reform program, and school.
Instructional Focus of Professional Development is the ratio of the number of instructional topics to the total number of topics identified as foci of their professional development activities during the current year. Examples of instructional topics included organizing the school's instructional program, your school's mathematics curriculum and materials, specific methods for improving reading/language arts instruction, your knowledge of mathematics, how to observe and monitor classroom instruction, how to promote standards-based learning, and new procedures to assess student learning. Examples of other topics included planning strategies, improving parent involvement, and fund raising/grant writing.
Reflective Practice (α = .84) is a factor that gauges the leader's degree of agreement that their professional development activities during the current year promoted reflection on their practice.

Led me to think about an aspect of my work in a new way
Led me to try new things in my practice or work
Made me pay closer attention to particular things I was doing in my work
Led me to seek out additional information from another school leader, teacher, or some other source
Provided me with useful feedback about my practice or work

Predominantly Teaching Role is a dummy variable coded 1 if the leader devotes more than 75% of their time to teaching assignments.
Years in Role is the number of years the leader has held their current formal leadership position.
Principal is the referent category for the series of role dummies listed below.
Assistant Principal is a dummy variable coded 1 if the leader holds the position of assistant principal.
CSR Coach is a dummy variable coded 1 if the leader holds the position of Accelerated Schools Coach/Internal Facilitator, America's Choice Design Coach, America's Choice Literacy Coordinator, or Success For All Reading or Mathematics Facilitator.
Other is a dummy variable coded 1 if the leader holds any of a number of non-CSR positions such as subject area coordinator, special program coordinator, or master/mentor teacher.

Notes

[1] As discussed earlier, configuration processes also are at work in the emergence of informal leadership positions, as research on the emergence of task and socio-emotional leadership in small groups shows (see, e.g., Bales, 1976).

[2] These descriptions reflect our understanding of the reform models' role expectations as they existed in the 2000-2001 school year, the year data used for this study were collected. Some responsibilities for these roles have changed since that time.

[3] Minority percentage, Free and reduced lunch percentage, Reading/language arts achievement, and Mathematics achievement are not included in analyses presented here but are listed in Table 1 for descriptive purposes.

[4] A number of other predictors were entered into these regression analyses in the exploratory stages of our work, including accountability pressure, clear standards, supportiveness of policy environment, average achievement level in the school, faculty teaching experience, number of funding sources, and number of programs offered at the school. None of these were statistically significant in any regression model we developed. Given the limited number of schools available for analysis, we limited the predictor variables in the final models to those with statistically significant effects.

[5] Given survey non-response, we did not receive data from every leadership team member within every school. HLM analyses presented here utilize data on 97 Principals, 51 Assistant Principals, 123 CSR Coaches, and 90 "other" leaders. HLM is well suited for dealing with missing data such as these because it adjusts school intercepts when leaders are missing in a school by "borrowing" data. Specifically, HLM imputes to a school missing a response for a particular role, the overall effect for that role. In OLS analyses, schools which did not have complete data for every leadership team member could not be included in the analysis.

[6] Another question the perceptive reader might ask is why we did not simply fit OLS regression models to these data. But, even when the groups under analysis in HLM are small and heterogeneous, hierarchical linear models have a number of significant advantages over OLS regression analyses. One advantage (discussed in footnote 5) is the "data borrowing" that occurs when cases within a school are missing due to survey non-response. A second advantage is that HLM provides a more conservative estimate of the intercept than a school-level OLS analysis. Through Bayesian estimation, intercepts for schools with small cluster sizes are shrunken towards the grand mean. Consequently the model places relatively more emphasis on the more reliable grand mean, and relatively less emphasis on more unreliable individual school means.

[7] Some school leaders in our sample lacked data on Level 1 predictor variables. Rather than deleting cases that were missing on these predictors, we utilized a series of dummy variables that indicated leaders who were missing on Level 1 variables. Specifically, when leaders were missing on a predictor, the predictor variable itself was coded 0 and the corresponding missing data dummy variable was coded 1. In essence, the missing data indicators add another category, "don't know", to each variable. Coefficients for the missing data indicators were generally not statistically significant and are not displayed in tables of results.

[8] After controlling for leader role, the reliability of the intercepts for setting instructional goals, developing instructional capacity, coordinating curriculum, and monitoring improvement are .047, .271, .014, and .335 respectively. These models further indicate that the proportion of variance lying between schools on setting instructional goals, developing instructional capacity, coordinating curriculum, and monitoring improvement are .015, .112, .004, .148 respectively.

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TABLE 1: Descriptive Statistics

	Total		ASP		AC		SFA		COMP	
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Schools										
Clear Standards	0.14	0.98	0.12	1.04	0.25	0.79	0.22	1.06	-0.06	1.03
Accountability Pressure	-0.04	1.06	-0.24	1.10	0.23	1.10	-0.17	1.09	0.02	0.89
School Size	474.57	194.00	471.72	252.72	541.61	179.14	402.47	97.72	478.14	200.79
Disadvantage Index	0.00	1.00	-0.45	1.05	0.18	0.81	0.30	0.92	-0.06	1.10
Minority percentage	69.28	23.12	78.77	21.37	80.98	15.75	73.72	23.95	75.85	21.40
Free and reduced lunch percentage	67.18	31.81	88.13	19.84	83.52	25.01	75.89	27.45	79.02	27.07
Reading/Language Arts Achievement	565.40	14.91	570.36	13.54	557.35	13.93	564.81	13.58	570.33	15.29
Mathematics Achievement	531.57	19.27	534.37	17.26	521.45	16.91	532.43	20.84	539.66	17.94
Leaders										
Male	0.17	0.38	0.21	0.41	0.13	0.34	0.13	0.34	0.25	0.44
Hispanic	0.06	0.23	0.02	0.14	0.03	0.18	0.09	0.29	0.12	0.32
African American	0.33	0.47	0.18	0.39	0.50	0.50	0.28	0.45	0.29	0.46
Post-secondary Training in Literacy and Math	23.08	13.85	24.52	13.57	20.67	13.81	23.67	13.32	24.46	14.62
Teaching Experience	16.64	8.92	16.77	9.66	17.46	9.09	16.30	8.52	15.38	7.91
Days of Professional Development	25.43	11.51	24.92	10.78	27.94	12.08	24.87	11.68	22.40	10.65
Instructional Focus of Professional Development	0.67	0.18	0.62	0.19	0.71	0.17	0.67	0.16	0.68	0.20
Reflective Practice	0.00	1.06	-0.15	0.98	0.23	1.06	0.00	1.14	-0.18	1.00
Predominantly Teaching Role	0.26	0.44	0.39	0.49	0.23	0.42	0.10	0.31	0.30	0.46
Years in Role	5.57	6.35	6.59	6.89	5.27	7.12	3.73	3.70	6.67	6.08
Instructional Leadership	0.01	0.99	-0.25	1.03	0.23	0.86	0.10	0.99	-0.12	1.06
Building Management	0.00	1.01	-0.06	0.97	-0.17	1.05	0.14	0.92	0.20	1.03
Boundary Spanning	0.00	1.00	-0.05	0.92	-0.12	1.05	0.05	0.90	0.22	1.11
Setting Instructional Goals	0.01	0.99	-0.14	0.97	0.13	0.82	-0.02	1.16	0.02	1.08
Developing Instructional Capacity	0.01	1.00	-0.39	1.01	0.39	0.93	0.11	0.87	-0.22	0.97
Coordinating Curriculum	0.00	1.00	0.08	1.01	-0.03	0.90	-0.08	1.05	0.05	1.09
Monitoring Improvement	0.01	1.01	-0.34	1.04	0.24	0.88	0.28	0.93	-0.21	1.07

TABLE 2: OLS Regression Analyses Predicting Leadership Configuration as a Function of CSR Participation and School Structure and Demography

	Total FTE leadership positions			*Proportion of total FTE personnel who are program and/or subject area facilitators or master/mentor teachers*			*FTE teacher to FTE leader ratio*		
Predictor	*B*		*SE*	*B*		*SE*	*B*		*SE*
Intercept	0.862	***	0.087	-4.977	***	0.254	2.190	***	0.102
School Size	0.285	***	0.044	0.011		0.129	0.037		0.051
Disadvantage Index	0.119	**	0.045	0.294	*	0.131	-0.081		0.052
Accelerated Schools Project	0.108		0.125	0.739	*	0.364	-0.119		0.146
America's Choice	0.543	***	0.120	1.658	***	0.347	-0.528	***	0.139
Success for All	0.484	***	0.125	1.797	***	0.363	-0.566	***	0.145
R^2	.479			.313			.244		

* p < .05 ** p < .01 *** p <.001

TABLE 3: Variance Decomposition for Instructional Leadership Composite and Administrative Function Scales

	Instructional Leadership		Building Management		Boundary Spanning	
	Fully unc.	Controlling for role	Fully unc.	Controlling for role	Fully unc.	Controlling for role
Reliability of intercept	0.124	0.146	0.004	0.228	0.051	0.076
Level 1 variance	0.947	0.693	1.011	0.353	0.996	0.778
Level 2 variance	0.044	0.039	0.001	0.035	0.017	0.021
Proportion of Variance Wtihin Schools	0.956	0.947	0.999	0.910	0.983	0.974
Proportion of Variance Between Schools	0.044	0.053	0.001	0.090	0.017	0.026

TABLE 4: Conditional Models Predicting Instructional Leadership Composite and Administrative Function Scales

	Instructional Leadership Composite			Building Management			Boundary Spanning		
	coef	se		coef	se		coef	se	
Intercept	0.014	0.039		0.031	0.035		0.021	0.045	
School-level predictors									
Accountability Pressure	0.017	0.042		0.056	0.037		0.015	0.048	
Clear Standards	0.064	0.045		0.023	0.039		-0.093	0.052	
School Size	0.064	0.043		-0.030	0.038		-0.108	0.050	*
Accelerated Schools Project	-0.343	0.129	**	0.045	0.112		-0.093	0.149	
America's Choice	-0.110	0.128		-0.073	0.112		-0.157	0.148	
Success for All	-0.066	0.134		0.157	0.116		-0.188	0.154	
Leader-level predictors									
Male	-0.078	0.108		0.042	0.088		0.191	0.124	
Hispanic	0.336	0.181		0.056	0.151		0.086	0.208	
African-American	0.183	0.094		0.029	0.078		0.010	0.108	
Post-secondary Training in Literacy and Math	0.141	0.043	***	0.012	0.035		0.063	0.049	
Teaching Experience	-0.022	0.044		-0.039	0.036		-0.004	0.051	
Days of Professional Development	0.248	0.047	***	0.032	0.038		0.147	0.054	**
Instructional Focus of Professional Development	0.031	0.042		0.005	0.035		-0.062	0.049	
Reflective Practice	0.110	0.044	*	0.024	0.036		-0.011	0.050	
Predominantly Teaching Role	-0.188	0.112		-0.135	0.092		-0.284	0.129	*
Years in Role	-0.070	0.044		0.003	0.036		-0.078	0.051	
Assistant Principal	-0.305	0.137	*	0.189	0.110		-0.384	0.157	*
CSR Coach	-0.207	0.120		-1.482	0.097	***	-0.816	0.138	***
Other leader	-1.019	0.129	***	-1.385	0.104	***	-0.735	0.148	***
Residual variance components									
Level 1 (within schools)	0.5287			0.3337			0.6937		
Level 2 (between schools)	0.0002			0.0219			0.0026		
Proportion of Base Model Variance Explained[1]									
Level 1 (within schools)	0.2371			0.0547			0.1084		
Level 2 (between schools)	0.9951			0.3751			0.8776		

* p < .05 ** p < .01 *** p <.001

[1] Base models control for leader role at Level 1 and contain no other predctor variables.

TABLE 5: Results of Multivariate Hypothesis Tests of Differences Between Selected Coefficients

	Instructional Leadership Composite		Building Management		Boundary Spanning	
	Difference in coefficients contrasted	X^2	Difference in coefficients contrasted	X^2	Difference in coefficients contrasted	X^2
Asst. Principal vs. CSR Coach	-0.098	0.461	1.671	206.596***	0.432	6.894**
Asst. Principal vs. Other	0.715	21.819***	1.573	159.625***	0.352	4.011*
CSR Coach vs. Other	0.812	46.262***	-0.097	0.994	-0.081	0.347
ASP vs. AC	-0.233	3.816*	0.118	1.289	0.065	0.221
ASP vs. SFA	-0.276	4.838*	-0.111	1.045	0.096	0.439
AC vs. SFA	-0.043	0.123	-0.230	4.592*	0.031	0.049

* $p < .05$ ** $p < .01$ *** $p < .001$

TABLE 6: Conditional Models Predicting Instructional Leadership Component Scales

	Setting Instructional Goals			Developing Instructional Capacity			Coordinating Curriculum			Monitoring Improvement		
	coef	se		coef	se		coef	se				
Intercept	0.0294	0.0434		-0.0006	0.0427		0.0034	0.0476		0.0110	0.0364	
School-level predictors												
Accountability Pressure	0.0064	0.0463		0.0668	0.0456		-0.0253	0.0507		0.0017	0.0389	
Clear Standards	0.0678	0.0501		0.0658	0.0493		-0.0256	0.0548		0.0900	0.0420	*
School Size	0.0258	0.0478		0.0529	0.0471		0.0752	0.0524		0.0540	0.0401	
Accelerated Schools Project	-0.3777	0.1430	**	-0.3455	0.1407	*	-0.0659	0.1562		-0.2967	0.1200	*
America's Choice	-0.2154	0.1422		0.1838	0.1400		-0.4107	0.1553	**	0.0469	0.1193	
Success for All	-0.1888	0.1482		0.0125	0.1458		-0.2125	0.1617		0.1438	0.1243	
Leader-level predictors												
Male	-0.0025	0.1201		-0.0551	0.1182		-0.0943	0.1297		-0.1001	0.1006	
Hispanic	0.4624	0.2004	*	0.0708	0.1972		0.4347	0.2173	*	0.1500	0.1679	
African-American	0.2073	0.1042	*	0.0905	0.1025		0.2203	0.1128		0.0866	0.0873	
Post-secondary Training in Literacy and Math	0.0610	0.0473		0.2030	0.0465	***	0.0964	0.0511		0.0947	0.0396	*
Teaching Experience	0.0591	0.0490		-0.0577	0.0482		-0.0287	0.0530		-0.0439	0.0411	
Days of Professional Development	0.1948	0.0519	***	0.2071	0.0511	***	0.2401	0.0561	***	0.1646	0.0435	***
Instructional Focus of Professional Development	-0.0153	0.0469		0.0184	0.0461		0.0445	0.0506		0.0516	0.0393	
Reflective Practice	0.0882	0.0484		0.0981	0.0476	*	0.1014	0.0523		0.0706	0.0405	
Predominantly Teaching Role	0.2735	0.1243	*	-0.4420	0.1224	***	-0.0213	0.1344		-0.3884	0.1042	***
Years in Role	-0.0017	0.0488		-0.0994	0.0480	*	-0.0158	0.0528		-0.1006	0.0409	*
Assistant Principal	-0.4692	0.1515	**	-0.0863	0.1491		-0.0886	0.1632		-0.3245	0.1269	*
CSR Coach	-0.3871	0.1331	**	0.3309	0.1310	*	-0.1698	0.1435		-0.4332	0.1115	***
Other leader	-1.1489	0.1427	***	-0.2251	0.1404		-0.6214	0.1539	***	-1.2666	0.1195	***
Residual variance components												
Level 1 (within schools)	0.6473			0.6272			0.7480			0.4538		
Level 2 (between schools)	0.0004			0.0003			0.0083			0.0009		
Proportion of Base Model Variance Explained[1]												
Level 1 (within schools)	0.1593			0.2040			0.1652			0.1355		
Level 2 (between schools)	0.9658			0.9966			---[2]			0.9907		

* p < .05 ** p < .01 *** p <.001

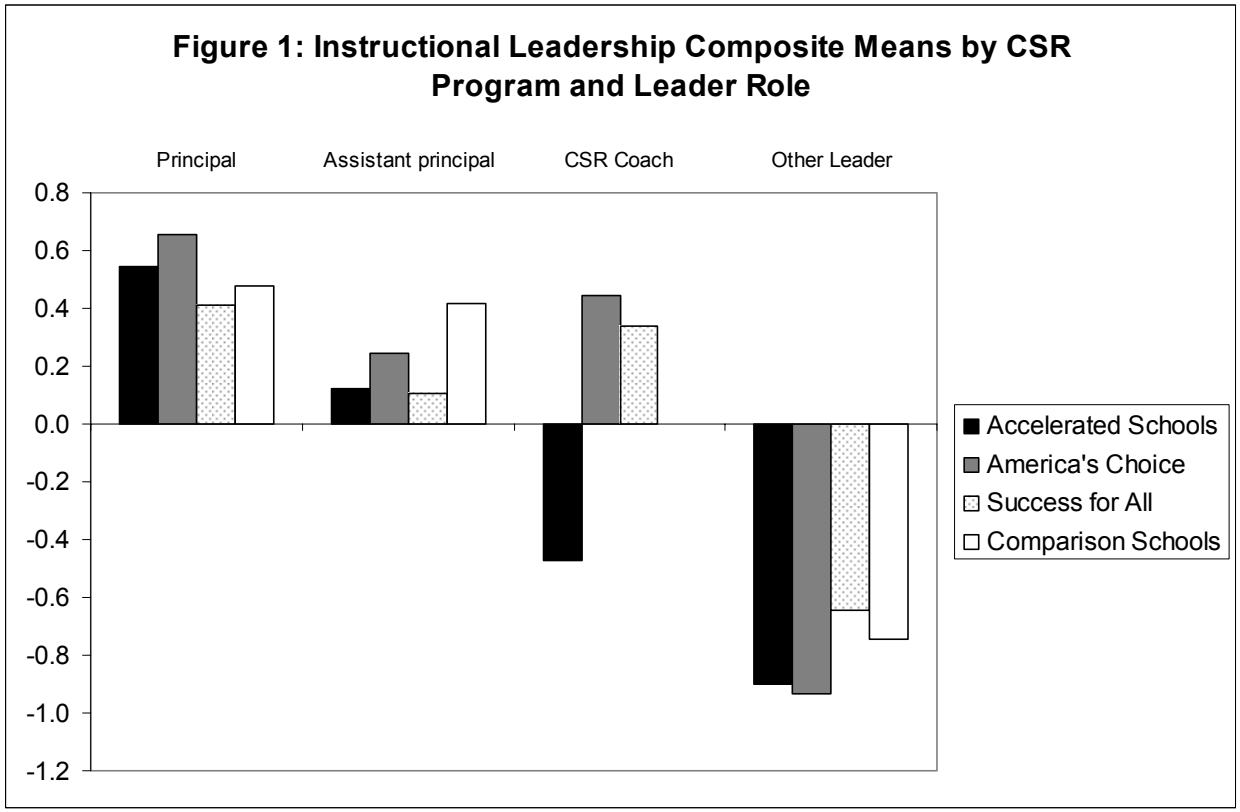
[1] Base models control for leader role at Level 1 and contain no other predctor variables.

[2] Because the amount of between-school variation in the Coordinating Curriculum scale increased when predictors were added to the models, it is not possible to calculate the percentage of Base Model variation explained by school level variables.

TABLE 7: Results of Multivariate Hypothesis Tests of Differences Between Selected Coefficients

	Setting Instructional Goals		Developing Instructional Capacity		Coordinating Curriculum		Monitoring Improvement	
	Difference in coefficients contrasted	X^2	Difference in coefficients contrasted	X^2	Difference in coefficients contrasted	X^2	Difference in coefficients contrasted	X^2
Asst. Principal vs. CSR Coach	-0.082	0.267	-0.417	7.115**	0.081	0.225	0.109	0.667
Asst. Principal vs. Other	1.618	16.110***	0.311	0.693	0.710	8.489**	1.591	44.094***
CSR Coach vs. Other	1.536	33.218***	-0.106	18.263***	0.791	9.890**	1.700	56.634***
ASP vs. AC	-0.162	1.509	-0.529	16.581***	0.345	5.696*	-0.344	9.612**
ASP vs. SFA	-0.189	1.846	-0.358	6.846**	0.147	0.933	-0.440	14.265***
AC vs. SFA	-0.027	0.038	0.171	1.638	-0.198	1.776	-0.097	0.721

* $p < .05$ ** $p < .01$ *** $p < .001$



Note: CSR coaches include Accelerated Schools Coaches, America's Choice Design Coaches, America's Choice Literacy Coordinators, and Success for All Reading and Math Facilitators. "Other" leaders include program/subject area coordinators, master/mentor teachers whose roles are not associated with a CSR program.