

## Centralization, Fragmentation, and School District Complexity

John Meyer  
W. Richard Scott  
David Strang  
*Stanford University*

This study investigates how the administrative complexity (in funding and personnel) of American public school districts varies, depending on the importance of local, state, and federal funding environments. The analyses are based on a data set integrated from several national data sources describing school districts in the 1970s. Dependence on federal funding—which takes the form of complex and fragmented programs—generates more administrative positions and expenditures than does dependence on the other levels, as hypothesized. State funding, reflecting the legitimated and integrated state control over public education, generates the least administrative intensity, as hypothesized. High levels of local funding—reflecting dependence on an environment that is complex but not highly formally organized—generates intermediate levels of administrative staffing and funding. •

In this paper, we examine the effects of the institutional environment on the administrative component of American public school districts. These units function in the complex and many-layered structure of American education, with pressures coming from parents and community groups, states, the national government, and a wide variety of professional and interest groups organized at all these levels. Districts differ radically from similar schooling organizations in highly centralized national educational systems, where districts and schools often function as simple subordinate units in a sovereign national bureaucracy.

The study examines the effects of the changing American institutional context on the administrative complexity of school districts. We use a unique data set on school districts to explore three main ideas. First, the expanding federal involvement in education, given its fragmented organizational character, expands administrative burdens at the school district level. Second, the expansion of state involvement, given the legitimated sovereignty and more integrated bureaucracies operating at the state level, lowers administrative complexity in school districts. And third, dependence on local funding, where interests and pressures are diverse and complex but less formally organized, produces an intermediate level of administrative complexity.

The environment of U.S. school districts has changed dramatically over the course of this century. From a situation in which virtually all funding and control resided exclusively in the local community, the role of both state and national governments has gradually increased:

“Prior to 1930, localities provided more than 80 percent of school revenues, the states less than 20 percent. Though the state share reached 30 percent just before World War II, it did not edge above 40 percent until 1973, by which time there was also a visible—though always small—federal contribution. The local share, which in 1973 was down to 50 cents of the school dollar, continued to erode during the past decade until in 1979, for the first time ever, the state share slightly exceeded the local contribution.” (Doyle and Finn, 1984)

Because there is great variation among states in school funding and control arrangements and among districts in the amount of support received from federal sources, it is possible to examine the impact on district organization of cross-

© 1987 by Cornell University.  
0001-8392/87/3202-0186/\$1.00.

• The research reported here was conducted with funds from the Institute for Research on Educational Finance and Governance (now Stanford Education Policy Institute) under a grant from the National Institute of Education (Grant NIE-G-83-0003). The analyses and conclusions do not necessarily reflect the views or policies of either institute.

We are pleased to acknowledge the contributions of Young Hwan Lee, Kyoung-Ryung Seong, and Zueguang Zhou who assisted us in compiling, organizing, and analyzing the data on school districts and federal programs.

sectional variations in their funding environments. To do this, we employ data compiled from several national educational surveys of school districts in the U.S. as of 1977.

### THEORETICAL AND RESEARCH BACKGROUND

Earlier organizational theories viewed organizational structure—in particular, the complexity of the administrative component—as derived from the nature of technical tasks performed by organizations (see Woodward, 1965; Perrow, 1967; Thompson, 1967; Galbraith, 1973). This line of argument provides little leverage in explaining public school organizations, which tend to carry out similar tasks but exhibit wide variation in size and complexity (Meyer and Rowan, 1978). Failures to account for the characteristics of school organizations, as well as inadequacies in accounting for much structural variation among other types of organizations, have led theorists to shift from a focus on technology as the primary determinant of structure to emphasize the role played by the environment (Meyer and Scott, 1983). Organizational environments vary in the complexity of resource and power arrangements (Pfeffer and Salancik, 1978) as well as in the configuration of their wider structures and legitimating rules (Meyer and Rowan, 1977; DiMaggio and Powell, 1983). In this paper, we build on these conceptions, seeing the organizational structures of American school districts as created and shaped by the resource flows and control structures in their environment.

We start with the general notion that administrative expansion in organizations reflects complexity in the wider environment. But in order to spell out what environmental complexity means, and the conditions under which it produces formalized complexity within organizations, it is useful to distinguish several dimensions of environmental structure. Here we distinguish the *fragmentation* of the environment from the *formal structuring* of environmental actors. We touch briefly on the effects of environmental centralization, in the sense of shifts upward in the social structural locations of environmental actors.

*Fragmentation* reflects the number and distribution of organizations or social actors a focal organization is dependent upon. A unified or unfragmented environment exists when the resources relevant to a focal organization stem from the same source and are integrated in some clear way. This is the position of an organizational subunit, when the larger organization effectively buffers it from direct external forces, provided the larger organization itself does not present a highly fragmented structure. At the other extreme, a focal organization is dependent upon and penetrated by multiple, quasi-independent organizations and social actors, each presenting possibly conflicting, and at best uncoordinated, sets of demands and pressures. By many lines of argument, administrative structures within the focal organization should expand as the environment fragments in this way. If administration arises to deal with environments (as much or more than internal technologies), then environmental complexity should expand administrative work.

*Formal structuring* refers to the extent to which an organization is surrounded by formally organized interests, sovereigns,

and constituency groups, as opposed to environments made up of less formally organized groups, communities, or associations. The core idea here is that over and above the degree of complexity of an environment, formalization in the environment is especially likely to generate formal administrative structure within organizations. A highly formalized environment, containing many varieties of organized professions, associations, regulatory bodies, or interest groups, is expected to generate administrative expansion in focal organizations such as school districts. When the complexity of the environment is more loosely structured or diffuse, taking the form of multiple, interpenetrated, and shifting political interests and informal pressures, local units may be highly penetrated, but their response is less likely to be reflected in increased formal complexity, or bureaucratic expansion. In school districts, the multiple demands of less rationalized environments are met less by formalized administrative expansion and differentiation than by the informal behavioral adjustments of participants, whether administrators or teachers, as they attempt to accommodate and fend off pressures and demands. Many current lines of organizational theory—institutional arguments, along with resource dependency and ecological ones—can produce the argument that formalized administration reflects not only environmental complexity but environmental formalization. This argument can explain why traditional local school systems in the United States have evinced less administrative formalization than their quite complex social and political environments would be expected to generate.

The dimensions of formalization and unification are quite distinct. One can imagine organizations whose environments are high on both—as with a subunit of a big bureaucracy or a firm dominated by a single large supplier or customer. But a consensual community—a technical profession, for instance—may unify an environment without formalizing it. Obviously, many organizations such as small firms or traditional one-room schools may function in an environment neither formalized nor unified. And environments with many formalized but inconsistent groups are common—perhaps especially in the American federal context. A local hospital now faces, for instance, all sorts of regulatory pressures from local, state, national, and professional governors, as well as a highly formalized system of third-party payers.

We use the dimension of environmental unification versus fragmentation to better specify what is sometimes, in the literature, meant by centralization. It is often assumed that an environment in which control is shifted upward in level (and thus centralized) is thereby unified and simplified: complexity is absorbed at the central level, and a given local organization therefore faces a simpler environment. This is not necessarily so. Authority may be shifted upward in level in an environment, without becoming more integrated in a unified sovereign body and, thus, without consolidating the environment of a given local organization. This is often strikingly true in American society, given a federalist structure, and is certainly often the case in American education, in which upward shifts of authority often build up a highly fragmented political control system. We have elsewhere used the term “fragmented centralization” to describe this process (Meyer and Scott, 1983).

### **Centralization, Fragmentation, and Complexity**

In the section below, we consider how these general distinctions and expectations are applicable to American school districts and their environments.

### **EVOLUTION OF EDUCATIONAL ENVIRONMENTS AND SCHOOL ORGANIZATIONS**

Nineteenth- and early twentieth-century American schooling operated mainly within a local context. State statutes provided a general framework supporting education with rules specifying attendance requirements for pupils, the length of the school year, and minimum qualifications for teachers. But most educational decisions were made within local communities, first at the school and then increasingly at the district level. Funding provisions were also predominantly local, based on property taxes.

The relevant environment was local, but not necessarily simple. Education affects a wide range of individuals and groups, including many specialized interests— from economic and class groups to familial and religious ones— so that schools are often a prime focus of public attention and political pressure. The multiple functions and meanings attributed to education tend to give rise to complex and active environmental pressures, often reflected in boisterous school board or school bond elections and prolonged disputes over the selection of library books or sites for new schools.

The local environment of schools often entails complexity but not of the sort that is highly structured. Multiple, urgent, and shifting pressures are placed on school systems, making demands on board members, principals, and teachers, but not of a type to foster much administrative expansion. In the small school district, much of the administrative burden is not codified in the elaboration of formal structure but in the broad and nuanced definitions of citizen, parent, school board member, principal, and teacher.

Beginning late in the nineteenth century and proceeding up to the present, there has been continuing consolidation of schools. Early in this period, urban school reformers sought to integrate the many schools into a few districts, each with a single sovereign board representing the entire community and managing the schools through a more efficient, bureaucratic district office. Tyack (1974) has chronicled the history of this movement and has characterized its driving ideology as an intent to create and impose on all schools "the one best system." This movement has made steady progress, although its development has been slower and has continued longer than is generally recognized. Data we have compiled and reported elsewhere (Meyer et al., 1987) reveal that the consolidation of schools and districts has continued steadily well into the 1970s. Mean school enrollment increased from 142 to 440 over the 1940 to 1980 period, while the mean number of school districts per state has declined eightfold, from 2437 to 330, during the same period (Meyer et al., 1987). This type of centralization has been associated with some bureaucratization of the system: superintendents and their administrative staffs expand over time, and there is increased formalization of administrative roles both at school

and district levels. But much of the complexity of the local environment continues to be managed informally.

The twentieth century has witnessed a great expansion of the role of the states in education. In recent decades, state funding has risen to match and surpass levels of local funding, and state authority has expanded in all the domains of education (e.g., curriculum, accreditation, setting minimum standards, personnel certification, and meeting the needs of special groups). There has been considerable conflict and much variability in this process, although state authority is constitutionally grounded. In the earlier period, and up to the present, there has been much genuine and legitimated local authority in education—indeed, a religion of localism. But always, in the background, there has been the authority of the states. Thus, even in the nineteenth century, states defined the basic framework of schooling, imposing such requirements as compulsory attendance laws, teacher certification requirements, and all sorts of other specifications. In the early period, these control attempts were weak, in an organizational sense—e.g., the median American state department of education contained a staff of two in 1890 (National Education Center, 1931: 5)—but the political, legal, and cultural principles of state sovereignty were well established. And as centralization and consolidation have proceeded throughout the twentieth century, they have conformed to well-established organizational control principles.

Thus, the expansion of state funding and decision making could take the form of direct organizational authority. The impact on local organization, following the lines of theory discussed above, is clear. The gradual evolution of a strong node of authority in the environment in one sense adds complexity to the situation of the local school district but, in a more important sense, simplifies it. The environment becomes more centralized but also more unified: the organizational rules constituting schooling become more clear, better specified, more uniform and integrated than before. The result is bigger and more standardized school districts, each having a common and highly authorized form, with relatively small administrative components. Much complexity is absorbed, thus, by state-level integration.

Although the general trend toward increased state authority over education is clear, states vary enormously in the extent to which funding has become centralized, in the development of the administrative and professional capacity of the state educational office, and the political culture supporting a more centralized and integrated view of educational decision making (see Kirst, 1978; Burlingame and Geske, 1979; Fuhrman and Rosenthal, 1981; McDonnell and McLaughlin, 1982). This variability among states is exploited in our design to test the effects of increased state centralization and unification on local district administration.

Since the early 1960s, as a part of the Great Society reforms initiated under presidents Kennedy and Johnson and continuing through the 1970s, the federal government has become involved in the funding and management of education. Prior to this time, federal efforts in education had been highly restricted and conducted with relatively low levels of direct

### Centralization, Fragmentation, and Complexity

authority. The most prominent federal programs had been in the area of vocational education, developing in the 1920s, but this effort was limited in funding and largely marginal to mainstream educational programs and institutions. This was due largely to the lack of constitutional provision for a federal role in education (Timpone, 1976).

The U.S. constitutional pattern—differing greatly from that obtaining in many other modern states—has also heavily influenced the evolution of federal funding and authority in education in recent decades. Rather than expanding direct national controls in the management of education, reform efforts during the 1960s and 1970s took the form of categorical or special-purpose programs. No programs were created for the general support and management of education, and none defined or attempted to assist its primary goals or core processes. Rather, special purposes were defined and furthered with specially organized fundings in a highly fragmented system. The high point of this expansion came in about 1977. There were special fundings to deal with specific types of students (rural, urban, migrant, needy, physically handicapped, academically handicapped, neglected, or adult); with a few types of special educational topics (consumer education, work-study programs, vocational training, or cooperative educational programs); and with special resource problems (state administrative costs, local administrative costs, innovation, community services, research dissemination, and especially libraries—public libraries, school libraries, cooperation among libraries—and library facilities for special groups such as the handicapped or the disadvantaged). The funding impact of these programs on local school organizations is suggested by Table 1, which reports the level of funding received from

Table 1

#### Numbers of School Districts and Revenue Amounts from Federal Programs\*

Program name	Number of school districts receiving funds (N = 894)	Average amount of money per district
Adult Education	194	14,043
Handicapped Children	55	34,908
Migrant Children	46	81,343
Local Education Agencies	824	138,214
Special Incentive	35	35,156
Library Resources	40	1,925
Education Centers	41	39,656
Handicapped in Public School	96	36,270
Strengthening Instruction	32	1,023
Basic Grants	585	18,367
Special Needs	98	9,092
Research	13	4,224
Innovation	19	17,857
Consumer and Homemaking	600	3,143
Cooperative Education	103	14,931
Work Study	199	2,232
Library Resources	783	10,097
Educational Innovation and Support	79	30,536

\* Taken from detailed federal data on a subsample of districts.

each of the main programs by the average school district as of 1977.

Complexity in the environment of schools has been greatly enhanced by these developments. While more decisions are made at higher levels, not only have decisions become more highly centralized, but the actors involved are both more structured and more fragmented. The various programs establish their own rules of eligibility, of operation, of accounting. Although the bulk of these funds were routed through the state educational agencies, "by 1979, 25 percent of all federal grants-in-aid funding bypassed state governments and was allocated directly to local jurisdictions" (McDonnell and McLaughlin, 1982: 7). Even though the amount of federal funding never accounted for more than a small fraction of total educational funding—the upper limit reached in 1977 was less than 10 percent—the organizational impact on school districts appears to have been considerable. According to our line of argument, the combination of increased structuring and increased fragmentation should greatly expand the administrative burden imposed on the local level. In a longitudinal analysis within five states, Freeman, Hannan, and Hannaway (1978) showed substantial increases in district administrative staff associated with higher levels of federal funding.

Federal fragmentation imposes administrative burdens on school districts through a number of mechanisms, illustrated in great detail in qualitative research (e.g., Bankston, 1982; McDonnell and McLaughlin, 1982). From the side of the agencies in the federal environment, the lack of integrated sovereignty over schooling leads to control efforts that take specialized and very directive forms: the impulse is to require that funds from each federal program be kept separate organizationally and, in accounting, that specialized reports be made on the needs, programmatic structures, and effects associated with each program's purposes, and even that distinct administrative positions carry responsibility for the federal program aims and funds. Sometimes special funding directly supports these mandated administrative activities. Given the number of federal agencies involved, Bankston (1982) showed that the required proposals, reports, and accountings for a medium-size school district could easily add up, during the high period of the 1970s, to hundreds of documents per year.

From the perspective of the school district, there is obvious interest in conforming to these federal legal requirements. But the interest may go beyond passive conformity: maintaining an administrative system isomorphic to the complex federal system carries advantages for obtaining funding preferment. Such an administrative system can develop the competence to search out funding prospects and adapt to changed funding potentials, can learn to conform to program and reporting requirement more readily, and can develop relationships that smooth over the whole process.

The mechanisms that link federal fragmented complexity with district administrative elaboration, thus, serve both federal and local interests and take the form of legal, financial, and organizational pressures for isomorphism (DiMaggio and Powell, 1983).

## Centralization, Fragmentation, and Complexity

### STUDY DESIGN AND HYPOTHESES

A direct examination of the arguments presented above would investigate the effects that reporting requirements and program fragmentation have on administrative complexity at the district level. We do not have direct measures of environmental complexity and rely on the results of much past research, cited above, to assume that federal programs embody the most complex, and state programs the least complex, sets of demands on the local district. And, as discussed, local funds are assumed to be associated with intermediate levels of demands on the administration of local districts, involving diverse but less formally structured interests. We thus take the sources of revenue to embody distinctive degrees of complexity and examine the relation between the district's sources of revenue and its organizational structure.

The structure of district organization is measured in two distinct areas: administration and instruction. We argue that environmental complexity is mirrored in the complexity of administrative roles, enabling the organization to buffer from external demands the actual work done. The corollary is that instruction, the technical work of the district, should not be much affected by environmental complexity.

As a baseline, we expect that more revenue of any sort tends to expand the district organization along any dimension. We thus focus on the relative effects of the sources of revenue and not on their absolute effects. Our hypotheses are:

**Hypothesis 1:** Federal funding involves especially large increases in district administrative structure compared to those of state or local funding.

**Hypothesis 2:** State funding involves lower increases in district administrative structure than do either federal or local funding. Since the local environment is less organizationally structured, we expect the impact of its complexity on formal administration to be less than federal funding but greater than that of state-administered funds.

As an extension of this line of reasoning, we take advantage of a measure of state programmatic centralization developed by Wirt (1978) to argue:

**Hypothesis 3:** The centralization of a state's educational system lowers the degree of administrative complexity of school district organizations, independent of any funding effects.

**Hypothesis 4:** There are few significant differences among federal, state, or local funding effects on the complexity of district instructional roles and expenditure levels.

Our main interest is to explore the federal effect suggested by Hypothesis 1, since the federal system is highly unusual in its degree of bureaucratic fragmentation, providing the best test of our central theme. We can go further than a simple aggregated federal effect by examining the effects of specific federal programs. Over time, older federal programs have been captured by the state departments of education; the funding channels have become less differentiated and the reporting requirements less extensive.<sup>1</sup> Federal programs initiated in the 1960s and 1970s should thus have larger effects on district administration than earlier ones: the federal effort has been bigger, and time has not yet routinized it. In our data, this involves a comparison between the Elementary and Secondary Education Act (ESEA) programs and the older fed-

1

A similar process is occurring at the present time, as the more recent federal programs of the 1970s have increasingly been "block granted," coming more under state control during the 1980s. However, our data set does not include these current developments.



eral education programs, such as the National Defense Education (NDEA) and vocational education programs. Our final hypothesis is thus:

**Hypothesis 5:** Funding from newer (ESEA) federal programs leads to more expansion of district administration than does funding from older federal programs.

### Data

Data for this study are taken from four independent governmental surveys done in 1976–77. These are the Bureau of the Census's *Survey of Local Government Finances*, the *Elementary and Secondary Staff Information Survey* of the Equal Employment Opportunity Commission (EEOC), the *Elementary and Secondary School Civil Rights Survey* of the Office of Civil Rights, and the *Tabulations of Census Data by School District* done by the National Institute of Education. These surveys can be used in conjunction because of the important work of the National Center for Education Statistics in merging and editing the files. Since each survey has its own unique history, this combination of data from different sources is only available for 1975–76 and 1976–77.

Most of the surveys in the data set attempted to reach all of the 16,853 school districts in the country. Our analyses of administrative expenditure variables in fact included 15,013 (or 89 percent) of this population: the missing cases lacked information on one or another of our independent variables or sometimes enrolled no students.

Our analyses of school district administrative positions took their measures of this dependent variable from the EEOC survey noted above. This survey sampled 6,889 cases from the population of American school districts. The sample was a weighted random one—somewhat oversampling urban cases with minority populations. Our analysis was based on 6,718 cases, or 97 percent of this sample. Again, a few cases were missing because of missing data on one or another independent variable.

The variables in the analyses are described below. Table 2 gives their means and standard deviations. It shows that the sample with data on personnel variables is quite similar to the overall population of school districts. The overrepresentation of urban, minority, and southern districts was not for our purposes problematic, since these variables were controlled in the analyses.

### Dependent Variables

*Administrative positions* includes the total number of district and school administrators. School administrators include principals and assistant principals. District administrators include superintendents, assistant superintendents, and special services administrators. Collected by the EEOC, Fall 1976.

*Teaching positions* includes the total number of teachers in the district, including elementary and secondary school teachers and teacher aides. Collected by the EEOC, Fall 1976.

*Administrative expenditures:* total administrative expenditures as measured by the Bureau of the Census, 1976–77, *Survey of Local Government Finances*.

### Centralization, Fragmentation, and Complexity

*Teaching expenditures*: total instructional expenditures, also measured by the Bureau of the Census, 1976–77, *Survey of Local Government Finances*.

### Independent and Control Variables

*State funds*: total revenue received by the district directly from the state. All revenue variables were collected by the Bureau of the Census, 1976–77, *Survey of Local Government Finances*.

*Local funds*: school district revenue derived from local sources. These include the property tax, the parent government funding (local city or county), and revenue from other school districts.

*Federal funds*: school district revenue from the ESEA, the NDEA, Federal Vocational Programs, School Lunch monies, and direct federal aid through Public Laws 815 and 874.

*State centralization index*: Wirt's (1978) measure of the programmatic authority of the state department of education. Wirt did content analyses of state law, involving items such as accreditation, textbook, and attendance requirements, and combined these into an index varying between 0 and 6.

*Enrollment*: total enrollment in the district, measured by the Bureau of the Census, 1976–77, *Survey of Local Government Finances*, and edited by the National Center for Education Statistics. We include enrollment as a control variable, given the much discussed effects of organizational scale on administrative intensity (see Freeman and Kronenfeld, 1974). (Other analyses not reported here also tested for curvilinear size effects.)

*Number of schools*: total elementary and secondary schools in the district; measured by the National Institute of Education's Special Tabulations of Census Data by School District. The number of organizational units has clear implications for administrative complexity, following Blau's (1970) arguments.

*Urban, suburban location*: two dichotomous variables (*rural* is the omitted category), developed from a Bureau of the Census code based on population count. Urban districts are often thought to be more administratively complex, sometimes because greater diversity of students leads to higher technical complexity.

*Black students*: the total number of black pupils in the district, collected by the Office for Civil Rights, Elementary and Secondary School Survey, Fall 1976. We controlled for the enrollment of blacks and poor students because such students are sometimes thought to create administrative burdens—among other reasons, because they increase technical variability.

*Poor students*: the total number of children between 6 and 17 in the district who were classified as poor by the National Institute for Education, Special Tabulations of Census Data by School District.<sup>2</sup>

*South*: a dummy variable, coded 1 if the district was in a southern state. The comparative literature suggests that southern public administration is more centralized, so this factor was held constant in the analysis.

<sup>2</sup>

This variable was not included in the analyses of administrative and instructional expenditures because its inclusion reduced the sample size by more than 2,000 cases.

Table 2

**Means and Standard Deviations of Variables in Regression Analyses**

Variables	Overall district data set ( <i>N</i> = 15,013)		Data set with personnel information ( <i>N</i> = 6,717)	
	Mean	S.D.	Mean	S.D.
Administrative positions/students	—	—	.004	.002
Teaching positions/students	—	—	.053	.023
Administrative expenditure/students	82.35	90.08	—	—
Teaching expenditure/students	914.00	339.54	—	—
ESEA funds/students	41.95	51.46	41.13	40.58
Other federal/students	73.90	140.84	71.52	93.36
State funds/students	625.95	422.29	651.51	269.99
Local funds/students	905.46	744.86	748.31	518.45
State centralization index	3.58	.52	3.61	.46
Suburban	.24	.43	.39	.48
Urban	.02	.15	.05	.22
1/Enrollment	.008	.030	.001	.001
Percent black	.056	.14	.08	.16
Percent poverty	—	—	.15	.13
South	.11	.32	.18	.38

**Analyses**

The models reported here are multivariate regression analyses of the effects of levels of funding from local, state, and federal sources on school district administrative staff size and expenditures. The control variables described above are included in the models. For comparative purposes, effects of the same independent variables on district instructional staff size and expenditures are also estimated.

Since the dependent variables are raw staff size and expenditure figures, rather than ratios of these figures to, for instance, enrollments, they are naturally scaled to district size. This poses no problems for examining the effects of the main independent variables—funding dollars from various sources—since these are also naturally scaled to size. That is, it is reasonable to suppose that a given raw number of dollars (or students) would produce a given raw number of administrators or dollars of administrative expenditure. This is also true of a number of the control variables, such as the raw number of black students or students from families below the poverty line or district enrollment itself. The other control variables do not have this built-in property. It makes sense to hypothesize that the effects of state educational centralization, the urban or suburban character of the district, and location in the South affect administrative staff size or expenditure *in proportion to the size of the district*. For instance, location in a centralized state might lower the number of administrators in a small district by less than one full position, while the same effect in a large district might amount to a half-dozen positions. Thus, in the analyses, the effects of state centralization, urban and suburban location, and southern location are estimated with the interaction of these variables with the enrollment of the district.

In estimating the equations, ordinary-least-squares techniques are not really appropriate. All the variables, both independent

### Centralization, Fragmentation, and Complexity

and dependent, are very highly skewed in distribution, because they all reflect size variations. Thus the residuals in ordinary-least-squares analyses are far from normally distributed. Bigger districts have much bigger staffs, more funds of all sorts, and will tend to have larger residual errors in absolute terms. Our solution was to weight all terms in the equations by the reciprocal of district enrollment, for estimating purposes—i.e., to use weighted-least-squares estimation. This produces analyses with better distributed residuals, as well as less skewed variables.

### RESULTS

Table 3 reports multivariate analyses of the size of district administrative staff (equation 1) and of administrative expenditures (equation 3). For comparative purposes, effects on instructional staff size and expenditures are also presented (equations 2 and 4). To simplify presentation, the staff-size estimates are made in terms of 1/1000 of a position. The issues relevant to the hypotheses have to do with the relative effects of local, state, and federal funds. The latter are broken down into (1) those funds linked to the recent reforms of the ESEA and (2) all other federal funds, to permit a test of the idea that ESEA funding produces especially large effects on administrative expansion.

The overall findings are very clear. State funding, as expected, generates the lowest levels of administrative expenditure and staffing. Local funding generates higher levels of both. Non-ESEA federal funding generates still higher levels of both. And ESEA federal funding generates very high levels of administrative expenditure and staffing.<sup>3</sup>

These differences are generally not paralleled by effects on instructional staffing and expenditure. Local, state, and non-ESEA federal effects here differ little. Federal ESEA funding, on the other hand, does generate distinctly larger effects on instructional funding and staffing than do the other funding sources. But this differential is still much less than the differential ESEA effect on administrative staffing and expenditure.

For administrative expenditures, the differences between each pair of the four effects are statistically significant. For administrative personnel, all differences are statistically significant except for that between non-ESEA federal funding and local funding. And substantively, the effects are quite large. A local dollar generates about three times the adminis-

3

Data were also available for district level "professional staff," a heterogeneous category including such titles as counselors, librarians, and instructional specialists. We examined the effects of federal, state, and local funding on this category but found inconsistent and unconvincing results largely due, we would argue, to the variable types of personnel included in this category. We have omitted these analyses to simplify the presentation of results.

Table 3

**Effects of Various Types of Federal, State, and Local Funding on School District Administration and Instructional Expenditures and Personnel (All terms weighted by 1/Enrollment)**

Equations*	Federal Funds ESEA	Other	State funds	Local funds	State central- ization	Suburban (= 1)	Urban (= 1)	Percent black	Percent poverty	No. of Schools	South (= 1)	Enroll- ment	Constant
(1) Administrative positions/1000	.0060*	.0012*	.0003*	.0009*	.09	.011	.17	.06	.44	.002	.17	1.16*	1,399*
(2) Teaching positions/1000	0.78*	.009*	.012*	.016*	2.6*	-1.76*	1.66*	9.76*	7.01*	.008	4.91*	30.0*	11,971*
(3) Administrative expenditures (\$)	22*	0.7*	.037*	.059*	3.77*	12.59*	13.21*	60.		.26*	9.59*	10.91	-217
(4) Teaching expenditures (\$)	69*	.26*	.26*	.30*	9.16*	87.4*	65.0*	138.4*		.78*	-114.2*	349*	2,210

\*  $p \leq .01$ .

\* Number of cases for equations 1 and 2 is 6,718, and for equations 3 and 4 is 15,013.

trative staffing of a state dollar, non-ESEA federal dollars about four and one-half times as much, and ESEA federal dollars about nineteen times as much. On administrative expenditures, local dollars produce about one and one-half times the effect of state dollars, non-ESEA federal dollars about twice the effect, and ESEA dollars six times the effect. And most of these effects are larger than the differential effects of the fundings on instructional expenditure and staffing. The extraordinary ESEA effect on administration, however, is diminished by this comparison: it still remains higher than any other effect on administrative expenditure but is no longer higher (relative to the instructional effect) than the non-ESEA effect on administrative staffing.

These data provide substantial support for our main hypotheses. State funding, as expected, has the smallest effects on administrative funding and staffing, with local funding having greater effects and federal funding much greater yet. The differences are large. Further, the recent-ESEA-funding variable has, as expected, greater administrative effects than older federal fundings: our confidence in this result on the staffing side is diminished because ESEA funding also seems to substantially increase instructional staffing (which we did not predict).

We also hypothesized that state centralization would tend to lower administrative expenditures and staffing. The results do not support this idea: an effect of this sort occurs in the expenditure analysis, but an insignificant positive effect appears in the staffing analysis.

With funding structure held constant, the effects of the control variables tend to be small. Enrollment still has some additional positive effects. Urban and suburban districts have lower administrative and higher teaching expenditures than rural ones but do not differ much on staffing. Southern districts have slightly lower expenditure levels. Districts with more black students appear to have slightly more teachers and teaching expenditures. Districts with more students below the poverty line have slightly more teachers, too. The reported expenditures analysis does not include this variable (in order to reduce missing cases, as noted above).<sup>4</sup>

We conclude that the data provide support for the argument that the more fragmented local and federal environments are associated with higher levels of administrative complexity of school districts than the more integrated—state—environments. And, given environmental complexity, the more formally structured federal environment is associated with higher levels of administrative complexity than the less formally structured—local—environments. That these effects are not simply a matter of centralization but of fragmentation of funding is supported by the finding that earlier federal programs that are less fragmented in form of administration are associated with lower administrative complexity of districts than are the more recent and more highly fragmented federal programs. Over time, federal programs have been captured and integrated by state and local organizations. Finally, the data do not support the expectation that greater programmatic authority over education at the state level, by providing

<sup>4</sup> Parallel analyses including the poverty variable give very similar results to those reported here.

### Centralization, Fragmentation, and Complexity

a simpler environment, would be associated with lower administrative complexity at the district level.

### DISCUSSION

We have described the funding environments of American public school districts to see whether the organized complexity of these environments predicts administrative elaboration in both positions and funding. The results show that federal funding—especially in the newer federal educational programs—generates unusually high levels of administrative expenditures and staffing size, in comparison to state and local funding. There is some further evidence that state funding and centralization reduce relative levels of administrative expenditures in comparison to the effects of local funding.

The results of the district-level analyses in some respects contrast with those we found in an earlier analysis, using data aggregated to the state level (Meyer et al., 1987). There, we found dramatic organizational changes over time, apparently reflecting the general expansion of state and federal funding and authority, but few differences among states in aggregated administrative expenditures or positions dependent on particular patterns of (aggregated) state and federal funding. It seems clear that the present analysis—conducted at the appropriate level of analysis—is to be taken much more seriously. The fact that state expansion produces much larger districts, with corresponding changes in administrative structure (Strang, 1986), was apparently inadequately controlled in the earlier analyses. Our central result on the special administrative burden created by federal funding is consistent with the results of an earlier analysis of district structures within several states (Freeman, Hannan, and Hannaway, 1978), though in that study, state funding was also associated with expanded administrative structures (perhaps reflecting effects of particular states).

These results lend considerable support to the idea that a complex or fragmented organization environment is likely to expand the administrative burdens of an organization. In the case of education, such burdens take on clear and palpable meaning—specialized outside agencies (recently, especially agencies at the federal level) provide funds in exchange for detailed administrative controls and reports. Sometimes, there have even been external rules in effect *requiring* local schooling organizations to differentiate their programs administratively in terms of the external funding and requirements involved. These results suggest that over time, with routinization, such effects may decrease—for example, the older vocational education supports are no longer accompanied by much special administrative pressure.

The results of this study come from the late 1970s—the period of high and recent reformist federal intervention into many aspects of education. It seems likely that the administrative effects of the recent programs—designed, as they were, to penetrate and reconstruct aspects of local education—have attenuated over time. Federal funding has shifted away from special-purpose grants toward block grants and has shifted from programs attempting direct controls over local educational organizations toward more general support filtered through state education departments. The long-run

effects of these changes has undoubtedly been to reduce the local administrative burden and probably to reduce the special effects of federal funding that we have reported here. Further research covering longer time periods would be useful in examining this question.

It would also be useful, in further work, to see if the earlier periods of expansion in state organizational control and funding were accompanied by similar administrative pressures on local districts. In the short term, the addition of a new organizational layer would ordinarily add complexity. But the state's role in education has typically been rather simple and direct—the expansion of that role is closely tied to the consolidation and standardization of schools and school districts. From early on the state departments of education may have had the net effect of undercutting the complexities of local political pressures on schooling and providing for a simpler environment for local administration.<sup>5</sup> From this point of view, then, the distinctive aspect of federal involvement lies in its special lack of authority to provide direct and integrated educational control over the whole educational system—and thus in its intrinsically special-purpose and fragmented character. Unlike the rise of state authority, federal involvement has not lowered the legitimate pressures impinging on local organization from existing loci of authority and control. It thus added complexity, in an overall sense, to the system.

Overall, our analyses lend support to the general ideas with which we began. Environmental fragmentation does seem to increase the formal administrative burden in organizations, as does the formal organization of the environment. Centralization by itself, independent of these other factors, may have little effect on administrative complexity. In the case of the American federal system—especially pronounced, perhaps, in the instance of education—centralization to the national level may increase fragmentation, thus increasing the administrative complexity or demands faced by local organizational structure. This line of thought may help explain why, in a period in which many issues are raised to national attention, the great increases in complexity in American organization seem to have been at the local or intermediate (e.g., district) level.

5

Of course, we would expect important variation among states in their interest in and capacity for consolidating controls over local districts. Assuming the development of an adequate measure of state centralization, this variance could be exploited to provide a more sensitive test of the arguments advanced.

## REFERENCES

- Bankston, Mary**  
1982 "Organizational reporting in a school district: State and federal programs." Project Report No. 82-A10, Institute for Finance and Governance, Stanford University, April.
- Blau, Peter M.**  
1970 "A formal theory of differentiation in organizations." *American Sociological Review*, 35: 201-218.
- Burlingame, Martin, and Terry G. Geske**  
1979 "State politics and education: An examination of selected multiple-state case studies." *Educational Administration Quarterly*, 15 (Spring): 51-75.
- DiMaggio, Paul, and Walter W. Powell**  
1983 "The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields." *American Sociological Review*, 48: 147-160.
- Doyle, Denis P., and Chester E. Finn, Jr.**  
1984 "American schools and the future of local control." *The Public Interest*, 77 (Fall): 77-95.
- Freeman, John, Michael Hannan, and Jane Hannaway**  
1978 *The Dynamics of School District Administrative Intensity: Effects of Enrollments and Finance in Five States*. Cambridge, MA: Abt Associates.
- Freeman, John H., and J. E. Kronenfeld**  
1974 "Problems of definitional dependency: The case of administrative intensity." *Social Forces*, 52: 108-121.
- Fuhrman, Susan, and Alan Rosenthal (eds.)**  
1981 *Shaping Education Policy in the States*. Washington, DC: Institute for Educational Leadership.

### Centralization, Fragmentation, and Complexity

- Galbraith, Jay**  
1973 *Designing Complex Organizations*. Reading, MA: Addison-Wesley.
- Kirst, Michael W.**  
1978 "The state role in regulating local schools." In M.F. Williams (ed.), *Government in the Classroom: Dollars and Power in Education*: 45-56. New York: Academy of Political Science.
- McDonnell, Lorraine M., and Milbrey W. McLaughlin**  
1982 *Education Policy and the Role of the States*. Santa Monica, CA: Rand (R-2755-NIE).
- Meyer, John W., and Brian Rowan**  
1977 "Institutionalized organizations: Formal structure as myth and ceremony." *American Journal of Sociology*, 83: 340-363.  
1978 "The structure of educational organizations." In Marshall W. Meyer (ed.), *Environments and Organizations*: 78-109. San Francisco: Jossey-Bass.
- Meyer, John W., and W. Richard Scott**  
1983 *Organizational Environments: Ritual and Rationality*. Beverly Hills, CA: Sage.
- Meyer, John W., W. Richard Scott, David Strang, and Andrew Creighton**  
1987 "Bureaucratization without centralization: Changes in the organizational system of American public education, 1940-1980." In Lynne G. Zucker (ed.), *Institutional Patterns and Organizations: Culture and Environment*. Cambridge, MA: Bollinger (forthcoming).
- National Education Center of the U.S.**  
1931 *Studies in State Educational Administration*, No. 9. Washington, DC: Research Division, National Education Association of the United States.
- Perrow, Charles**  
1967 "A framework for the comparative analysis of organizations." *American Sociological Review*, 32: 194-208.
- Pfeffer, Jeffrey, and Gerald R. Salancik**  
1978 *The External Control of Organizations*. New York: Harper and Row.
- Strang, David**  
1986 "The centralization of American education: District consolidation, 1938-1980." Paper presented at the Annual Meetings of the American Sociological Association, New York City.
- Thompson, James D.**  
1967 *Organizations in Action*. New York: McGraw-Hill.
- Timpone, Michael (ed.)**  
1976 *The Federal Interest in Financing Schooling*. Cambridge, MA: Ballinger.
- Tyack, David B.**  
1974 *The One Best System: A History of Urban Education*. Cambridge, MA: Harvard University Press.
- Wirt, Frederick**  
1978 "School policy culture and state decentralization." *Policy Studies Review Annual*, 2: 458-481.
- Woodward, Joan**  
1965 *Industrial Organization: Theory and Practice*. New York: Oxford University Press.