PREDICTION OF A SCHOOL SUPERINTENDENT'S TENURE USING REGRESSION AND BAYESIAN ANALYSES

by

Sandra Lee Anderson

Dissertation submitted to the Faculty of the
Virginia Polytechnic Institute and State University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

in

Educational Research and Evaluation

APPROVED:

J. C. Fortune, Co-Chairman

K. E. Underwood, Co-Chairman

R. M. Forbes

L. McCluskey

W. L. Seaver

L. M. Wolfle

June, 1988

Blacksburg, Virginia

PREDICTION OF A SCHOOL SUPERINTENDENT'S TENURE USING REGRESSION AND BAYESIAN ANALYSES

by

Sandra Lee Anderson

Committee Chairmen: Jim C. Fortune
Educational Research and Evaluation,
Kenneth E. Underwood
Educational Administration

(ABSTRACT)

A model was developed to incorporate the major forces impacting upon a school superintendent and the descriptors, stability measures, intentions and processes of those forces. Tenure was determined to be the best outcome measure, thus the model became a quantitative method for predicting tenure. A survey measuring characteristics of the community, School Board, and the superintendent was sent to superintendents nationwide who had left a superintendency between 1983 and 1985. Usable forms were returned by 835 persons.

The regression analysis was significant ($p \leq .0000$) and accounted for 40% of the variance in superintendent tenure. In developing the equation, statistical applications included Mallows C_p for subset selection, Rousseeuw's Least Median of Squares for outlier diagnostics, and the PRESS statistic for validation.

The survey also included 24 hypothetical situations randomly selected out of a set of 290 items with four optional courses of action. The answers were weighted by the tenure groups of the superintendents. and the responses analyzed using a Bayesian joint

probability formula. Precictions of the most probable tenure based on these items were accurate for only 18% of the superintendents.

Variables found to contribute significantly in every candidate equation included per pupil expenditure, recent board member defeat, years in the contract, use of a formal interview format, age, being in the same ethnic group as the community, intention to move to another superintendency, orienting new Board members, salary, enrollment, and Board stability. Variables which were significant in some equations were region of the country, state turnover rate, proportion of Board support, whether changes were expected, use of a regular written evaluation, community power structure, number of Board members, grade levels in the district, gender, and having worked in the same school district. Variables which did not contribute were per capita income, whether the board was elected or appointed, educational degree and type of community.

Acknowledgements

I acknowledge first the support of my husband, , who not only programmed all of the data basing applications and formatted the final document, but also maintained the family during the long hours of study. Our daughters, , also showed great patience and support.

Each member of the dissertation committee was selected because of his excellence in the field of education, and for the unique contribution he could make to this study: Jimmie C. Fortune, Kenneth E. Underwood, Roy M. Forbes, Lawrence McCluskey, William L. Seaver, and Lee M. Wolfle.

This comprehensive study was completed through the contributions of many people, including the 943 superintendents who responded to the rather long survey. In addition were those persons who reviewed the decision-making items: John Bennett, John W. Brubacher, Houston Conley, Mark Eastman, Robert R. Freeman, Carroll Johnson, Richard Miller, Richard R. Short, Charles F. Smith, Ray Smith, and Edward L. Whigham; and, those who piloted the instrument: A. B. Hatch, Robert Metcalf, Charles Nunley, Donald P. Sheldon, Howard S. Smucker, Donald Thomas, and Wayne Worner.

The American Association of School Administrators (AASA) endorsed the study and provided address lists, envelopes and the costs for mailing. The support of AASA and staff members, Richard D. Miller, Gary Marx, Ann Bowman and Deborah Kyle, was invaluable. Lists of superintendents in 1983 and 1985 were received from the Educational Research Service (ERS) through the careful work of Nancy Prothro.

Each of the survey forms for the 1574 superintendents on the mailing list consisted of a cover letter, page of demographic items and four randomly selected pages of decision-making questions. The preparation of the surveys, including massive collating, labeling with matching inside and outside labels, folding and stuffing was

completed with the help of Ashley Anderson, Mark Corner, Jennifer Rice, Jeffrey Walkup, Jennifer Walkup, and John Williams.

Persons who assisted in individual ways included Janet Carlton, Barbara Hutson, Marina Hruncu, Richard Krutchkoff, Nina Kjos, Norma McGehee, William Sider, Carmen Wisdom, and George Woytach.

The assistance of each of these persons, whose collective help made the study possible, is acknowledged and greatly appreciated.

Table of Contents

List of Tables

PREDICTION OF A SCHOOL SUPERINTENDENT'S TENURE USING REGRESSION AND BAYESIAN ANALYSES

Chapter 1: Purpose of the Study

A person who is applying for a position as superintendent has had very little information available to use in comparing different superintendencies or assessing how well he or she would do in a particular job. Similarly, Boards of Education have not had quantitative information for evaluating their districts or applicants for the position. Success of a superintendent, the executive officer of a public school board, has often been associated with one's tenure in the position, thus a method of predicting tenure in a given superintendency could be valuable. The prediction would provide both the prospective superintendent and school board with a way of determining how favorable the situation would be for longevity and planning accordingly.

Tenure was the best characteristic for the focus of this study because it was measurable, and it was often seen as being synonymous with success by persons in the superintendent ranks as well as others. Ross Engel, a former superintendent, commented, "usually, in this rather perilous business, mere survival is one measure of success" (1985, pp. 39-40). For the purposes intended here, tenure should be understood as the job duration, or number of months a superintendent remained in a position.

In explaining the many factors affecting a school superintendent's tenure, the literature relied almost entirely on self-report data, case studies and expert testimony. These qualitative approaches were useful in the sense that they addressed the broad scope of the community, institutional and personal influences on a superintendent's survival in

office. However, the same information was needed in quantitative form to allow the application of knowledge from many superintendents and their districts to a better understanding of the prospects of one superintendent in a specific district.

This study developed a method of predicting superintendent tenure based upon a national survey with a large number of superintendents who were asked about a past superintendency. Variables addressing the characteristics of the applicant, the Board of Education, the stability of the situation, and the support of the community were used to describe the person and the given situation. The person was then asked to make decisions in response to a series of situations which were weighted to distinguish among longer and shorter tenured superintendents.

The value of this method would be its ability to provide a person with (1) a way of comparing expected tenure in different situations, and (2) feedback on the implications of decision-making for his or her tenure as a superintendent. The method's appeal was its ability to account for both the characteristics of the situation and the actions of the superintendent in predicting tenure.

Characteristics of the situation were analyzed using a regression equation which reflected as nearly as possible the multiple forces at work in a given community which impacted upon a superintendent. These attributes included factors which a review of the research indicated were associated with tenure as well as those factors which intuitively suggested themselves. Some examples were school district size, region of the country, urban or rural status, school board size and average tenure, school budget, and superintendent's age, gender, race, home district, prior experience, and personal goals.

By the same token, certain individuals appeared to maintain their superintendent positions wherever they were. If this perception were true, then it would be necessary to identify the characteristics which caused them to remain at a position longer than other superintendents. These leadership characteristics (Szilagyi and Wallace, 1980) could

include personal attributes, mental constructs, management abilities, and political adroitness. Decision-making was one act which cut across all the characteristics affecting survival (in the sense of retaining one's job). Each decision manifested the mental integration of the superintendent's knowledge at the moment, personal characteristics, and a judgement.

Decision-making characteristics of the individual were measured by applying a Bayesian analysis to the decisions made in response to a series of problem situations. Each situation had four optional courses of action, and the superintendent selected the action he or she would most likely take. It was an assumption of this study that superintendents who enjoyed the longest tenure would tend to select the same options, and that superintendents who had relatively short tenure would tend to select different options. Based upon the option selected, a prediction was made as to the relative length of tenure the individual would enjoy. Using a Bayesian approach, the prediction of the most probable tenure was then progressively modified by the decision made for each additional situation.

By using the weighted predictions of tenure from both the regression analysis of the demographic characteristics of the superintendency, and the Bayesian analysis of the decisions made, the developed method modeled reality in that an individual is able to affect job duration in part by his or her actions.

The methodology implied by this model had value beyond the obvious results. It could be applied in any potential career situation or organization, for example, college presidents seeking increased funding, business leaders responding to market research, politicians working within party platforms, or coaches facing career moves. This method could be applied to predicting longevity or success in any number of the wide ranging arenas of human endeavor.

Chapter 2: Review of the Literature

This review of relevant research began with entries in the Comprehensive Dissertation Index from 1973 to 1983; the Educational Resources Information Center (ERIC) from 1970 to 1985 through Resources in Education and the Current Index of Journals in Education; and the Education Index from 1970 through 1984. As references to significant studies prior to the 1970's were found, these were included in the review. The major studies which look at variables related to superintendent tenure are discussed below.

Related Research

One major study was completed in 1955 by Samson, as reported by Puffer (1959, p. 41). Samson conducted his study in Iowa, Illinois and Michigan, which had small school districts. Some of his findings were:

1. Size of the school district tends to be smaller in the high turnover group of districts.

2. The salaries paid to superintendents in high turnover districts tend to be lower.

3. The median length of service of board members in the low turnover districts is lower.

4. Boards of low turnover districts tend to promote from within the system to the position of superintendent.

5. When selecting a superintendent who has had previous experience in the superintendency, Boards in high turnover districts tend to select a person who has remained in his previous position for only a few years.

6. In low turnover districts, the Board tends to delegate more administrative authority to the superintendent and to interfere less in administrative matters than is the case in the high turnover districts.

7. In high turnover districts the extent of community understanding of the purposes of the school program and of community cooperation with the schools is lower.

8. In high turnover districts, there is a greater tendency for well-qualified people to refuse to serve on the board because of undesirable pressures to which the Board is subjected. (Samson, 1955, p. 170)

An examination of the findings of Samson identified several variables to be considered at the onset of one's tenure. These were: (1) size of school district, (2) salary, (3) average length of service of board members, (4) selection from inside or outside the school system, and (5) tenure in a prior superintendent position. Those factors which might impact upon job duration, but might not be known by an inquiring superintendent included: (6) board interference in administrative matters, (7) community understanding and cooperation with the school system purposes, and (8) undesirable pressures on board members.

Puffer conducted a study of Michigan school systems in which the superintendents had tenures of 20 years or more. In Michigan a school principal was identified as a superintendent. He found a positive relationship between long tenure and a clear demarcation between Board policy-making and superintendent policy-execution. (p. 146)

He found no relationship of tenure with: property valuation, except in schools having less than 500 pupils; per pupil expenditure, except in very small schools; the tax rate levied for operating expenses; highest degree earned, recency of courses, or path to the superintendency; time the Board spent in deliberation; level of education of board members; pay for the board members; a superintendent contract or length of contract; special contracts for the superintendent; the role of standing committees; national background of the superintendent and of the community; urban, suburban or rural areas; or, stable vs. shifting communities. (pp. 142-147)

Puffer's suggestions for superintendents desiring long tenure were to properly orient new board members and to avoid communities with a lot of division and contention. (p. 150) Although he found no relationship between many of the factors and

tenure, several of them appeared worthy for consideration in this study, specifically, average family income, per pupil expenditure, highest degree earned, contract length, ethnic background, and urban/rural/suburban areas.

The study by March and March approached the study of the succession of superintendents with a concept similar to the one employed in this study. They began in the 1977 article with, "A chief executive job is a pairing of an individual and an organization" (p. 377). From the individual's point of view, a superintendency was one position in a career of positions, including superintendencies. From the school system's point of view, a superintendent was one in a chronology of superintendents. From these two joined systems, March and March used a Markovian model based on simple chance to predict the careers and chronologies. They then compared the actual careers of Wisconsin superintendents between 1940 and 1972 to their model.

March and March used a stochastic transition model, asserting that the movement in careers and chronologies should be viewed as chance fluctuations determined by probability, in contrast to the approach of the present study, which they may have well described:

> Much of the literature on careers in educational administration . . . seeks to explain variations in careers and chronologies as necessary consequences of personal, temporal, or organizational factors. Individuals with long careers are characteristically described as having properties that produce long careers; organizations with high turnover are characteristically described as having properties that produce high turnover. The events of some time periods are seen as conducive to long careers, other times to short ones. The result is that there is considerable lore and some data about what kinds of administrators succeed - have long careers - when, and what kinds of districts are attractive - have low turnover - to whom. (1977, p. 378)

In examining the extent to which the observed structure of careers and chronologies matched the random pairing of indistinguishable individuals with indistinguishable organizations, the March and March study concluded that:

> The chance model is quite robust against differences in the underlying characteristics of jobholders. Even if there were significant differences among

> superintendents in their capabilities for survival, the chance model would give a fair first approximation under many circumstances. (1977, p. 398)

Among the findings of the study were the following: There was a slight tendency for advanced study to be negatively associated with tenure - the loss of one year for each additional degree earned. (1977, p. 400) Age, as it increased before the age of 58, was associated with a slight decrease in promotion rates to new superintendencies. After age 58, the promotion rate declined rapidly. (p. 400) Longer job duration was associated with larger districts. (p. 401) The correlation ($r = .035$) of the length of job duration from one superintendent to his or her successor was not great. (footnote, p. 401) Movement of individual superintendents into new superintendencies was in the direction of larger cities, and in Wisconsin, it was toward the southeast. (p. 402) March and March also found that the longer a person was in the position, the even greater number of additional years of tenure could be expected:

> For example, a superintendency begun when the individual is 35 years of age has an expected duration of 7.1 years at the start of the term. After 5 years of existence, if the match endures that long, such a match has an expected additional duration of 9.2 years; after 10 years, the expected additional duration is 10.3 years. (p. 403)

This would suggest a distribution of tenure with a long tail for successive years of service in the position. One final variable to be cited was the apparent hierarchy of status among school districts:

> Superintendents move to better districts, that is, larger and more southeasterly; vacancies move to poorer districts. Districts appear to be ordered with respect to their attractiveness in a more distinct way than are superintendents. (p. 404)

The apparent overall finding of the study, that a random model explains much of the movement of superintendents and vacancies, had a kindred thought from Engel, "Here's a heretical notion: Maybe no substantive differences exist between the successful and the less-than successful school executives" (p. 39).

Schmittlein and Morrison commented on the March and March study, "However, the fact that a control system does not reliably discriminate between individuals in a system is not evidence that the individuals are truly homogeneous" (1981 p. 87). March and March responded in their 1981 article, "Their [Schmittlein and Morrison] discussion, however, might lead a reader to conclude that we thought the Wisconsin data were consistent with a simple, homogeneous, stationary model. We said explicitly that they were not. We identified several ways in which the data do not fit such a model. . . . and our second paper is devoted entirely to describing a performance sampling model that deals with such results" (p. 90).

The March and March second paper appeared to call for a model using a sampling of performance to improve upon the fit of the random model. The present study, through the decision-making items, approached that performance sampling: "In a career system in which managerial performance is sampled, individual managers are sorted (i.e. fired, retained, or promoted) on the basis of estimates about their capabilities formed from observations of their performances" (1978, p. 441).

For the assumption on estimation, "The relative importance of past performances declines with distance from the present. . . . (footnote): A more fundamental modification in which the outcome of one performance affects the probability of success on a subsequent performance, is more complicated and has not been investigated" (p. 441). Bayesian theory was an appropriate mathematical application to adjust the probability of a predicted tenure based upon each additional sampling of decision-making, in an approach similar to that mentioned by March and March.

The elaboration of the performance sampling theory in their 1978 article identified the limitation of this prediction method for superintendents who were exceptionally successful:

> Except for sampling error, variations in managerial careers will reflect variations in managerial skills. Better managers will be promoted faster and to better jobs than poorer managers (p. 442). . . . The decision process sequentially chops the tails off the distribution of successes and failures and fills the next jobs with individuals who have records in the successful tail of the distribution (p. 444). . . . Exit rates peak later [than promotion rates] because of record sorting. Individuals beginning a job tend to have good records. That is how they were promoted to the job. Over time, some of them will accumulate enough new performance failures to reach the exit point, but on the average it will take longer to reach that point than the promotion point, given that they begin with a successful record. (pp. 449-450)

It was important to keep in mind in the development of this method that a prediction of long tenure for an individual was susceptible to the voluntary departure of a successful superintendent to a better position.

The last major study for review was conducted by Lange (1981). He mentioned the idea that the personal expectations of the superintendents and the need for change in school districts might predestine a superintendent for short tenure. (p. 2) He cited Grieder, Pierce and Jordan, "In a good many smaller cities and towns in which bankers, doctors, dentists, and businessmen make a lifetime career, a peculiar philosophy prevails that there ought to be a change of superintendents every few years" (1969, p. 172).

Lange studied superintendents in Nebraska in 1980-81 with tenure of four years or less compared to those with tenure of five years or more. His findings were:

1. age: 45.6% of the shorter-tenured superintendents compared to 10.3% of the longer-tenured ones were less than 40 years old;

2. marital status: no difference;

3. district size: 5% more of the shorter-tenured superintendents were in the smaller districts;

4. contract duration: 75% of the shorter-tenured and 66% of the longer-tenured had 1-year contracts, while 12% of the shorter-tenured and 25% of the longer-tenured had 3-year contracts;

5. number of prior districts: 70.3% of the shorter-tenured and 65.5% of the longer-tenured superintendents had served in only one or two different districts; and

6. education: no significant difference was found. (pp. 141-142)

Appropriate areas for this study, paralleling Lange's work were age, district size or enrollment, contracted years, and level of education.

A model for decision-making items was developed by Musella and Joyce (1973) using an in-basket simulation of memoranda, letters, notes and phone calls to which a superintendent had to respond. These were simulated data, mainly used by students as learning experiences. Musella reported that there were no analyses nor explanation. (M. Hruncu, personal communication, December 12, 1985)

It can be inferred from this review of major studies that little has been done of the geographic scope, quantitative nature or comprehensiveness of examining superintendents experience as conducted in this study. Knowledge gained from the above studies and those to be cited in the next section on the examination of variables were invaluable, however, in identifying the areas which warranted further investigation as they impact upon superintendent tenure.

Underlying Variables

Selection of the variables to be used in the prediction equation was based upon a review of the items that appeared to be related to tenure as reported in the literature; those items which appeared intuitively to be important; and items which contributed to a comprehensive model of sources of influence on a superintendent's career. The model, illustrated in Table 1, assumed that the major forces influencing a superintendent's actions came from (1) the community, (2) the Board of Education, and (3) the superintendent. A fourth source could be the school system establishment, but these were assumed to be under the control of the superintendent.

Table 1

Variables Reflecting Major Forces and Effects

TYPES OF EFFECTS	MAJOR FORCES: Community	Board	Superintendent
Descriptors	1. region 2. state 3. community 4. enrollment 5. income	10. number on Board 11. grade levels in district	22. education 23. gender 24. age 25. race match
Stability Measures	6. Board defeat	12. number of new Board 13. Board support	26. insider/ outsider 27. departure
Objectives/ Intentions	7. per pupil expenditure	14. changes expected 15. salary 16. contract years	28. stepping stone
Processes	8. Board elected or appointed 9. power structure	17. evaluation 18. orient 19. agenda 20. search 21. interview	DECISION-MAKING QUESTIONS

The major categories for the types of effects of the major forces were (1) general descriptors of a demographic nature, (2) the stability of the situation, (3) the objectives of the community, board members or superintendent, and (4) the processes being utilized to achieve the objectives. The variables which were considered for the study are listed in the appropriate cell.

Each variable and the research available on it are discussed below. A copy of the questionnaire as it was sent to the superintendents is shown in Appendix A.

1. **Region of the country**. This variable suggested itself because of comments made about superintendencies, such as, "But it doesn't work that way in the South." It also provided access to linkage with other studies which had, in most cases, been conducted in one state only, as illustrated by Puffer, March, and Lange mentioned above.

Perhaps the most compelling reason for considering the region of the country was the finding by March and March (1977, p. 402) that there was a hierarchy among superintendencies, and in Wisconsin at least, more successful superintendents moved toward the southeast. It might be possible that there was hierarchy of prestige among regions within the nation.

The regional divisions were taken from a national survey by Underwood, Fortune, and Cleary for the National School Boards Association (1985, pp. 30-31).

> NORTHEAST: Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virgin Islands
>
> SOUTHERN: Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Texas, Virginia, West Virginia
>
> CENTRAL: Illinois, Indiana, Iowa, Kentucky, Michigan, Minnesota, Missouri, Ohio, Wisconsin
>
> WESTERN: Colorado, Kansas, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Wyoming
>
> PACIFIC: Alaska, Arizona, California, Hawaii, Idaho, Nevada, Oregon, Utah, Washington.

2. Name of state. It appeared that tenure differed among the states: Some states were organized by intermediate areas serving several school boards, some had a larger proportion of elected superintendencies, average salaries differed, and state laws governing tenure were different. All of these factors might influence how long the superintendent stayed in one place.

To account for the differences among states, the average turnover rate in the state between August 1983 and August 1985 was used, as documented in Table 2. The turnover rate assigned to the District of Columbia and Hawaii, which each had one superintendent, was the average turnover of 26.9%.

3. Type of community. The research findings on the types of community, which were classified as (1) urban, (2) suburban, (3) rural, or (4) small town, were not conclusive. Puffer stated that "Superintendents of long tenure were found in urban, suburban and rural areas" (p. 147). A study by Berger reported, "The event of succession, in other words, was independent of whether the district was urban, suburban, or rural in nature" (1984, p. 100). In support of considering the type of community, Bentley in his review (1976, p. 14) reported a finding by Dils (1954, pp. 62-63) that California superintendents were promoted from smaller to larger units, with the greatest turnover in the city or unified districts, and the smallest in the elementary districts.

4. School district enrollment. This variable measured of size of the district, which was found in the majority of studies to be positively correlated to tenure. Bentley (pp. 14-17) reported a relationship of tenure with the size of school boards (Lutz, 1963), size of units (Dils), and size of district (Samson, 1956, pp. 1-4). He also reported (pp. 15-16) from Sales and Taylor that superintendents in the smallest districts tended to stay in their first superintendencies a shorter time (3.0 years) than did superintendents in larger districts (greater than 4800 students) who remained 4.6 years.

Table 2

State Superintendencies and Sample Size by National Quartile

STATE	NUMBER OF STATE SUPERINTENDENCIES AND SAMPLE SIZE BY APPROXIMATE NATIONAL QUARTILES						
	Enrollment Quartiles	Number 1983-4	Number Changed 1985-6	Quartile Percent Changed	Mailing Sample Size	Sample Size	Percent of 83-4 Total
NATIONAL TOTAL	0 - 349	3498	1104	31.6%	282	142	4.1%
	350 - 999	3569	930	26.1%	374	202	5.7%
	1000 - 2499	3564	872	24.5%	423	226	6.3%
	2500 +	3591	923	25.7%	495	265	7.4%
	total:	14222	3829	26.9%	1574	835	5.9%
ALABAMA	0 - 349	0	0	—	0	0	—
	350 - 999	4	0	0.0%	0	0	0.0%
	1000 - 2499	37	7	18.9%	2	2	5.4%
	2500 +	87	28	32.2%	11	2	2.3%
	total:	128	35	27.3%	13	4	3.1%
ALASKA	0 - 349	25	8	32.0%	3	1	4.0%
	350 - 999	15	4	26.7%	3	2	13.3%
	1000 - 2499	7	2	28.6%	0	0	0.0%
	2500 +	5	1	20.0%	0	0	0.0%
	total:	52	15	28.8%	6	3	5.8%
ARIZONA	0 - 349	79	26	32.9%	5	2	2.5%
	350 - 999	39	15	38.5%	6	4	10.3%
	1000 - 2499	45	9	20.0%	4	2	4.4%
	2500 +	45	13	28.9%	6	3	6.7%
	total:	208	63	30.3%	21	11	5.3%
ARKANSAS	0 - 349	104	24	23.1%	6	3	2.9%
	350 - 999	158	45	28.5%	10	5	3.2%
	1000 - 2499	68	20	29.4%	8	3	4.4%
	2500 +	36	9	25.0%	5	3	8.3%
	total:	366	98	26.8%	29	14	3.8%
CALIFORNIA	0 - 349	317	112	35.3%	15	4	1.3%
	350 - 999	216	65	30.1%	15	7	3.2%
	1000 - 2499	178	46	25.8%	10	5	2.8%
	2500 +	307	84	27.4%	36	17	5.5%
	total:	1018	307	30.2%	76	33	3.2%
COLORADO	0 - 349	71	15	21.1%	4	1	1.4%
	350 - 999	43	8	18.6%	1	1	2.3%
	1000 - 2499	32	6	18.8%	4	2	6.3%
	2500 +	35	8	22.9%	7	2	5.7%
	total:	181	37	20.4%	16	6	3.3%
CONNECTICUT	0 - 349	23	7	30.4%	2	0	0.0%
	350 - 999	28	6	21.4%	3	1	3.6%
	1000 - 2499	46	13	28.3%	12	9	19.6%
	2500 +	68	14	20.6%	11	6	8.8%
	total:	165	40	24.2%	28	16	9.7%

(table continues)

STATE	NUMBER OF STATE SUPERINTENDENCIES AND SAMPLE SIZE BY APPROXIMATE NATIONAL QUARTILES						
	Enrollment Quartiles	Number 1983-4	Number Changed 1985-6	Quartile Percent Changed	Mailing Sample Size	Sample Size	Percent of 83-4 Total
DELAWARE	0 - 349	0	0	—	0	0	—
	350 - 999	1	0	0.0%	0	0	0.0%
	1000 - 2499	3	0	0.0%	0	0	0.0%
	2500 +	12	3	25.0%	2	2	16.7%
	total:	16	3	18.8%	2	2	12.5%
DISTRICT OF COLUMBIA	0 - 349	0	0	—	0	0	—
	350 - 999	0	0	—	0	0	—
	1000 - 2499	0	0	—	0	0	—
	2500 +	1	0	0.0%	0	0	0.0%
	total:	1	0	0.0%	0	0.0%	0.0%
FLORIDA	0 - 349	0	0	—	0	0	—
	350 - 999	2	2	100.0%	0	0	0.0%
	1000 - 2499	10	6	60.0%	1	0	0.0%
	2500 +	55	25	45.5%	9	1	1.8%
	total:	67	33	49.3%	10	1	1.5%
GEORGIA	0 - 349	5	1	20.0%	0	0	0.0%
	350 - 999	21	6	28.6%	1	0	0.0%
	1000 - 2499	75	27	36.0%	4	2	2.7%
	2500 +	104	33	31.7%	8	2	1.9%
	total:	205	67	32.7%	13	4	2.0%
HAWAII	0 - 349	0	0	—	0	0	—
	350 - 999	0	0	—	0	0	—
	1000 - 2499	0	0	—	0	0	—
	2500 +	1	0	0.0%	0	0	0.0%
	total:	1	0	0.0%	0	0	0.0%
IDAHO	0 - 349	33	12	36.4%	4	2	6.1%
	350 - 999	34	16	47.1%	6	4	11.8%
	1000 - 2499	27	11	40.7%	5	2	7.4%
	2500 +	21	6	28.6%	6	4	19.0%
	total:	115	45	39.1%	21	12	10.4%
ILLINOIS	0 - 349	261	76	29.1%	22	10	3.8%
	350 - 999	361	100	27.7%	48	24	6.6%
	1000 - 2499	250	60	24.0%	36	20	8.0%
	2500 +	133	41	30.8%	27	15	11.3%
	total:	1005	277	27.6%	133	69	7.0%
INDIANA	0 - 349	10	2	20.0%	1	0	0.0%
	350 - 999	33	8	24.2%	3	3	9.1%
	1000 - 2499	151	47	31.1%	23	13	8.6%
	2500 +	107	28	26.2%	16	12	11.2%
	total:	301	85	28.2%	43	28	9.3%

(table continues)

STATE	NUMBER OF STATE SUPERINTENDENCIES AND SAMPLE SIZE BY APPROXIMATE NATIONAL QUARTILES						
	Enrollment Quartiles	Number 1983-4	Number Changed 1985-6	Quartile Percent Changed	Mailing Sample Size	Sample Size	Percent of 83-4 Total
IOWA	0 - 349	103	30	29.1%	20	10	9.7%
	350 - 999	230	52	22.6%	30	21	9.1%
	1000 - 2499	74	9	12.2%	7	7	9.5%
	2500 +	33	4	12.1%	4	3	9.1%
	total:	440	95	21.6%	61	41	9.3%
KANSAS	0 - 349	80	28	35.0%	8	5	6.3%
	350 - 999	142	29	20.4%	12	8	5.6%
	1000 - 2499	56	13	23.2%	9	7	12.5%
	2500 +	28	11	39.3%	10	5	17.9%
	total:	306	81	26.5%	39	25	8.2%
KENTUCKY	0 - 349	5	0	0.0%	0	0	0.0%
	350 - 999	30	4	13.3%	1	1	3.3%
	1000 - 2499	72	16	22.2%	1	0	0.0%
	2500 +	79	16	20.3%	3	1	1.3%
	total:	186	36	19.4%	5	2	1.1%
LOUISIANA	0 - 349	0	0	—	0	0	—
	350 - 999	0	0	—	0	0	—
	1000 - 2499	6	2	33.3%	0	0	0.0%
	2500 +	60	21	35.0%	7	4	6.7%
	total:	66	23	34.8%	7	4	6.1%
MAINE	0 - 349	42	16	38.1%	5	3	7.1%
	350 - 999	43	18	41.9%	7	3	7.0%
	1000 - 2499	62	12	19.4%	6	2	3.2%
	2500 +	23	7	30.4%	4	2	8.7%
	total:	170	53	31.2%	22	10	5.9%
MARYLAND	0 - 349	0	0	—	0	0	—
	350 - 999	0	0	—	0	0	—
	1000 - 2499	0	0	—	0	0	—
	2500 +	24	6	25.0%	4	2	8.3%
	total:	24	6	25.0%	4	2	8.3%
MASSACHUSETTS	0 - 349	8	2	25.0%	0	0	0.0%
	350 - 999	35	5	14.3%	4	1	2.9%
	1000 - 2499	98	15	15.3%	8	4	4.1%
	2500 +	120	22	18.3%	16	8	6.7%
	total:	261	44	16.9%	28	13	5.0%
MICHIGAN	0 - 349	27	8	29.6%	3	2	7.4%
	350 - 999	112	30	26.8%	20	11	9.8%
	1000 - 2499	213	55	25.8%	36	24	11.3%
	2500 +	181	43	23.8%	27	12	6.6%
	total:	533	136	25.5%	86	49	9.2%

(table continues)

STATE	NUMBER OF STATE SUPERINTENDENCIES AND SAMPLE SIZE BY APPROXIMATE NATIONAL QUARTILES						
	Enrollment Quartiles	Number 1983-4	Number Changed 1985-6	Quartile Percent Changed	Mailing Sample Size	Sample Size	Percent of 83-4 Total
MINNESOTA	0 - 349	107	33	30.8%	14	7	6.5%
	350 - 999	175	39	22.3%	21	11	6.3%
	1000 - 2499	89	15	16.9%	9	4	4.5%
	2500 +	65	13	20.0%	10	7	10.8%
	total:	436	100	22.9%	54	29	6.7%
MISSISSIPPI	0 - 349	1	1	100.0%	0	0	0.0%
	350 - 999	15	4	26.7%	0	0	0.0%
	1000 - 2499	71	22	31.0%	3	1	1.4%
	2500 +	70	17	24.3%	5	1	1.4%
	total:	157	44	28.0%	8	2	1.3%
MISSOURI	0 - 349	192	70	36.5%	12	6	3.1%
	350 - 999	188	48	25.5%	16	9	4.8%
	1000 - 2499	103	23	22.3%	13	6	5.8%
	2500 +	64	16	25.0%	10	8	12.5%
	total:	547	157	28.7%	51	29	5.3%
MONTANA	0 - 349	311	148	47.6%	24	12	3.9%
	350 - 999	56	12	21.4%	4	1	1.8%
	1000 - 2499	20	5	25.0%	3	1	5.0%
	2500 +	9	3	33.3%	3	3	33.3%
	total:	396	168	42.4%	34	17	4.3%
NEBRASKA	0 - 349	197	55	27.9%	29	20	10.2%
	350 - 999	91	22	24.2%	11	7	7.7%
	1000 - 2499	20	5	25.0%	3	2	10.0%
	2500 +	16	5	31.3%	4	2	12.5%
	total:	324	87	26.9%	47	31	9.6%
NEVADA	0 - 349	3	0	0.0%	0	0	0.0%
	350 - 999	2	0	0.0%	0	0	0.0%
	1000 - 2499	4	1	25.0%	1	0	0.0%
	2500 +	8	0	0.0%	0	0	0.0%
	total:	17	1	5.9%	1	0	0.0%
NEW HAMPSHIRE	0 - 349	0	0	—	0	0	—
	350 - 999	6	0	0.0%	0	0	0.0%
	1000 - 2499	18	4	22.2%	2	0	0.0%
	2500 +	29	6	20.7%	5	2	6.9%
	total:	53	10	18.9%	7	2	3.8%
NEW JERSEY	0 - 349	119	24	20.2%	6	1	0.8%
	350 - 999	161	34	21.1%	15	7	4.3%
	1000 - 2499	155	35	22.6%	21	9	5.8%
	2500 +	136	21	15.4%	13	5	3.7%
	total:	571	114	20.0%	55	22	3.9%

(table continues)

STATE	NUMBER OF STATE SUPERINTENDENCIES AND SAMPLE SIZE BY APPROXIMATE NATIONAL QUARTILES						
	Enrollment Quartiles	Number 1983-4	Number Changed 1985-6	Quartile Percent Changed	Mailing Sample Size	Sample Size	Percent of 83-4 Total
NEW MEXICO	0 - 349	22	15	68.2%	2	2	9.1%
	350 - 999	30	10	33.3%	1	0	0.0%
	1000 - 2499	14	8	57.1%	2	2	14.3%
	2500 +	24	9	37.5%	2	2	8.3%
	total:	90	42	46.7%	7	6	6.7%
NEW YORK	0 - 349	77	26	33.8%	9	5	6.5%
	350 - 999	154	45	29.2%	17	8	5.2%
	1000 - 2499	263	56	21.3%	29	15	5.7%
	2500 +	233	54	23.2%	34	20	8.6%
	total:	727	181	24.9%	89	48	6.6%
NORTH CAROLINA	0 - 349	0	0	—	0	0	—
	350 - 999	2	0	0.0%	0	0	0.0%
	1000 - 2499	24	4	16.7%	0	0	0.0%
	2500 +	118	29	24.6%	20	12	10.2%
	total:	144	33	22.9%	20	12	8.3%
NORTH DAKOTA	0 - 349	216	55	25.5%	13	6	2.8%
	350 - 999	53	6	11.3%	3	2	3.8%
	1000 - 2499	5	0	0.0%	0	0	0.0%
	2500 +	9	2	22.2%	2	0	0.0%
	total:	283	63	22.3%	18	8	2.8%
OHIO	0 - 349	6	2	33.3%	1	1	16.7%
	350 - 999	99	30	30.3%	11	8	8.1%
	1000 - 2499	302	82	27.2%	30	14	4.6%
	2500 +	211	70	33.2%	34	21	10.0%
	total:	618	184	29.8%	76	44	7.1%
OKLAHOMA	0 - 349	304	83	27.3%	18	9	3.0%
	350 - 999	194	51	26.3%	20	9	4.6%
	1000 - 2499	81	18	22.2%	12	3	3.7%
	2500 +	38	13	34.2%	8	5	13.2%
	total:	617	165	26.7%	58	26	4.2%
OREGON	0 - 349	150	59	39.3%	11	8	5.3%
	350 - 999	66	25	37.9%	12	6	9.1%
	1000 - 2499	51	16	31.4%	13	9	17.6%
	2500 +	42	14	33.3%	10	6	14.3%
	total:	309	114	36.9%	46	29	9.4%
PENNSYLVANIA	0 - 349	1	0	0.0%	0	0	0.0%
	350 - 999	31	8	25.8%	7	3	9.7%
	1000 - 2499	227	45	19.8%	26	15	6.6%
	2500 +	241	41	17.0%	30	17	7.1%
	total:	500	94	18.8%	63	35	7.0%

(table continues)

STATE	NUMBER OF STATE SUPERINTENDENCIES AND SAMPLE SIZE BY APPROXIMATE NATIONAL QUARTILES						
	Enrollment Quartiles	Number 1983-4	Number Changed 1985-6	Quartile Percent Changed	Mailing Sample Size	Sample Size	Percent of 83-4 Total
RHODE ISLAND	0 - 349	3	7.5%	0.0%	0	0	0.0%
	350 - 999	5	12.5%	60.0%	1	0	0.0%
	1000 - 2499	10	25.0%	10.0%	1	0	0.0%
	2500 +	22	55.0%	13.6%	1	0	0.0%
	total:	40	100.0%	17.5%	3	0	0.0%
SOUTH CAROLINA	0 - 349	0	0.0%	—	0	0	—
	350 - 999	5	5.4%	0.0%	0	0	0.0%
	1000 - 2499	26	28.3%	46.1%	8	2	7.7%
	2500 +	61	66.3%	21.3%	8	6	9.8%
	total:	92	100.0%	27.2%	16	8	8.7%
SOUTH DAKOTA	0 - 349	101	54.3%	17.8%	5	3	3.0%
	350 - 999	59	31.7%	10.2%	3	1	1.7%
	1000 - 2499	18	9.7%	5.6%	1	1	5.6%
	2500 +	8	4.3%	50.0%	3	3	37.5%
	total:	186	100.0%	15.6%	12	8	4.3%
TENNESSEE	0 - 349	1	0.7%	0.0%	0	0	0.0%
	350 - 999	18	12.7%	16.7%	0	0	0.0%
	1000 - 2499	34	23.9%	29.4%	4	1	2.9%
	2500 +	89	62.7%	36.0%	5	2	2.2%
	total:	142	100.0%	31.7%	9	3	2.1%
TEXAS	0 - 349	332	30.9%	26.2%	19	9	2.7%
	350 - 999	321	29.8%	31.5%	33	14	4.4%
	1000 - 2499	200	18.6%	30.5%	26	14	7.0%
	2500 +	223	20.7%	26.0%	33	15	6.7%
	total:	1076	100.0%	28.5%	111	52	4.8%
UTAH	0 - 349	2	5.0%	50.0%	1	1	50.0%
	350 - 999	5	12.5%	20.0%	1	1	20.0%
	1000 - 2499	10	25.0%	30.0%	1	1	10.0%
	2500 +	23	57.5%	26.1%	3	1	4.3%
	total:	40	100.0%	27.5%	6	4	10.0%
VERMONT	0 - 349	1	1.7%	0.0%	0	0	0.0%
	350 - 999	12	20.7%	16.7%	1	0	0.0%
	1000 - 2499	38	65.5%	13.2%	3	2	5.3%
	2500 +	7	12.1%	14.3%	1	0	0.0%
	total:	58	100.0%	13.8%	5	2	3.4%
VIRGINIA	0 - 349	1	0.7%	0.0%	0	0	0.0%
	350 - 999	8	5.9%	75.0%	2	2	25.0%
	1000 - 2499	42	30.9%	33.3%	9	4	9.5%
	2500 +	85	62.5%	35.3%	16	10	11.8%
	total:	136	100.0%	36.8%	27	16	11.8%

(table continues)

STATE	NUMBER OF STATE SUPERINTENDENCIES AND SAMPLE SIZE BY APPROXIMATE NATIONAL QUARTILES						
	Enrollment Quartiles	Number 1983-4	Number Changed 1985-6	Quartile Percent Changed	Mailing Sample Size	Sample Size	Percent of 83-4 Total
WASHINGTON	0 - 349	97	32.3%	38.1%	5	2	2.1%
	350 - 999	75	25.0%	26.7%	8	7	9.3%
	1000 - 2499	57	19.0%	28.1%	9	8	14.0%
	2500 +	71	23.7%	16.9%	4	2	2.8%
	total:	300	100.0%	28.3%	26	19	6.3%
WEST VIRGINIA	0 - 349	0	0.0%	—	0	0	—
	350 - 999	0	0.0%	—	0	0	—
	1000 - 2499	14	25.5%	28.6%	0	0	0.0%
	2500 +	41	74.5%	26.8%	2	2	4.9%
	total:	55	100.0%	27.3%	2	2	3.6%
WISCONSIN	0 - 349	53	11.9%	34.0%	11	6	11.3%
	350 - 999	178	40.1%	19.7%	14	9	5.1%
	1000 - 2499	140	31.5%	18.6%	15	6	4.3%
	2500 +	73	16.4%	21.9%	10	7	9.6%
	total:	444	100.0%	21.4%	50	28	6.3%
WYOMING	0 - 349	8	16.3%	62.5%	4	1	12.5%
	350 - 999	13	26.5%	46.2%	3	1	7.7%
	1000 - 2499	18	36.7%	22.2%	3	2	11.1%
	2500 +	10	20.4%	10.0%	0	0	0.0%
	total:	49	100.0%	32.7%	10	4	8.2%

Pasekoff (1978, pp. 102-105), who also reviewed the literature, reported similar findings: Turnover was related to school size (Castleberry, 1954), and turnover was related to size of community (Porter, 1970). An additional study by Gerardi found the median tenure in large districts to be 12.0 years in contrast to about 9.0 years in medium and small districts. (1980, p. 32)

March and March reported that the district high school enrollment in Wisconsin ranged from 30 to 39,280, and that the distribution was highly skewed. (1977, pp. 382-383) For this reason a logarithmic transformation of enrollment was used for the analysis.

5. **Average family income**. The research on the significance of socioeconomic status, which this variable served to measure, was not conclusive; however, the findings of March and March, that "vacancies move to poorer districts" (1977, p. 404), which has as its corollary that superintendents seek out more affluent districts, was strong evidence of its importance to tenure. Bentley reported Crosby (1972) as finding that socioeconomic status contributed to conflict leading to turnover. In contrast, one of Puffer's findings was that:

> There did not appear to be a relationship between property valuation and tenure of superintendents, except in schools having less than 500 pupils. . . . It cannot be said that the superintendents of long tenure in Michigan were found in schools that were favored by greater than average financial resources. (p. 142)

6. **Board member defeat**. There was a considerable body of literature, based in a great part on work by Iannaconne and Lutz (1970), that, as a community experienced some changes, it became dissatisfied with the actions and membership of the Board of Education. The Boards, in most likelihood, reflected a community ethos prior to the changes. This theory, called "Dissatisfaction Theory," then provided for the dissonance to be resolved through a change on the school board, either through board incumbent defeat or loss of appointment.

A similar theory by Kerr (1964), described by Eblen (1975), stated that as the Board of Education extended its tenure, it became more influenced by the educational professionals. As a result, it became less familiar and sympathetic with the concerns of the parents and community. Again, an incumbent was defeated by someone who campaigned against the school system. One example was mentioned by Chase: "A reelected incumbent obtained the highest number of votes of all candidates after campaigning on a platform which attacked the superintendent and pressed for a change in leadership of the district" (1981, p. 175).

The process was frequently accompanied by the dismissal of the superintendent who might have associated too strongly with the forces opposing change, sided with the losing faction, or become the scapegoat of the community process. A series of superintendents could even be caught in this process of social change until community consonance was restored.

This theory of community change might be refuted by Eblen's findings which were:

> Change in district social status did not result in increased electoral conflict.
>
> District level of conflict was not a predictor of incumbent board defeat.
>
> Incumbent board defeat did not relate to superintendent turnover. (p. 108)

Also Porter, as reported by Pasekoff (p. 104), found no significant correlation of factors associated with population growth and turnover, and Puffer reported that "Superintendents of long tenure were found in stable communities and in communities having shifting populations" (p. 147).

The review by Ashmore (1981, pp. 20-21), however, supported the dissatisfaction theory: Turnover was more frequent when incumbent board members were defeated, and the defeat of even one member signaled community desire for organizational change (Freeborn); the defeat of incumbent board members signaled a new Board power

structure (Walden, 1967); and, the election of an individual was not as significant as the election of a faction within the Board (Kerr).

The question measuring this variable asked if an incumbent had been defeated within the past four years. This number was selected based upon a report by Berger that "Walden (1966), Moen (1971), and Eblen all thought there might be three or perhaps four years between school board incumbent defeat and superintendent turnover" (p. 96).

7. **Per pupil expenditure**. The amount of funds spent for each student could be taken as a measure of support the community provided to the school system. The relationship of per pupil expenditure to tenure was disputed, however. Todd found that among the highest factors associated with tenure was the net current expenditure per average daily attendance. (1963, p. 15) On the other hand, Puffer summarized, "It cannot be said that expenditure per child is associated with long tenure of superintendents in Michigan, except in very small schools where greater expenditures may tend to compensate for lack of size" (p. 143).

Berger concluded, "Finally, the data analysis revealed that one dimension of organizational performance, namely, per pupil expenditures, discriminated between succession and nonsuccession districts: the higher the per pupil expenditures, the greater the probability of succession" (p. 103). He elaborated on this position later by commenting, "Alternately, districts with higher per pupil expenditures may be larger in size and more heterogeneous than districts with lower per pupil expenditures. If this is true, then size and heterogeneity, not pupil expenditures, predict succession" (p. 103).

8. **Board elected or appointed**. The interesting aspect of this variable was that nothing was found in the literature to support or refute its value in predicting tenure. Either there was a universally-held attitude that it was not important - and it might not be - or there had simply been no investigation of its role. It did suggest itself as one of the processes by which a community affected its educational system.

9. **Community power structure**. McCarty and Ramsey (1967) provided a model of community power structures, and how these different community structures resulted in different structures of the Board of Education, which in turn, determined the role of the superintendent. The four variations in the power structure were (1) dominated - the power structure of the community was a pyramid, with a few or even one person at the top, (2) factional - there were at least two distinct poles of power, (3) pluralistic - the power structure was diffused with many poles of power, and (4) inert - the community exhibited no active power structure. (pp. 27-29)

Sequeira (1980) replicated the McCarty and Ramsey model (1968) and added an average tenure of superintendents associated with each structure. (pp. 27, 66) Table 3 is the conceptual model of community and school board power structures with superintendent roles and tenures. Sequeira concluded that:

> Superintendents in districts which conform to the McCarty and Ramsey model are apt to have greater longevity than the superintendents in districts which do not conform. . . . Of school districts which conform to the model, it is in districts with the most professional desirable pattern of relationships that the tenure of the superintendent is apt to be the longest. (p. 3)

Table 3

Conceptual Model of Community Power Structures and Tenure

Community Power Structure	School Board	Role of the Superintendent	Average Tenure
Dominated	Dominated	Functionary	4.1 yrs
Factional	Factional	Political Strategist	3.0 yrs
Pluralistic	Status Congruent	Professional Advisor	5.4 yrs
Inert	Sanctioning	Decision Maker	4.4 yrs

On the strength of this study, a meaningful way of measuring community processes was achieved using the four community power structure categories as listed in the model.

10. Number of board members. As in the case of whether or not the Board of Education was appointed or elected, no research was discovered relating the number of members on the Board to superintendent tenure. Grieder, Pierce and Jordan reported, "Experts in educational administration believe that the best size is seven or nine. A three-member board is too small for the satisfactory conduct of school affairs" (p. 123). This variable could possibly be important, and would suggest itself as a general descriptor of the Board of Education.

11. School system grade levels. The only research encountered which examined superintendent turnover in relation to the grade levels in the school system was a reference by Bentley (p. 14) to the study by Dils which found that the greatest turnover was in the city or unified districts, and smallest in the elementary districts.

12. Proportion of new board members. The research generally supported the association of board members' longevity on the Board with tenure of the superintendent. Specifically, Samson reported, "The median length of service of board members in the low turnover districts is longer" (1956, p. 2), and Todd (p. 124) reported from Owen (1961) that board member tenure is shorter in districts with shorter superintendent tenure. Bentley reported that Samson, Crosby, and Merrow (1972) all found board member turnover to be associated with superintendent turnover. (pp. 14-17) Lange (p. 5) also associated the tenure of board members with that of the superintendent. The number of new board members, divided by the total number of members, was used as the measure of Board instability.

13. Proportion of board support. Little research was encountered which examined the proportion of board members voting for a new superintendent in relation to

that superintendent's tenure. It did, however, appear to be a viable measure of initial support for the superintendent, and Fielders cited it in his case study of one superintendent. (1982, p. 17) The number of board members initially voting for the superintendent divided by the total number of members was used as the measure of board member support.

14. **Changes expected**. There were general findings that superintendents who were agents of change had a shorter tenure than those who were not agents of change. The study by Todd was one example: He found that agents of change had a average tenure of 6.75 years, while agents of resistance had an average tenure of 14.21 years. (p. iii) Similarly, Scott (1978, pp. 53-54) reported that Jensen (1967) found innovative superintendents had less tenure than noninnovative superintendents, but that this Preising (1968) who found no significant difference in mean length of tenure of superintendents classified as high, medium or low on structural innovation.

The most direct look at the mandate for change given to a superintendent was taken in the case study of one district by Chase. In that district, of the five superintendents, the first four turned over in fairly rapid succession:

> Each superintendent with the exception of the fifth, has reported no clear single mandate was communicated by any board. In a general sense, the mandates to the second, third and fourth superintendents were to make whatever organizational changes were necessary to exercise "leadership," i.e. control, over the principals. . . . A more specific mandate was transmitted to the fifth superintendent which was to bring a stability to the organization and not to initiate further change. (p. 157)

> Each successor superintendent made administrative personnel changes, but the greatest organization changes occurred during the fourth superintendent's regime. (p. 175)

15. **Salary**. Two studies associating superintendent salary to tenure were by Samson, as reported by Puffer (p. 41), "The salaries paid to superintendents in high turnover districts tends to be lower;" and by Dorland (1973) who found low salary associated with turnover, as reported by Bentley (p. 14).

Because this study used salary at the beginning of the superintendent's tenure, it was necessary to adjust it for inflation. The Consumer Price Index for the U.S. City Average (CPI-U) dated August 21, 1986 from the Bureau of Labor Statistics was used to adjust each superintendent's starting salary to the common date of July 1980.

16. **Years on the initial contract**. This variable examined whether the number of years on the superintendent's initial contract affected his or her longevity. Puffer reached the conclusion that, "The data of this study tend to indicate that no certain length of contract or any contract at all is necessary to long tenure of superintendent" (p. 145.); however, Bentley (p. 14) reported Lutz's finding that short term contracts were related to turnover, and Lange reported that 75% of superintendents with less than five years in their position had 1-year contracts and 12% had 3-year contracts, in comparison to 66% of superintendents with five years of more in their position with 1-year contracts and 25% with 3-year contracts. (p. 142)

17. **Regular written evaluation**. The value of a regular written evaluation was attested to by Wilson (1981) who studied the most successful superintendents in Ohio; Fultz who reported, "There is a significant relationship between the dismissal or encouragement of a superintendent to leave and the lack of an annual written evaluation" (abstract), and Pasekoff (p. 104) who related that Sitter (1972) found that having no objective evaluation affected superintendent dismissal.

18. **New board member orientation**. Support for this variable came from Puffer who recommended that superintendents properly orient new board members (p. 150); and from Kerr, as reported by Eblen (p. 5), that "freshmen board members are highly receptive to the pressures from, and very dependent on, both incumbent board members and school administrators."

19. **Board agenda**. Although no research was found addressing the relevance of whether the board or the superintendent set the agenda, it might provide an insight to the idea of power brokerage and whether that had any relationship to tenure.

20. **Scope of search**. This variable investigated whether the vacancy for the superintendent was advertised in the local district, among adjoining districts, statewide, within the region of the country, or nationwide. It was mentioned by Fowler in the context of a Board of Education's being satisfied with its superintendent selection: "This is the only selection variable in the entire study with a significant relationship to 'over-all performance,' and it virtually constitutes an axiom - the wider the geographic selection base, the better the chances of making a good selection" (1973, p.33).

21. **Formal interview format**. Fowler also introduced this variable and included among his findings, "School boards that place emphasis on a detailed candidate-interview format when hiring a superintendent are likely to be most pleased later with the winning candidate's performance in 'public relations' and in 'instructional direction'" (p. 33). Fultz also found "a significant relationship between the dismissal or encouragement of a superintendent to leave and the procedures utilized in the selection process" (p. 7).

22. **Education**. The research on the relationship of tenure and the highest degree earned by the superintendent was not clear. Puffer's research concluded, "No relationship was found between tenure of superintendents and their amounts of formal preparation, the recency of courses taken, or the way they obtained their degree" (p. 143), and he mentioned (p. 40) that Samson (1955, pp. 50-51) had found no significant difference in educational background. On the other hand, March and March reported, "There appears to be a slight tendency for more education to result in shorter average terms - about one year for each additional degree - but the error term is large, and the

contribution to explaining length of match very small (contribution to $R^2 = 0.02$)" (1977, p. 400).

23. **Gender of the superintendent**. According to Cunningham and Hentges in their study for the American Association of School Administrators, only 1.2% of superintendents were female (1982, p. 16). In one study Saunders (1976) reported that men had significantly longer experience as a superintendent ($\alpha = .05$), but she speculated that women may have had more recent appointments in contrast to men who had traditionally served in the role. (p. 40) Her study found no major differences in behavioral disposition between men and women superintendents. (p. 52)

24. **Age of the superintendent**. No explicit finding that age was related to tenure was discovered in the literature. There was some implication in the March and March study (1977) that as the superintendent approached age 57 there was a steady decrease in the promotions to new superintendencies and a rapid decrease after age 58. It was possible that this variable was curvilinear, explaining why no linear relationship had been reported.

25. **Race of the superintendent**. According to Cunninghan and Hentges, only 2.1 percent of all superintendents were members of minorities. (p. 16) Puffer had one finding related to this issue, "There were no relationships between the national backgrounds of the superintendents and the national background of the people they served" (p. 147). It did appear possible, however, that a superintendent whose race was different from that of the district might have a more difficult time.

26. **Insider/outsider superintendent**. One aspect of the research focused on the conditions under which the Board would select a superintendent from within the school system in contrast to someone from outside the school system. For example, Carlson (1962) suggested that when the Board wanted a change, it would select an outsider; if it wanted to maintain the status quo, it would select an insider. (p. 70) This is consonant

with Samson's finding that "significantly more Boards in low-turnover districts promoted from within their own school systems to the position of superintendent than was the case in medium- and high-turnover districts" (1956, p. 20). On the other hand, Chase, in the case study described under the variable, CHANGES EXPECTED (no. 14), reported that, "Superintendent turnover occurred four times in this case, with each respective successor being an insider, outsider, insider, outsider" (p. 175).

The other approach of the research looked at the insider/outsider issue from the perspective of the superintendent. Gerardi studied the role of "career bound" superintendents - those persons who considered moving part of their career and expected it, in contrast to "place bound" superintendents - those who put a high value on location and commitment to the community. Place bound superintendents would wait for the vacancy, fill it, and then expect to remain as superintendent until retirement (p. 1). He found that career bound superintendents changed jobs every 5.1 years in contrast to place bound superintendents who changed every 13.4 years. (p. ii)

27. **Departure**. One concern of this study was determining whether or not a superintendent was pressured to leave the position. This might have implications for the way in which decisions were made as reflected in the decision-making items. It was possible that the persons leaving of their own volition made different decisions from superintendents who were pressured or required to leave. The question, designed to determine how the superintendent left, asked if he or she moved to another superintendency, one with increased income, more prestige or a preferred location.

28. **Stepping stone**. This variable sought to discover whether the superintendent intended to remain in the new superintendency for a long time. Superintendents who had chosen a career path of ever increasing responsibilities and salaries would remain in one position for only a few years before seeking a new position.

29. Tenure. This was the dependent variable in this study, superintendent tenure itself. Cunningham and Hentges found that in 1972 the average superintendent job duration was between 6 and 6.5 years, while in 1982 it was estimated at 5.6 years. (p. 55) The distribution of the variable was described by March and March, "both promotion and exit rates exhibit a common pattern as a function of tenure. The rates are low the first year, rise to a peak in the second, third or fourth years, and decline slowly thereafter" (1970, pp. 402-403). In 1978 they reported, "Duration of matches in employment can often be approximated by distributions (e.g. lognormal) characterized by a long right-side tail and a mode near, but not at, the left extreme point" (p. 441). A logarithmic transformation of tenure was used in this study to accommodate this distribution.

Chapter 3: Study Methods

The basic steps in the development of a method for predicting tenure were sample identification, development of the survey instrument, determination of the regression equation, Bayesian analysis of the decision-making items, application of the method and resulting prediction.

Sample Identification

The requirement for the sample was to represent as fully as possible all superintendencies in the nation, geographically and among school districts of varying enrollments. The total number of superintendencies by state and by enrollment were determined using the national computer files of the Educational Research Service (ERS) of Arlington, Virginia.

The ERS file of school districts, which includes regular school districts, and administrative districts as they are organized in Maine, Massachusetts, New Hampshire and Vermont, was determined to be appropriate for this study because the district areas were specified, the areas were contiguous, and the superintendent was accountable to a school board or school boards. Area superintendencies, such as those which represented intermediate service agencies; subdistricts, such as those used in New York City; or, vocational centers were not used as they did not fall within the above definition.

The focus of the study was the number of months that a person was the superintendent in a specific position. For that reason, the person had to describe a past superintendency. The appropriate persons to participate were identified using the ERS computer files.

The ERS national file of superintendents in the 14,222 school districts was based upon telephone calls made during the summers of 1983 and 1985 to all the school districts to ask, "Who will be your superintendent in the fall?" (N. Prothro, ERS, personal

communications, March 3, 1986 and April 4, 1988). If the name of the superintendent of a district were different for the two dates, then it was assumed that the 1983 superintendent had left the position and could be included in this survey. Of the districts, 3829, or 26.9%, had experienced a change of superintendent.

The addresses for these superintendents who had lift their 1983 superintendencies were acquired from the membership files and district mailing list of the American Association of School Administrators (AASA), which had endorsed this study and provided the envelopes and costs for mailing the survey. Current addresses were located for 1574 of these superintendents, constituting 41.1% of the changed superintendents, and 11.1% of all superintendencies.

The 1574 surveys were mailed (see Appendix B, letter of May 1986), with an initial return of 648, or 41% of the mailed surveys. A second mailing (see Appendix B. letter of July 1986) brought an additional 295 surveys, or 943 total surveys returned. However, some of the forms could not be used: One person objected to the study and refused to complete it; one person was from a state with administrative districts (New Hampshire) and was not comfortable reporting on his three districts on one form; and, 40 persons returned the forms blank. Sixty-five (65) were out-of-frame, specifically, the person was deceased, another had the same name as the person sought, the person was an area superintendent, the superintendent was still in the position, or the person had been elected (10 total) to the position and could not be used. Subtracting the 66 known out-of-frame surveys from the 1574, the percentage of return was 835/1508 or 55%. This represented about 22% (835/3829) of all the districts which had changed superintendents.

All of the returned forms were received by the end of September, 1986. The total number of forms which could be used for the survey was 835 for the demographic data, and 830 for the decision-making items.

In five cases where the respondent wrote a note objecting to the survey, he or she expressed a discomfort with the possible actions explaining, for example, "The options stop short of responsible answers." The two surveys which were returned with positive notes included the comment, "The questions are good."

The known bias in the sample for mailing was that it reflected those persons who had either moved to another superintendency, or who had maintained their membership in AASA. It was decided that attempting to locate persons for whom addresses were not available would require contacting the school district for a forwarding address. The receiving school districts would either give the survey to another staff member or forward it, as requested. Not all districts, however, have forwarding addresses, and a bias would be introduced toward superintendents who maintained contact with the district.

Addresses were not found for 2255 persons, about 59% (2255/3829) of the sample. They would be people who left education, retired or died. This findings of this study could thus be generalized only to persons who would maintain an interest in education after they left a superintendency.

A potential for bias also existed between those who responded to the survey in contrast to the 674 persons who did not answer or returned a blank form. To check for this, every 35th non-respondent, for a total of 20, was telephoned during the summer of 1987, and asked why he or she did not respond. Fourteen (14) persons were contacted, three could not be located, and three could not be reached during the day.

The reasons stated by the fourteen for not responding included: Three assumed that since they had left the superintendency, the survey did not apply to them; three thought that probably it was because the survey was too long [The length had been used to describe the survey when the person couldn't remember it, and this may have influenced this answer.]; two had been too busy and put the survey aside; two just didn't

feel like answering it; two didn't remember the survey; one didn't remember receiving it; and for one person, the survey had been sent to the wrong address.

The largest groups for potential bias were those persons who were too busy to complete surveys and those persons who were indifferent to the process. In all likelihood, many persons who did respond were as busy as these busy persons. The indifferent persons, however, probably would not have counterparts in the survey sample.

The ideal size for the sample had been estimated to be 1450. If each person answered the 24 questions on the survey, then at least 120 respondents would answer each of the 290 questions in the pool of decision-making items. This would provide for at least 30 persons to be able to select one of the four possible actions - A, B, C, or D. However, that ideal size had assumed an even distribution of answers and the use, in part, of parametric statistics. The use of only probability through a Bayesian application did not require an assumption concerning the distribution.

The ideal size for the regression analysis was estimated (see Pedhazur, p. 148) to be at least 30 persons for each of the estimated 30 variables in the equation, for a total of 900. The total variables in the regression were 26, requiring an ideal sample of 780; thus, the sample size was adequate for the study.

A national profile of the number of school districts by the enrollment size is provided in Table 4. It can be seen that the distribution was highly skewed toward the smaller districts. The distribution of the sample was fairly similar to the national sample, with the greatest discrepancies falling under 300 enrollment (undersampling by 50% national to 41% sample) and over 25,000 enrollment (oversampling by 1% national to 2% sample). The greater proportional sampling of the larger districts was desirable because there were fewer of them, and the sample should represent the range of district sizes as evenly as possible.

Table 4

National Enrollment and Sample Size

ENROLLMENT	NATIONAL ENROLLMENT AND SAMPLE SIZE					
	Number 1983-84	Percent of Enroll.	No. on Mailing List	% of Mailing Total	Sample Size	% of Sample Total
000-099	953	6.7%	30	1.9%	11	1.3%
100-199	1073	7.5%	93	5.9%	52	6.2%
200-299	1022	7.2%	107	6.8%	52	6.2%
300-399	884	6.2%	97	6.2%	57	6.8%
400-499	721	5.1%	74	4.7%	42	5.0%
500-599	613	4.3%	67	4.3%	40	4.8%
600-699	528	3.7%	59	3.7%	22	2.6%
700-799	478	3.4%	50	3.2%	25	3.0%
800-899	420	3.0%	40	2.5%	25	3.0%
900-999	375	2.6%	39	2.5%	18	2.2%
000-999	7067	49.8%	656	41.7%	344	41.2%
1,000-1,999	2730	19.2%	333	21.2%	185	22.2%
2,000-2,999	1466	10.3%	161	10.2%	85	10.2%
3,000-3,999	845	5.9%	105	6.7%	51	6.1%
4,000-4,999	510	3.6%	69	4.4%	34	4.1%
5,000-5,999	318	2.2%	37	2.4%	16	1.9%
6,000-6,999	226	1.6%	41	2.6%	25	3.0%
7,000-7,999	170	1.2%	28	1.8%	15	1.8%
8,000-8,999	149	1.0%	31	2.0%	17	2.0%
9,000-9,999	111	0.8%	19	1.2%	10	1.2%
1,000-9,999	6525	45.9%	824	52.4%	438	52.5%
10,000-10,999	93	0.7%	13	0.8%	7	0.8%
11,000-11,999	69	0.5%	7	0.4%	4	0.5%
12,000-12,999	51	0.4%	6	0.4%	4	0.5%
13,000-13,999	37	0.3%	5	0.3%	4	0.5%
14,000-14,999	39	0.3%	4	0.3%	3	0.4%
15,000-15,999	27	0.2%	2	0.1%	1	0.1%
16,000-16,999	27	0.2%	4	0.3%	2	0.2%
17,000-17,999	25	0.2%	5	0.3%	5	0.6%
18,000-18,999	13	0.1%	1	0.1%	1	0.1%
19,000-19,999	24	0.2%	5	0.3%	2	0.2%
20,000-20,999	10	0.1%	3	0.2%	2	0.2%
21,000-21,999	13	0.1%	0	0.0%	0	0.0%
22,000-22,999	16	0.1%	2	0.1%	0	0.0%
23,000-23,999	14	0.1%	4	0.3%	3	0.4%
24,000-24,999	12	0.1%	2	0.1%	1	0.1%
1,000-24,999	470	3.3%	63	4.0%	39	4.7%
25,000-99,999	144	1.0%	28	1.8%	14	1.7%
100,000+	16	0.1%	3	0.2%	0	0.0%
TOTAL	14222	100.0%	1574	100.0%	835	100.0%

A state by state profile is provided in Table 2, showing the school district enrollments for each state divided according to approximate national quartiles. The national total, listed first on the table, illustrated that about a quarter of all school districts were under 350 enrollment, and half were under 1000. The third quartile broke the distribution at about 2,500 students.

Following the national total across the page, the number of school districts which had a change of superintendent in each quartile by August 1985 (school year 1985-86) can be seen. The percentage which changed superintendents, however, was not evenly divided among the quartiles, as it weighed most heavily among the smallest districts. A comparison of the national quartiles (Table 2) and approximate national deciles (Table 4) with the sample group for goodness of fit found a significant difference between the two using a chi-square, $X^2 = 35.5$ with 3 d.f., and $X^2 = 44.2$ with 9 d.f., respectively. (Tate, 1965, p. 289)

The mailing sample was not as successful in locating the past superintendents from the small districts, and the final mailing distribution was 282 or 8.1% of all districts in the first quartile; 374 or 10.5% in the second quartile; 423 or 11.9% in the third quartile; and, 495 or 13.8% in the fourth quartile.

The final sample of 835 respondents continued to underrepresent the smallest districts with 142 respondents or 17.0% of the total for the first quartile, 202 or 24.2% for the second quartile, 227 or 27.1% for the third quartile, and 265 or 31.7% for the fourth quartile.

The state by state breakdown of the data was provided to assure that there was reasonable geographic representation. An important point to note was that the differences between states in the percentage of superintendent turnover did not follow regional patterns. The total percentage of superintendencies which had changed for each state was the value entered for the state turnover variable in the questionnaire. The

multiple-district states with the highest turnover were Florida (49.3%), Montana (42.4%), and New Mexico (46.7%). Those with the lowest turnover were Nevada (5.9%), South Dakota (15.6%) and Vermont (13.8%).

The percentages of total districts for each state included in the mailing sample ranged from lows of Kentucky (2.7%), Mississippi (5.1%), Nevada (5.9%) and West Virginia to highs of Idaho (18.3%), South Carolina (17.4%), Virginia (19.9%) and Wyoming (20.4%). Again it was difficult to make any generalizations as to regions of the country.

In order to discern if any patterns existed in the participation rate by states, the 15 bottom and 15 top states were examined. Of the 15 states with the lowest percentage of superintendents represented in the sample (see Table 5), four had a low percentage of superintendent turnover: District of Columbia, Hawaii, Nevada and Vermont. All the states except Florida and Alabama, had a low percentage for the mailing list. These two states, plus Georgia and Mississippi, lost participants because some of the persons were elected. With the exception of West Virginia, which returned all questionnaires (2), all states had a lower percentage of the mailing list returned than the average of 55%. The major discernable pattern appeared to be the underrepresentation of the Southern states.

Of the 15 states with the highest percentage of representation in the sample (see Table 6), four had a high turnover rate: Wyoming, Oregon, Idaho and Virginia. Seven had a high percentage of addresses found: Wyoming, Maryland, South Carolina, Michigan, Connecticut, Idaho and Virginia; and four had a high rate of return: Iowa, Nebraska, Utah and Delaware. The most apparent pattern seemed to be the high participation rate from the mid-country farm states.

Table 5

States with the Least Percentage Participation

State	Total Positions 1983-84	Percentage Changed by 1985-86	Mailing List % of Total	Final Sample No.	Final Sample %
mean:		26.9%	11.1%		5.9%
D.C.	1	0.0%	0.0%	0	0.0%
Hawaii	1	0.0%	0.0%	0	0.0%
Nevada	17	5.9%	5.9%	0	0.0%
Rhode Island	40	17.5%	7.5%	0	0.0%
Kentucky	186	19.4%	2.7%	2	1.1%
Mississippi	157	28.0%	5.1%	2	1.3%
Florida	67	49.3%	14.9%	1	1.5%
Georgia	205	32.7%	6.3%	4	2.0%
Tennessee	142	31.7%	6.3%	3	2.1%
North Dakota	283	22.3%	6.4%	8	2.8%
Alabama	128	27.3%	10.2%	4	3.1%
California	1018	30.2%	7.5%	33	3.2%
Colorado	181	20.4%	8.8%	6	3.3%
Vermont	58	13.8%	8.6%	2	3.4%
West Virginia	55	27.3%	3.6%	2	3.6%

The states were not all equally represented, but this did not present a bias in terms of regions of the county. Since the identification of the state for the study used the rate of turnover based upon the 3829 changed superintendencies of the total 14,222 school districts, the lack of representation by all states was not a problem.

Survey Instrument

The survey instrument (see Appendix A) consisted of two parts: The first asked a series of questions of a demographic nature described in the previous chapter. They identified characteristics of the community, the school board and school system, and the past superintendent responding to the survey. These were the items used in the regression analysis. The second part consisted of approximately 24 decision-making

situations, each of which had four possible actions the superintendent could take. These were the responses used in the Bayesian analysis.

Table 6

States with Greatest Percentage Participation

State	Total Positions 1983-84	Percentage Changed by 1985-86	Mailing List % of Total	Final Sample No.	Final Sample %
mean:		26.9%	11.1%		5.9%
Kansas	306	26.5%	12.7%	25	8.2%
Wyoming	49	32.7%	20.4%	4	8.2%
Maryland	24	25.0%	16.7%	2	8.3%
North Carolina	144	22.9%	13.9%	12	8.3%
South Carolina	92	27.2%	17.4%	8	8.7%
Michigan	533	25.5%	16.1%	49	9.2%
Indiana	301	28.2%	14.3%	28	9.3%
Iowa	440	21.6%	13.9%	41	9.3%
Oregon	309	36.9%	14.9%	29	9.4%
Nebraska	324	26.9%	14.5%	31	9.6%
Connecticut	165	24.2%	17.0%	16	9.7%
Utah	40	27.5%	15.0%	4	10.0%
Idaho	115	39.1%	18.3%	12	10.4%
Virginia	136	36.8%	19.9%	16	11.8%
Delaware	16	18.8%	12.5%	2	12.5%

Demographic questions.

On the top right corner of each form, a label was affixed identifying the superintendent's name, school district, state, and district enrollment. The data on these inside labels and the matching mailing labels were generated using the ERS tapes and address file from AASA, and were prepared using dBase III software. From the labels three variables used in the study were derived: state, region of the country, and enrollment.

The demographic questions, developed from a thorough review of the literature, were divided into three major sections: (1) what the superintendent knew when he or she

began the superintendency, (2) a look backward describing the superintendency, and (3) a look at where the superintendent went following the superintendency.

Decision-making items.

The second part of the form consisted of 22 to 24 situations, each of which had four possible actions a superintendent might follow. The respondent was asked to select the primary action he or she would most likely take.

The pool from which the items were drawn consisted of 290 situations. In order to randomly assign the 22 to 24 questions that each person would answer, the 290 items were randomly sorted three different ways. Each sort, once printed, consisted of 48 to 49 pages. The four pages to be completed by any one superintendent were then randomly selected from one of the three sorted sets. This careful attention to random assignment of questions to superintendents ensured that all questions would be represented by an unbiased sample of superintendents.

The large size for the number of items was chosen in order to enable a prospective superintendent to complete a random set of the questions, perhaps as many as 50, resulting in a prediction of tenure; then to complete a different random set of the remaining items, again resulting in a prediction of tenure; and so on. Multiple repetitions of this process required a very large pool of items.

The 290 items in the pool of situations were drawn from examples in the newspaper concerning urban and suburban school systems around Washington, D. C.; incidents recommended by Maine superintendents (C. Smith, personal communication, March 4, 1985), encounters by Superintendent Alioto in San Francisco described by Fielders; events documented by Russo (1980), Umberger (1982), and Cooper, Beni and Muth (1984); and, other situations known or envisioned by the researcher which could constitute decision-making situations for superintendents.

The optional courses of action proposed for each situation were also generated by the researcher as each item was developed. Although it was recognized that this introduced a bias into the possible courses of action, it was felt that the superintendents who would be reviewing the items would be more comfortable and have the time to work within that format. It was also felt that the bias would not be an important issue if the superintendents were able to make selections within the format,and if the items predicted well.

In order to check how the sample of items represented the range of decisions made by a superintendent, the original 294 items were organized according to category (see Table 7). With the largest proportion of the items falling under the category of "general", and the remaining items spread across an array of subjects, the situations represented the broad spectrum of decisions.

Instrument review and piloting.

The survey form, with special attention to the demographic questions, was given an initial review and critique by the Graduate Committee overseeing the study. The revised form, with approximately 60 of the decision-making questions attached, was then sent to 16 persons, knowledgeable about school superintendencies (see Appendix B, letter of November 29, 1985). Eleven (11) persons responded, resulting in two to five persons reviewing each item. All suggestions were given serious consideration with appropriate modifications, including some deletions, made.

The revised instrument was then sent as a pilot to ten persons who had been superintendents (see Appendix B, letter of January 14, 1986). Seven of the ten responded, and their responses were carefully analyzed. There were four inconsistent responses: Two were respondent errors, (entering family size instead of family income, and entering two answers for contract duration), one person didn't know if he had intended to use the position as a stepping stone, and one person wrote that his race was

the same as the district, but not of the pupils in school. These responses didn't require a change in the form. The first three would have been entered as "missing data" to the data base, and the fourth would have been entered as the "same" race as the district.

Table 7

Number of Decision-Making Items by Group and Subject

Community/ Parents	Board of Education	Administrative Staff	Superintendent
General-6	General-55	General-42	Personal/ Promotion-6
Funding-3	Budget-3	Budget-15	Management-10
Closing Schools-2	Building Use/ Closing-2	Buildings-9	Leadership-14
Public Relations-2	Community-4	Public Relations-3	Public Relations-3
Racial Issues-12	Racial Issues-5	Racial Issues-3	
Religious Values-8	Ethics-1	Ethics-2	Politics-2
Upper/Middle Class-6	Evaluation of Sup't-2	Child Safety/ Health-4	Instruction-17
Press/Media-6	Personnel-4	Special Education-4	Legal-4
		State Educ. Agency-2	
		Testing-3	
		Teachers' Union-16	

The data entry for the demographic questions was fairly straight-forward. Data were entered as "missing" if the item were blank or ambiguous, or the person marked

"don't know". The following protocols or decision rules were established: For community type (Appendix A, question #1), if suburban and rural were marked, then rural was used; if suburban and small town, then small town; and, if urban, suburban and rural, then suburban was used.

If the community power structure (#2) were listed as pluralistic and inactive, then inactive was entered. For the geographic search (#12), if more than one area were listed, the wider of the two, for example using region, if state and region, were entered. In preparing the agenda (#23), if the superintendent prepared it with the Board, then "yes" was entered.

On the decision-making items, the possibility of respondents marking multiple responses, or not responding occurred. As a result, a fifth category for "no response" was added to the recording of the survey answers; although it was not included as a viable option on the survey.

A protocol was established later in the study that when a person entered multiple answers, and no priority or ranking were indicated, then all the responses (up to 3) would be entered as legitimate answers. This was because the respondent was giving each of the answers an equal probability of being selected. If the respondent indicated all four options, the answer was coded as "no response." Multiple selection of options did not occur very often.

Regression Analysis

The label information and the demographic section of the survey provided the data for the regression analysis. After considering transformations and usability of the data, 26 of the variables were selected. Of first concern, then, was determining the method to be used to select the best subset of these variables for the final equation.

The usual recommendation for subset selection was to use a stepwise procedure. Draper and Smith offered their opinion that, "Our own preference for a practical regression method is the stepwise procedure. If exploration "around" the stepwise choice is desired, we prefer the "best subsets" procedure, perhaps with the C_p statistic [Mallows, 1973] as criterion for examination" (1981, p. 341).

Daniel and Wood expressed some reservation with using stepwise approaches:

> Stepwise regression can lead to confusing results, however, when the independent variables are highly correlated. Moreover, it is based on the implicit assumption that there is one best equation and that stepwise regression will find it. In our experience there are often better equations with different sets of independent variables that are overlooked by this procedure. . . .
>
> The most comprehensive approach is to fit all 2^K equations and then to compare them. . . . The method of searching for influential subsets proposed by Furnival and Wilson [1974] is rapid and allows a selected number of better equations to be found at each level of p terms ($p < K$). This method is particularly useful when there is a large number of variables to be searched. (1980, p. 85)

Hocking (1976) suggested that the task of assuring that the subset contained all important variables and variable functions was not easy. An analysis of residuals might reveal the different functional forms to be considered and might cause some previously unconsidered variables to be included. He strongly recommended the use of residual analysis for selecting the candidate subset equations be used (pp. 2-3), and concluded that if the intent were to screen subsets based on the residual sum of squares, the second Furnival algorithm seemed efficient. (p. 8)

It was decided that the Furnival and Wilson leaps and bounds approach to residual analysis would be used to select the best subset of variables, and that final determination of the set would be based upon an examination of the residuals using Mallow's C_p. An All Possible Regressions computer program which used leaps and bounds with residual analysis was available in the BMDP P9R program (Dixon et al. 1985). The P9R program generated up to 10 "best" subsets based on either R^2 or minimum Mallows' C_p for each number of independent variables.

Mallows C_p.

C_p is an estimate of the scaled sum of the squared errors that has the advantage of being very easily graphed with the values of p equal to the number of variables plus the intercept along the horizontal axis and the computed value of C_p along the vertical axis. (Montgomery and Peck (1982), Mallows, Draper and Smith, Daniel and Wood, Hocking) C_p is defined as:

$$C_p = \frac{RSS_p}{\sigma^2_*} - (n - 2p)$$

which can be shown to equal:

$$C_p = \frac{(s^2 - \sigma^2_*)}{\sigma^2_*} (n - p) + p$$

where RSS_p is the residual sum of squares for the subset of p (k +1) variables, n is the sample size, s^2 is the mean squared error for the p model equation, and the estimate, σ^2_*, is the variance for the full or complete model, assumed to be an unbiased estimate of the true error variance, σ^2. This formulation reflects variance plus bias. The less bias there is (when the difference between s^2 and σ^2_* is minimal), the smaller C_p is, which will be closer to the $C_p = p$ line.

Equations with a lack of fit, or biased equations, will have C_p values greater than p and would be plotted above the $C_p = p$ line. Variance due to random error can result in C_p points below the line. The actual height of C_p is an estimate of the discrepancy of the total sum of squares (bias plus random error) of the fitted model (subset of variables) from the true model. The model to be chosen would be one with a low C_p value, about equal to p, in other words, close to the $C_p = p$ line. (Draper and Smith, p. 300)

To verify the selection of the best subset, and to validate the model, the PRESS statistic (PRediction Error Sum of Squares) was computed (Allen, 1971). The PRESS

statistic removes each case from the sample, predicts the value of its dependent variable on the remaining n - 1 observations, then calculates the residual from the true value for all cases. The statistic is shown below:

$$PRESS = \sum_{i=1}^{n} (y_i - y^*_{i,-i})^2$$

As Hocking reported, "PRESS has an intuitive appeal if the objective is prediction" (p. 23). A resulting $R^2_{predict}$ constructed from the PRESS, could serve to verify the subset, adjust the R^2 for shrinkage and to validate the final prediction equation.

$$R^2_{predict} = 1 - \frac{PRESS}{SS_{total}}$$

The PRESS statistic is computed as part of the SAS program REG procedure (SAS, 1985).

Examination of variables.

The focus for this study was superintendent tenure, given as the number of months that the person remained in the office. This variable was highly skewed, as indicated in Table 8. For this reason the logarithm of tenure was used as the dependent variable for the regression analysis.

The major variables to be used in the equation are listed in Table 9, and the correlation matrix is provided in Appendix C. From the 835 survey forms, 30 were set aside for use as a validation sample for the Bayesian model. That left the final sample size at 805. The variables, as they were entered into the data base are described below. The ones entered in the regression analysis are indicated with an asterisk (*).

1. ID. Sequential number assigned as the survey forms were received. This variable was used to determine if there were any major differences between forms returned early or as a result of the second mailing; there were none.

Table 8

Cumulative Percentages of Tenure

Years of Tenure	Inclusive Months	N	Cumulative Frequency	Cumulative Percentage
1	1- 18	28	28	3%
2	19- 30	84	112	14%
3	31- 42	98	210	26%
4	43- 54	104	314	39%
5	55- 66	84	398	49%
6	67- 78	61	459	57%
7	79- 90	53	512	64%
8	91-102	65	577	72%
9	103-114	26	603	75%
10	115-126	39	642	80%
11	127-138	14	656	81%
12	139-150	18	674	84%
13	151-162	13	687	85%
14	163-174	20	707	88%
15	175-186	11	718	89%
16	187-198	16	734	91%
17	199-210	12	746	93%
18	211-222	12	758	94%
19	223-234	9	767	95%
20	235-246	10	777	97%
21	247-258	1	778	97%
22	259-270	3	781	97%
23	271-282	4	785	98%
24	283-294	3	788	98%
25	295-306	2	790	98%
26	307-318	3	793	99%
27	319-330	3	796	99%
28	331-342	4	800	99%
29	343-354	2	802	100%
30	355-366	1	803	100%
31	367-378	1	804	100%
42	499-510	1	805	100%

Table 9

Description of Variables

Variable No.	Name	Total Freq.	Mean	Standard Deviation	Smallest Value	Largest Value
1	ID	805	468.878	272.014	1.000	926.000
2	Tenure	805	89.520	69.364	3.000	510.000
5	Region	803	2.924	1.240	1.000	5.000
* 6	Turnover	803	26.999	5.427	13.800	46.700
7	Enrollment	803	3261.596	6397.504	8.000	72515.000
8	Community	804	3.011	0.906	1.000	4.000
9	Power	793	2.693	0.964	1.000	4.000
*10	Income	734	19715.344	10219.273	4000.000	95000.000
*11	Perpupil	749	2741.275	1113.856	225.000	10000.000
*12	Grades	804	2.806	0.564	1.000	3.000
*14	Bdappoint	803	0.964	0.187	0.0	1.000
*15	Members	801	6.518	2.157	3.000	39.000
*16	Bddefeat	710	0.575	0.495	0.0	1.000
17	New Board	777	2.910	1.890	0.0	20.000
18	Salary	792	30856.656	11751.301	1700.000	880000.000
*19	Contract	792	20.591	12.406	0.0	60.000
20	Search	803	160.768	231.415	1.000	625.000
*21	Interview	753	0.482	0.500	0.0	1.000
*22	Degree	805	3.093	0.858	2.000	4.000
*23	Gender	804	0.978	0.148	0.0	1.000
*24	Age	802	41.415	6.998	24.000	62.000
*25	Ethnic	804	0.940	0.237	0.0	1.000
26	Support	795	6.225	1.788	2.000	23.000
*27	Local	804	0.234	0.424	0.0	1.000
*28	Stepstone	795	0.517	0.500	0.0	1.000
*29	Evaluate	800	0.606	0.489	0.0	1.000
*30	Orient	803	0.953	0.212	0.0	1.000
*32	Changes	795	0.521	0.500	0.0	1.000
*34	Xsalary	792	38740.824	14065.020	3173.000	157940.000
*36	Logtenure	805	4.226	0.748	1.099	6.234
*37	Logenroll	803	7.192	1.320	2.079	11.192
*38	Bdstable	775	0.451	0.256	0.0	1.000
*39	Propfor	793	0.964	0.091	0.556	1.000
*40	Sregion	803	4.492	0.054	4.400	4.550
*41	Scommunity	804	4.485	0.116	4.400	4.680
*42	Spower	793	4.489	0.132	4.220	4.630
*43	Ssearch	803	4.229	0.105	4.150	4.510

2. Tenure. Number of months in the position. The logarithm of tenure, LOGTENURE, was used instead of tenure.

*5. Region. Region of the country:

Value	Group	Number	Mean(years)	Mean(logtenure)
1	Northeast	142	7.7	4.52
2	South	117	7.9	4.55
3	Central	310	7.6	4.52
4	West	128	6.9	4.42
5	Pacific	106	6.8	4.40

*6. State turnover rate. The number of districts which had changed superintendents between 1983 and 1985 divided by the total number of districts in the state.

7. School district enrollment. The logarithm of enrollment, LOGENROL, was used instead of enrollment.

*8. Type of community.

Value	Group	Number	Mean(years)	Mean(logtenure)
1	urban	52	8.7	4.65
2	suburban	169	8.9	4.68
3	rural	301	6.8	4.40
4	small town	282	7.0	4.43

*9. Community power structure.

Value	Group	Number	Mean(years)	Mean(logtenure)
1	pyramid	143	6.5	4.36
2	two poles	98	5.7	4.22
3	plurality	411	7.9	4.55
4	inactive	141	8.6	4.63

*10. Average family income.

*11. Per pupil expenditure.

*12. Grade levels in the district. This variable was originally used as a dichotomous variable, ELEM, of elementary and not elementary. Later the values listed here were used instead in the variable, GRADES, as they represented the data more accurately.

Value	Group	Number	Mean(years)
1	elementary grades	65	8.8
2	secondary grades	26	8.1
3	all grade levels	713	7.3

*14. Board appointed.

Value	Group	Number	Mean (years)
0	appointed Board	29	7.8
1	elected Board	774	7.5

*15. Members of the board. The number of members on the Board of Education.

*16. Board defeat. Whether a board member was defeated during the past four years.

Value	Group	Number	Mean (years)
0	not defeated	302	8.2
1	member defeated	408	6.5

17. New board members. The number of board members who had served four years or less. This, divided by the number of board members, was a measure of Board instability, and that variable, BDSTABLE, was used instead of this one.

18. Starting salary. The starting salary was adjusted by the Cost of Living index to create a new variable, XSALARY, which was used instead of this one.

*19. Contract. The number of months in the original contract.

*20. Search. How wide a geographic area the Board searched in looking for a new superintendent.

Value	Group	Number	Mean (years)	Mean (logtenure)
1	district only	84	10.2	4.51
2	neighboring	43	8.1	4.28
3	statewide	331	7.0	4.15
4	region	189	7.4	4.24
5	nationwide	154	7.0	4.22

*21. Interview Format. A detailed candidate interview format was used.

Value	Group	Number	Mean (years)
0	was not used	390	8.3
1	was used	363	6.5

*22. Educational degree. (Only one person had just a bachelor's degree; he was combined with the master's group.)

Value	Group	Number	Mean (years)
1	masters (bachelors)	262	9.1
2	specialist	206	6.7
3	doctorate	337	6.7

*23. Gender.

Value	Group	Number	Mean (years)
0	female	18	4.2
1	male	786	7.5

*24. Age. Age and the powers of Age were examined for curvilinearity. The relationship to tenure was linear; although Age^3 alone was the best predictor. It was used in the early stages of the study, but later it was determined that not that much was gained by using Age^3 and Age was retained as the variable to use.

*25. Ethnic group. Whether the superintendent's racial/ethnic group was the same as most of the people in the district.

Value	Group	Number	Mean (years)
0	not the same	48	6.9
1	the same	756	7.5

26. Board member support. The number of board members who supported the person's appointment. This was divided by the total number of board members to give the variable, proportion of support, PROPFOR, which was used in the equation instead of this one.

*27. Local. Whether the person had worked in this school district before becoming superintendent.

Value	Group	Number	Mean (years)
0	had not worked there	188	6.9
1	had worked there	616	9.3

*28. Stepping stone. The superintendent had intended use this position as a stepping stone to another superintendency.

Value	Group	Number	Mean (years)
0	did not intend to	411	8.8
1	did intend to	384	6.2

*29. Evaluation. Whether the Board had regular written evaluations of the superintendent.

Value	Group	Number	Mean (years)
0	it did not	315	8.6
1	it did	485	6.7

*30. Orientation. Whether the superintendent was primarily responsible for orienting new board members.

Value	Group	Number	Mean (years)
0	was not	38	5.3
1	was	765	7.6

31. Agenda. Whether the superintendent prepared the agendas for the Board meetings. All superintendents prepared the agendas, so this variable was not used.

*32. Changes expected. Whether the Board expected the superintendent to make major/radical changes.

Value	Group	Number	Mean(years)
0	it did not	381	8.1
1	it did	414	6.7

*34. Xsalary. The starting salary adjusted for the Cost of Living.

*36. Logarithm of tenure. Natural logarithm, the dependent variable in the study.

*37. Logarithm of enrollment. Natural logarithm.

38. Board instability. Proportion of board members who were new.

*40. Proportion for. Proportion of board members who supported the superintendent's appointment.

*41. Region in criterion-scaled form. The mean of the logarithm of tenure for each region, as reported for the variable, REGION.

*42. Community in criterion-scaled form. The mean of the logarithm of tenure for each community, as reported for the variable, COMMUNITY.

*43. Community power structure in criterion-scaled form. The mean of the logarithm of tenure for each community power structure, as reported for the variable, POWER.

*41. Search in criterion-scaled form. The mean of the logarithm of tenure for each size area of the geographic search, as reported for the variable, SEARCH..

After computing an initial forward selection regression using all the data, including any possible outlier cases and categorical variables entered using the above values, the variables identified as contributing significantly were:

1.	Per pupil expenditure	PERPUPIL
2.	Elementary grades only	ELEM
3.	Board defeat	BDDEFEAT
4.	Contract	CONTRACT
5.	Interview	INTERVIEW
6.	Gender	GENDER
7.	Stepping stone	STPSTONE
8.	Evaluation	EVALUATE
9.	Adjusted salary	XSALARY
10.	Log of enrollment	LOGENROL
11.	Board instability	BDSTABLE
12.	Age^3	AGEX3

The R^2 for this equation was .2941, with F = 18.57 (12, 535 d.f.).

Categorical variables.

The categorical variables (region, community type, power structure, search and degree) presented a special problem. They had been significant when analyzed in a five-way ANOVA with F = 1.25523 (380, 406 d.f.). This was significant at $\alpha = .05$. Three of the categories (region, community type and power structure) were also significant ($\alpha = .01$) in a three-way ANOVA with F = 1.64161 (75, 715 d.f.). However, when they were dummy coded and each variable was entered into a forward selection equation after the significant variables, none of the categorical variables contributed significantly to the increment in the proportion of variance accounted for. (Pedhazur, p. 62)

In order to include the categorical variables during the All Possible Regressions runs, criterion scaling was used. With criterion scaling, the mean for the dependent variable for the group is the assigned value for that group variable. Pedhazur had stated, "A situation in which criterion scaling is particularly useful occurs when one wishes to apply a variable-selection procedure . . . to a set of categorical variables" (p. 391). He also advised that if a criterion scaled variable were to be used in the final subset of variables, it should be converted back to the dummy coded form and assigned the same position of entry in the equation. (p. 392) Using criterion scaling the categorical variables still did not load significantly; although power and region were both candidates,

based on the F-to-enter, for the next entry to the equation. This was all done before outliers were down-weighted.

Outlier diagnostics.

To identify the outliers a robust technique developed by Rousseeuw and Leroy (1987) was applied. The technique calculates outlying cases based upon minimizing; the median of the residuals squared instead of minimizing the sum of the residuals squared.

To test the robustness of different estimators, Rousseeuw and Leroy generated a sample of 100 "good" observations defining a robust linear relationship, and they used least squares, robust estimators, and their least median of squares (LMS) to describe the linear relationship. Then they began substituting "bad" or outlying observations for the "good" ones and noted at what stage the statistical approaches broke down and no longer accurately described the data. In contrast to the immediate breakdown of a least squares approach, at 30% with three robust estimators (Huber's, Mallows', and Schweppe's M-estimators), and at 40% with a repeated median approach, the breakdown point of the LMS approach did not break down before 50% contamination. (pp. 68-70)

Least Median of Squares takes repeated subsamples of different observations, calculates the median of each subsample, then squares the residuals from the median. The least median of the squared residuals is then used to identify the optimal equation. The algorithm for the LMS estimator for simple regression can be defined as:

$$\min_{b_1} \{\min_{b_0} \operatorname{med}_i ((y_i - b_1 x_i) - b_0)^2\}$$

where b_1 is the slope for x and b_0, the intercept. (1987, p. 204) The outliers are identified using a scale estimate of the fit, s^o, similar to the standard error, which is based on the minimal median, using the following formula (p. 202):

$$s^o = 1.4826(1 + 5/(n - p)) \sqrt{\operatorname{med}_i r_i^2(b)}$$

The authors explained that the constant was chosen because $1.4826 = 1/\Phi^{-1}(0.75)$, and $\text{med}_i \mid z_i \mid /\Phi^{-1}(0.75)$ is a consistent estimator of σ when the z_i are distributed like $N(0,\sigma^2)$. The weights were assigned using

$$w_i = 1 \text{ if } |r_i/s^o| \leq 2.5$$

$$w_i = 0 \text{ if otherwise.}$$

Rousseeuw's software for the algorithm, called "Progress" (Program for RObust reGRESSion) applies the LMS technique of selecting random subsamples (up to 1500 for 9 cases per subsample) until there is confidence that 95% of the subsamples will have only a small fraction of bad observations. The number of required subsamples increases with the amount of contamination to maintain a given probability that the subsamples will have predominantly good observations.

The PROGRESS software could work with no more than nine variables and 300 cases for each run. This required the identification of the best subset of variables to use in identifying outliers. To select the best subset the All Possible Regressions on BMDP was run.

Two equations, which used all cases, fell closest to the $C_p = p$ line:

	Subset A 13 variables p = 14	Subset B 14 variables p = 15
	PERPUPIL	PERPUPIL
	ELEM (GRADES)	ELEM (GRADES)
	BDDEFEAT	BDDEFEAT
	CONTRACT	CONTRACT
	INTERVIEW	INTERVIEW
	DEGREE	DEGREE
	GENDER	GENDER
	STPSTONE	STPSTONE
	EVALUATE	EVALUATE
	XSALARY	XSALARY
	LOGENROL	LOGENROL
	BDSTABLE	BDSTABLE
	AGEX3	AGEX3
		SSEARCH
R^2 =	.297685	.299915
C_p =	14.69	14.99

Because the additional variable in Subset B was a categorical one, SSEARCH, the 13 variables of Subset A were selected for use in identifying outliers using the PROGRESS software.

The other problem to be addressed in running PROGRESS was the limitation of 300 cases per PROGRESS run. The LMS technique used a process of taking repeated subsamples, and to accommodate the 805 in this study, subsampling to sizes less than 300 was also utilized. The most straightforward approach was to divide the sample into three sets with the first set consisting of cases [1 - 300], the second of cases [301 - 549], and the third of cases [550 - 805]. The major constraint would be whether or not a difference existed between superintendents who responded early to the study, and those who responded later since the record identification number was assigned in sequence of receipt of the form. The correlation of the identification number with the dependent variable was r = .0703, which was too small to be of concern, and the sort described above was used.

The second division of the sample took every third case, resulting in the fourth group consisting of the set of cases [1, 4, 7 ... 805], the fifth group of cases [2, 5, 8, ... 803], and the sixth group of cases [3, 6, 9, ... 804]. Sorting two different ways ensured that each case would be examined in two separate sets of cases by any one equation.

The first equation that was run utilized the variables (1) salary, (2) age, (3) stepping stone, (4) perpupil, (5) Board stable, (6) interview, (7) grades, (8) Board defeat, and (9) contract. This equation was run against all six groups described above.

The second equation utilized the variables: (1) per pupil expenditure, (2) Board defeat, (3) interview, (4) degree, (5) gender, (6) evaluation, (7) salary, (8) log of enrollment, and (9) age^3. This equation, however, only completed between 50% and 70% of its algorithms by the end of each run. It was thought that perhaps the presence of four binomial variables - (2) (3) (5) (6) - caused the median-based algorithm some problems. There were three binomial variables in the first equation, - (3) (6) (8).

One change was introduced with the third equation, which was the use of age, rather than age^3. An equation with age^3 had an R^2 of .4019 and with age, an R^2 of .3984. This difference wasn't deemed significant enough to justify using age^3.

The third equation included no binomial variables: (1) turnover, (2) per pupil expenditure, (3) grades, (4) contract, (5) degree, (6) salary, (7) log of enrollment, (8) Board stable, and (9) age. The algorithms for this equation were completed 100%. Among the three equations all of the 13 identified variables were utilized.

A decision rule was established that any case to be selected for down-weighting had to be identified as an outlier in at least two different runs. This would require selection by two different subsets of variables, or by one subset of variables among two different sets of cases. Using this criterion, 44 cases were identified as outliers. The distribution of the outliers compared to the total distribution (Table 8) is shown in Table 10.

Table 10

Cumulative Percentages of Tenure for Sample and Outlier Cases

Years of Tenure	Total Sample N	Total Sample Cumulative Percentage	Outlier Cases N	Outlier Cases Cumulative Percentage
1	28	3%	6	14%
2	84	14%	1	16%
3	98	26%	4	25%
4	104	39%	1	27%
5	84	49%	3	34%
6	61	57%	0	34%
7	53	64%	0	34%
8	65	72%	0	34%
9	26	75%	0	34%
10	39	80%	3	41%
11	14	81%	0	41%
12	18	84%	1	43%
13	13	85%	1	45%
14	20	88%	1	48%
15	11	89%	0	48%
16	16	91%	5	59%
17	12	93%	1	61%
18	12	94%	1	64%
19	9	95%	1	66%
20	10	97%	4	75%
21	1	97%	0	75%
22	3	97%	1	77%
23	4	98%	3	84%
24	3	98%	1	86%
25	2	98%	1	89%
26	3	99%	0	89%
27	3	99%	2	93%
28	4	99%	1	95%
29	2	99%	0	95%
30	1	99%	0	95%
31	1	99%	1	98%
42	1	100%	1	99%
Total:	805		44	

As can be seen in the compared distributions, tenure is heavily skewed with the greatest number between two to five years with drop-offs after ten and 20 years, and a long tail reaching the longest tenure of 42 years. On the other hand, the outlying cases weighed heavily at one and three years, flattened through the distribution with peaks at 16 (as the total group had), and at 20 years (a total group drop-off point), then included a greater proportion of the long tenures, including the two longest. This was considered a reasonable distribution for outlying cases.

The outlying cases were weighted out. The correlation matrix with the outliers removed is provided in Appendix D. At this point the variable, ELEM, was replaced by GRADES, as detailed in the variable description for grade levels.

All Possible Regressions was then run again on all the data. Two equations fell closest to the $C_p = p$ line. The first of these, Subset C, also had the highest R^2 among the subsets of twelve variables. For thirteen variables, the highest R^2 identified a different subset from the one identified with the C_p criterion. The three equations, without outliers, were:

Subset C Best $C_p = p$ Best R^2 12 variables p = 13	Subset D Best $C_p = p$ 13 variables p = 14	Subset E Best R^2 13 variables P = 14
PERPUPIL	PERPUPIL	PERPUPIL
BDDEFEAT	BDDEFEAT	BDDEFEAT
CONTRACT	CONTRACT	CONTRACT
INTERVIEW	INTERVIEW	INTERVIEW
AGE	AGE	AGE
ETHNIC	ETHNIC	ETHNIC
STPSTONE	STPSTONE	STPSTONE
ORIENT	ORIENT	ORIENT
CHANGES	CHANGES	CHANGES
XSALARY	XSALARY	XSALARY
LOGENROL	LOGENROL	LOGENROL
BDSTABLE	BDSTABLE	BDSTABLE
	SREGION	PROPFOR
R^2 = .398419	.400406	.401865
C_p = 13.58	13.92	12.71

With the outliers removed, the best equations, Subsets C and D, had 11 and 12 variables, and R^2 values of .3984 and .4004, respectively. The earlier best equations, Subsets A and B, had 13 and 14 variables and R^2 values of .2977 and .2999, respectively. The R^2 for the full model was .4160 with the outliers removed in contrast to .3132 before.

The equation identified by BMDP as the best one had 15 variables with an R^2 of .4073. The increment in the proportion of variance accounted for by the addition of the 13th variable, PROPFOR, however, was not significant, F = 3.67 (1, 498 d.f.).

In order to select among the competing subsets, the PRESS statistic was run using the SAS program against all of the subsets which were closest to the $C_p = p$ line. This included 16 equations of 12, 13 and 14 variables. The PRESS statistic was then used to calculate $R^2_{predict}$. Of all 16 subsets, the one with the highest $R^2_{predict}$ was Subset D with $R^2_{predict} = .3068$. Subset C had an $R^2_{predict}$ of .3018 and Subset E had an $R^2_{predict}$ of .3039. Subset D was selected as the best equation.

Subset D used the identical variables as Subset C and had in addition, SREGION, a categorical variable. For the All Possible Regressions, region was used as a criterion-scaled variable. That is, for Northeast 4.52 was entered, South - 4.55, Central - 4.52, West - 4.42, and Pacific - 4.40. However, for the PRESS statistic, region was entered as dummy codes with regions 1 through 4 each represented by one variable, and zeroes assigned to all the regions except the correct region which was assigned one.

Using forward selection regression, an F test to calculate the contribution of region to the increment in R^2 had found no significance for the criterion scaling, F = 1.66 (1, 498 d.f.). When Region was dummy coded, the contribution was significant at $\alpha = .01$, F = 3.12 (5, 494 d.f.). As Pedhazur had indicated, "With departures from linearity

the between-treatments sum of squares [dummy coding] will always be larger than the regression sum of squares" (p. 401).

Checking for multicollinearity.

One issue of concern was multicollinearity, or intercorrelation among the independent variables. This linear dependency could result in imprecise estimations of the regression coefficients and adverse effects on the standard errors of the coefficients. (Pedhazur, p. 235) In addition, as noted by Myers (1986), the regression coefficients are unstable and very dependent on the data set used to generate them (p. 76), and when the regression is used for prediction, then "predictions at combinations that are not consistent with the relationships in the data, or predictions at points that represent extrapolation outside the range of the data, can be adversely affected by multicollinearity" (p. 80).

The measure of multicollinearity recommended by Montgomery and Peck (p. 300) is the Variance Inflation Factor (VIF), based on the diagonal elements of the inverse of the correlation matrix. VIF is defined as:

$$C_{jj} = \frac{1}{(1 - R_j^2)} = \frac{1}{\text{Tolerance}}$$

R_j^2 is the coefficient of determination when X_j is regressed on the other independent variables. Montgomery and Peck reported that practical experience had indicated that if any of the VIF's exceeded 5 or 10, then multicollinearity was a problem. Another researcher had indicated that based on practical experience, a VIF of 2 could be a problem. (L. Wolfle, personal communication, May 4, 1988) Outliers among the independent variables could confound the multicollinearity issue by causing it or by hiding any that may exist. The outliers in this equation could have had major implications for multicollinearity. Table 11 reports for Subset D the tolerance and VIF values, for the total set of cases and when the outliers were removed. Based on the low

VIF, multicollinearity would most likely not affect the predictability of the selected equation.

Table 11

Tolerance and VIF for the Selected Subset of Variables

	All cases		Outliers Removed	
Variable	Tolerance	VIF	Tolerance	VIF
per pupil expenditure	.9771	1.02	.9759	1.02
board defeat	.9658	1.04	.9638	1.04
contract	.7706	1.30	.7727	1.29
interview	.8944	1.12	.9006	1.11
ethnic	.9629	1.04	.9609	1.04
stepping stone	.7323	1.37	.7221	1.38
orientation	.9557	1.05	.9598	1.04
changes requested	.9197	1.09	.9232	1.08
adjusted salary	.6473	1.54	.6293	1.59
log of enrollment	.5723	1.75	.5565	1.80
board instability	.9441	1.06	.9398	1.06
age	.7060	1.42	.6985	1.43
region1	.5133	1.95	.5009	2.00
region2	.5184	1.93	.5105	1.96
region3	.4238	2.36	.4110	2.43
region4	.5174	1.93	.5124	1.95

Analysis of residuals.

An examination of the scatter diagrams of the residuals with each independent variable revealed no violations of assumptions, such as non-constant variance. The normal probability plot of the standardized residuals and the expected normal values indicated that the residuals were normal. There were still a few possible outlier cases, but their impacts would be expected to be minimal. The regression equation selected as best accounting for the variance in tenure consisted of the variables shown in Table 12.

Table 12

Regression Coefficients and Significance of Selected Subset

Variable	Coefficient	Standard Error of Coeff.	Standardized Regression Coeff.	T	P(2 TAIL)
PERPUPIL	-0.1370E-03	0.2697E-04	-0.20	-5.08	0.00
BDDEFEAT	-0.1580	0.0476	-0.12	-3.32	0.00
CONTRACT	-0.0088	0.0020	-0.17	-4.42	0.00
INTERVIE	-0.1715	0.0476	-0.13	-3.60	0.00
AGE	-0.0253	0.0039	-0.28	-6.56	0.00
ETHNIC	0.1791	0.1013	0.06	1.77	0.08
STPSTONE	-0.3334	0.0534	-0.26	-6.25	0.00
ORIENT	0.2165	0.1097	0.07	1.97	0.05
CHANGES	-0.0999	0.0471	-0.08	-2.12	0.03
XSALARY	0.2252E-04	0.2298E-05	0.45	9.80	0.00
LOGENROL	0.0446	0.0239	0.09	1.87	0.06
BDSTABLE	-0.2016	0.0920	-0.08	-2.19	0.03
REGION1	0.1436	0.0851	0.09	1.69	0.09
REGION2	-0.0907	0.0882	-0.05	-1.03	0.30
REGION3	-0.0278	0.0735	-0.02	-0.38	0.71
REGION4	-0.1798	0.0889	-0.10	-2.02	0.04
INTERCEPT	4.72646				

The standardized regression coefficients each had the same sign as the variable's correlations with the logarithm of tenure. This provided another reassuring sign that the independent variables were sufficiently orthogonal. The squared multiple correlation coefficient was $R^2 = .4164$. This was significant with an F ratio of 22.031 (16, 494 d.f.) and probability of F at $p \leq 0.0000$. Adjusting for shrinkage, as defined by Pedhazur (p. 148), resulted in Adjusted $R^2 = .3975$, indicating that about 40% of the variance in tenure had been explained by this set of variables.

Bayesian Analysis

The decision-making items provided a unique problem: Unlike the usual test items which had one correct answer, the decision-making items did not. This made

traditional item analysis, such as latent trait theory, inappropriate. The questions did appear appropriate, however, for an application of Bayesian theory using individual answers to establish the probability that a superintendent belonged to a group of superintendents with a certain tenure.

Bayesian applications (Novick and Jackson, 1974) take an expected probability, known as a prior probability, and adjust that probability using additional information to make a more accurate estimation, known as the posterior probability. As more information becomes available, this posterior probability becomes the prior probability for a new estimation.

For this study each situation/event had four optional decisions, A, B, C, D, and no answer, E. It could not be assumed that the way one question was answered influenced the way the following question was answered. Thus for this application, the probabilities generated by each question had to be given equal weight. As described by R. D. Krutchkoff, "Say you have 4 questions. Then a particular response might be A_1, C_2, B_3, A_4. . . . You would have 4x4x4x4 = 256 possible 4-way answers and thus a lot of probabilities to calculate" (personal communication, October 25, 1985). Uninterrupted access to a computer, and the capability of applying the correct algorithm using dBase III made this approach using joint probabilities possible.

The basic Bayesian formula for a joint probability is given below (Iverson, 1984, p.12). This formula provides the probability of event A, given the existence of event T. In this case, A is the selected answer, and T is the tenure group of the superintendent.

$$\text{Prob}\ (T|A) = \frac{P(A|T) \times P(T)}{P(A)}$$

with P(A) = the proportion of all respondents who selected answer A, from the set of the possible answers, A, B, C, D, and no answer, E.

P(T) = the proportion of superintendents in tenure group T, from the set of tenure groups.

P(A|T) = the proportion of persons from tenure group T who selected answer A.

P(T|A) = the probability that a person belongs to a tenure group T given that he/she selected answer A.

Basic probability formulas which were applied are:

1) $P(A \text{ and } T) = P(A)P(T)$, if independence exists,

2) $P(T|A) = P(A \text{ and } T)/P(A)$

$P(A|T) = P(A \text{ and } T)/P(T)$

3) $P(A) = P(A \text{ and } T) + P[A \text{ and } (\text{not } T)]$

$P(A|T) = P(A \text{ and } T)/P(T)$

$P(A \text{ and } T) = P(A|T)P(T)$

$$P(T|A) = \frac{P(A|T)P(T)}{P(A)}$$

$$P(T|A) = \frac{P(A|T)P(T)}{P(A \text{ and } T) + P(A|\text{not } T)P(\text{not } T)}$$

$$P(T|A) = \frac{P(A|T)P(T)}{P(A|T)P(T) + P(A|\text{not } T)P(\text{not } T)}$$

To apply the Bayesian formula, the denominator was computed by summing the probabilities of A for all the tenure groups. The formula was then applied separately for each tenure group.

In assigning a probability of group membership it was important that the categories be exclusive and exhaustive. An early decision had to be made on the optimal number of tenure groups. It was felt that having approximately equal numbers of superintendents in each group would improve the predictability since fewer cells would be empty. The superintendents were divided in quartiles and deciles using the frequency data on tenure in Table 8.

In order to explore the alternative methods for applying the Bayesian theorem, a validation sample was drawn which consisted of every 30th form in the total sample. The validation sample, shown in Table 13 for eight groups, represented the total sample fairly well; although group 2 is overrepresented and group 4 is underrepresented. A chi-square test found that the validation sample represented the total sample with $\alpha = .01$ ($X^2 = 4.72$ with 7 d.f.).

Table 13

Comparison of Validation and Total Samples by Tenure Group

Tenure Group	No. in Validation Sample	Validation Sample Proportion	Total Sample Proportion
T1	1	.03	.03
T2	5	.17	.10
T3	6	.20	.25
T4	1	.03	.10
T5	8	.27	.22
T6	3	.10	.08
T7	4	.13	.17
T8	2	.07	.03
	30	1.00	.98

Using an empirical approach, the Bayesian formula for joint probabilities was applied to the validation sample of 30 superintendents. The most probable tenure for

each person was calculated, along with the standard error of measurement (SEM) (Kerlinger, 1973, pp. 452-53) for the different number of groups as shown in Table 14.

Table 14

Correct Predictions by Number of Groups

Number of Groups	Model Correct Predictions			Chance Correct Predictions		
	No.	%	SEM	No..	%	SEM
4	8	27%	1.74	7-8	25%	1.58
6	8	27%	1.74	5	17%	2.42
8	9	30%	2.34	4	13%	3.24
10	6	20%	3.83	3	10%	4.06

In order to determine if superintendents from urban, suburban or rural/small towns answered questions differently, predictions were generated accordingly using the deciles. As with the total group, six persons were predicted correctly, but only two were the same persons. Because the number of predictions was not improved, and the file would be too small for the subgroups, the file was kept together.

It was felt that intermediate size groups, between four and ten, might capitalize on the greater number of correct predictions of the quartiles, and the reduction in the SEM of the deciles. A cluster analysis was then applied to the distribution to provide more homogeneous groups for the sets of six and eight. The clustering for the set of eight was modified slightly to catch the dropoff after 20 years; this caused nine and ten years to cluster as they formed a small peak on the frequency distribution.

The use of eight groups was clearly the best: It provided the greatest number of accurate predictions among the 30 in the validation sample, the rate of correct prediction was more than twice that of chance, and the SEM was little more than half that of chance. The eight group model used the clusters shown in Table 15.

Table 15

Tenure Groups

Group	Tenure Years	Tenure Months	N	Proportion P(T)
T1	1 yr.	0 - 18	28	.0344
T2	2 yrs.	19 - 30	83	.1018
T3	3-4 yrs.	31 - 54	206	.2528
T4	5 yrs.	55 - 66	85	.1043
T5	6-8 yrs.	67 - 102	181	.2221
T6	9-10 yrs.	103 - 126	65	.0798
T7	11-20 yrs.	127 - 246	140	.1718
T8	21+ yrs.	247 - 516	27	.0331
			815*	1.0001

*This figure includes 10 elected superintendents.

With the tenure groups established, the matrices using the eight groups for each of the 290 decision-making items in the survey were applied to the 800 persons who completed the items. An example of a matrix is given in Table 16 for question #275. That was the first question for Person #30, the first person in the validation sample. The matrix displays the responses for the 75 persons who answered that question.

Table 16

Question #275, Matrix of Responses

	Tenure Group								
Answer	1	2	3	4	5	6	7	8	Total
A	1	1	2	1	0	0	4	1	10
B	1	0	3	2	3	0	1	0	10
C	2	2	14	6	16	5	9	1	55
D	0	0	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0	0	0
Total	4	3	19	9	19	5	14	2	75

An adjustment had to be made to the matrix because probability can not work with zeroes. That is, there cannot be a probability of zero that a person belongs to a certain tenure group. In determining what number to use in the empty cells, it was assumed that if the sample were increased ten times, then it was quite likely that the answer with the current empty cell would have been selected at least once. Thus each cell was multiplied by ten, and one was added. The effect of adding one to each cell tended to flatten the distribution. The modified matrix is shown in Table 17.

Table 17

Question #275, Modified Matrix

	Tenure Group								
Answer	1	2	3	4	5	6	7	8	Total
A	11	11	21	11	1	1	41	11	108
B	11	1	31	21	31	1	11	1	108
C	21	21	141	61	161	51	91	11	558
D	1	1	1	1	1	1	1	1	8
E	1	1	1	1	1	1	1	1	8
Total	45	35	195	95	195	55	145	25	790

The matrix was then developed, shown in Table 18, to report P(A|T), the proportion of persons from tenure group T who selected answer A.

Table 18

Question #275, P(A|T) Matrix

	Tenure Group							
	1	2	3	4	5	6	7	8
Answer								
A	.2444	.3143	.1077	.1158	.0051	.0182	.2828	.4400
B	.2444	.0286	.1590	.2211	.1590	.0182	.0759	.0400
C	.4667	.6000	.7231	.6421	.8256	.9273	.6276	.4400
D	.0222	.0286	.0051	.0105	.0051	.0182	.0069	.0400
E	.0222	.0286	.0051	.0105	.0051	.0182	.0069	.0400
Sum	.9999	1.0001	1.0000	1.0000	.9999	1.0001	1.0001	1.0000

Person #30 had a tenure of 192 months which placed him in tenure group seven, T7, and he selected answer C. To compute Person #30's most probable tenure, given that he answered C, the Bayesian joint probability formula was applied. For this person, A was replaced by the answer, 1C, the first decision-making item, and tenure, T, was computed for each tenure group, shown for T1 in the following formula:

$$P(T1|1C) = \frac{P(1C|T1)P(T7)}{P(1C|T1)P(T1) + P(1C|T2)P(T2) + P(1C|T3)P(T3) + P(1C|T4)P(T4) + P(1C|T5)P(T5) + P(1C|T6)P(T6) + P(1C|T7)P(T7) + P(1C|T8)P(T8)}$$

Using this formula, the probabilities that 1C would be selected given that the person belonged in each tenure group were computed beginning as follows:

	$P(1C\|T1)$	x	$P(T)$	=	$P(1C\|T1)P(T)$
T1	.4667	x	.0344	=	.0161
T2	.6000	x	.1018	=	.0611
T3	.7231	x	.2528	=	.1828
T4	.6421	x	.1043	=	.0670
T5	.8256	x	.2221	=	.1834
T6	.9273	x	.0798	=	.0740
T7	.6276	x	.1718	=	.1078
T8	.4400	x	.0331	=	.0146
				Σ =	.7068

To illustrate, the probability for the tenure group 1, T1, is:

$$P(T1|1C) = \frac{P(1C|T1)P(T1)}{P(1C|T1)P(T1) + P(1C|T2)P(T2) + \ldots P(1C|T8)P(T8)}$$

$$P(T1|1C) = \frac{(.4667)(.0344)}{(.4667)(.0344) + (.6000)(.1018) + \ldots (.4400)(.0331)}$$

$$P(T1|1C) = \frac{.0161}{.7068} = .0228$$

The probabilities for the person's belonging to each of the tenure groups was:

P(T1|1C)	=	.0228
P(T2|1C)	=	.0863
P(T3|1C)	=	.2586
P(T4|1C)	=	.0948
P(T5|1C)	=	.2595
P(T6|1C)	=	.1047
P(T7|1C)	=	.1525
P(T8|1C)	=	.0207
	Σ =	.9999

It could be shown that this result for person #30 would be the same as computing the proportion of persons selecting C who were in group T7 (91/558 = .1631) if the P(T)'s were based on the same matrix. Because this study used many items dealing with the same population of tenured groups, the P(T)'s for the total population, not the individual matrix, were used throughout.

When the answer to the second question was added (for example, for person #30, question #208, answer D), then the probability of the event, [1C and 2D], which would be P(1C)P(2D) (Raiffa, p. 21), was computed.

$$P(T1|1C,2D) = \frac{P(1C|T1)P(2D|T1)P(T1)}{P(1C|T1)P(2D|T1)P(T1) + P(1C|T2)P(2D|T2)P(T2) + \cdots + P(1C|T8)P(2D|T8)P(T8)}$$

The above formula was used as follows to determine the probability of the person belonging to each tenure group considering that he chose the answers 1C and 2D. [P(2D|T) is taken from the matrix for question #208, not shown here.]

	P(2D|T)	x	P(1C|T)P(T)	=	P(1C,2D|T)P(T)
(T1)	.6000	x	.0161	=	.00966
(T2)	.7846	x	.0611	=	.04794
(T3)	.4927	x	.1828	=	.09007
(T4)	.4824	x	.0670	=	.03232
(T5)	.4531	x	.1834	=	.08310
(T6)	.4400	x	.0740	=	.03256
(T7)	.2211	x	.1078	=	.02383
(T8)	.4667	x	.0146	=	.00681
			Σ	=	.32629

P(T1|1C,2D)	=	.0296
P(T2|1C,2D)	=	.1469
P(T3|1C,2D)	=	.2760
P(T4|1C,2D)	=	.0991
P(T5|1C,2D)	=	.2547
P(T6|1C,2D)	=	.0998
P(T7|1C,2D)	=	.0730
P(T8|1C,2D)	=	.0209
Σ	=	1.0000

Table 19 tracks the probability of person #30 belonging to each tenure group as, reading down, he answered each sequential question. The most probable group after each question was answered is printed in bold type.

At the end of the first question, the most likely tenure was group T5, but the probability was only p = .2595. After the second question was added, T3 seemed most likely, but the probability was still small, at p = .2761. After the third question , the most likely tenure returned to T5 and remained there through the 12th question. Then it jumped to T2 for 6 questions, and finally moved to T8 where it remained through the final four questions, and ended with a probability of .8815.

In order to establish the best way to interpret each chart to make the most accurate prediction, several approaches were examined:

1. Identifying the group to be predicted based upon any probability reaching .95. This approach, which was used with the data in deciles, did not predict well. For person #30, no prediction would have been reached.

Table 19

Person #30 P(T|A) Chart

(The true tenure group is T7.)

Question/ Answer		Tenure Group 1	2	3	4	5	6	7	8
275	C	.0227	.0864	.2587	.0948	**.2595**	.1047	.1526	.0206
208	D	.0295	.1469	**.2761**	.0990	.2547	.0998	.0731	.0208
071	E	.0111	.0852	.0475	.0331	**.4576**	.0375	.0359	.2921
086	B	.0198	.2074	.0688	.0707	**.4858**	.0433	.0530	.0511
134	B	.0018	.1684	.0176	.0301	**.6226**	.0050	.0023	.1523
151	A	.0016	.1624	.0149	.0199	**.6658**	.0043	.0022	.1289
131	D	.0012	.2247	.0125	.0222	**.7253**	.0002	.0019	.0119
094	D	.0015	.2041	.0191	.0394	**.7172**	.0005	.0027	.0156
048	A	.0007	.1596	.0157	.0264	**.7765**	.0002	.0018	.0192
158	C	.0001	.2056	.0062	.0340	**.7484**	.0001	.0015	.0040
055	A	.0001	.2118	.0052	.0271	**.7511**	.0001	.0014	.0032
226	E	.0005	.3389	.0043	.0566	**.5806**	.0002	.0013	.0176
181	C	.0007	**.7882**	.1157	.0467	.1307	.0002	.0016	.0262
025	A	.0000	**.8365**	.0031	.0288	.1049	.0002	.0012	.0253
182	E	.0001	**.7698**	.0208	.0459	.0735	.0002	.0008	.0888
200	B	.0000	**.6418**	.0285	.0704	.1218	.0002	.0012	.1361
049	B	.0000	**.5714**	.0201	.0814	.1538	.0002	.0012	.1719
060	E	.0000	**.4137**	.0122	.0955	.0937	.0002	.0100	.3747
147	E	.0000	.2286	.0430	.0774	.0365	.0001	.0504	**.5640**
037	E	.0001	.1222	.0052	.0597	.0087	.0000	.0206	**.7834**
191	C	.0000	.0823	.0040	.0608	.0058	.0000	.0177	**.8293**
011	B	.0000	.0696	.0004	.0445	.0036	.0000	.0004	**.8815**

2. Basing the prediction on the highest probability received among all the sequential questions. For person #30, this was group T8. For the validation sample of 30 people, this resulted in seven correct predictions.

3. Using the final probabilities as weights to be multiplied by the midpoints (months of tenure) of each the eight groups. For person #30, group T8 was predicted. For the sample this resulted in seven correct predictions.

4. Taking the highest weight at the end of the last question and predicting that group. For person #30, group T8 was again predicted. For the sample, nine tenure groups were correctly predicted. The standard variance of measurement was also smaller than for options 2 and 3 above.

The fourth approach was the one selected. For each of the 800 persons in the survey, the person was deleted from the sample, the individual's chart was generated, and the prediction was based on the most probable tenure group at the end of the series of questions.

The equal weighting of all items created a fluidity of prediction illustrated by Table 19, from which several observations could be made:

> The predicted tenure group could jump radically based upon the addition of just one high discriminating item. For example, for Person #30, as a result of question #181, the prediction jumped from T5 with a probability of .58 to T2 with a probability of .79.
>
> When a prediction was wrong, it was just as likely to be far away from the accurate prediction as close to it.

As noted earlier, this approach to the prediction resulted in correctly predicting the tenure of nine of the 30 persons in the validation sample. This was an accuracy rate of 30%. However, when predictions for the 800 persons in the total sample were calculated, predictions to the correct tenure groups were made for 143 persons,with a standard error of measurement (SEM) of 2.04. This was an accuracy rate of only 18%. Chance alone would have predicted with an SEM of 3.25 and an accuracy of 12.5%.

Integrated Method

Regression was chosen as the method for integrating the regression-based and Bayesian predictions; although a Bayesian formula could have also assigned the relative weights. When the predicted tenure from the regression and the predicted tenure group yfrom the Bayesian application were entered as the independent variables, and the logarithm of tenure as the dependent variable, the R^2 was .4179. The F ratio was $F = 181.284$ (2, 505 d.f.), significant at $p \leq 0.0000$.

Table 20

Coefficients and Significance Tests for the Integrated Prediction

Variable	Coefficient	Standard Error of Coeff.	Standardized Regression Coeff.	T	P(2 TAIL)
REGRESSION	0.9997	0.0525	0.65	19.03	0.0
BAYESIAN	0.0052	0.0133	0.01	0.39	0.70
INTERCEPT	-0.02029				

In a forward selection equation, the R^2 for just the regression prediction was .4177. When the Bayesian prediction was added, the increment in the amount of variance accounted for, indicated by R^2, was increased to .4179. This was not a significant increase with F = 0.17 (1, 505 d.f.). The regression equation alone best explained the variance in tenure.

Chapter 4: Results

The intent of this study was to develop a method which could reliably predict tenure. Because of the emphasis on prediction, particular attention was given to examining all the possible predictive equations by using Mallows C_p, to identifying and removing outlying cases, and to avoiding multicollinearity. Use of the PRESS statistic, which predicts each case after removing it from the sample, was a critical element in the selection and validation of the best subset of variables.

The Bayesian analysis also focused on prediction by providing a mechanism for establishing the most probable tenure based upon the decision-making patterns and tenures of superintendents.

Prediction Model

The regression analysis resulted in the identification of 13 variables which, as a group, significantly contributed to explaining the variance in tenure. These variables were per pupil expenditure, recent board member defeat, number of years in the contract, whether or not a formal interview was conducted, age of the superintendent, whether the superintendent was in the same racial/ethnic group as the community, whether the person intended using the position as a stepping stone to another superintendency, whether the superintendent oriented new board members, whether the Board expected the superintendent to make major changes, salary, school district enrollment, proportion of new board members, and region of the country. These variables accounted for about 40% of the variance in tenure.

The Bayesian analysis correctly predicted 18% of the tenures of the superintendents in contrast to the 12.5% that would have been selected by chance. This was not significant in contributing to an explanation of tenure.

In examining the various independent variables and the accurate Bayesian predictions, the one variable which correlated most highly was the question which determined whether the superintendent was induced to leave (see the variable, BOOTED, in Appendix C or D); that is, the person went to another superintendency which did not offer increased income, more prestige, or a preferred location. The correlation of the correct Bayesian prediction with this variable was r = .10.

In order to explain more fully why the Bayesian probabilities predicted with only 18% accuracy, the relationship of the Bayesian predictions and actual tenures was arrayed in Table 21.

Table 21

Matrix of Predicted and Actual Tenure Groups

		Predicted Tenure Group								
		T1	T2	T3	T4	T5	T6	T7	T8	Sum
Correct Tenure Group	T1	0	3	14	0	4	2	4	1	28
	T2	1	1	28	8	27	3	15	0	83
	T3	1	22	56	19	53	15	33	2	201
	T4	0	7	31	4	28	3	11	1	85
	T5	2	8	59	12	54	10	32	0	177
	T6	1	6	21	7	17	0	13	0	65
	T7	1	9	46	6	31	12	28	1	134
	T8	0	2	9	0	8	3	5	0	27
	Sum	6	58	264	56	222	48	141	5	800

The largest correct tenure groups were T3 (201) and T5 (177), with some persons represented in all groups, the smallest being T1 (28) and T8 (27). The largest groups,

based on the Bayesian items, were even larger with T3 (264) and T5 (222). The smallest groups were even smaller with T1 (6) and T8 (5).

The distributions of predicted tenure shown across each correct group row were very similar. They did not cluster on the diagonal as they would have if each person had been predicted correctly. There was no significant relationship between the prediction - the variable PREDICT, and the person's actual tenure group - the variable, GROUP8. The Spearman rank order correlation was .023, with a t-value of .0652.

The Bayesian analysis tended to predict to the groups with the greatest proportion of members, to an even greater extent than warranted by the proportion. To understand this effect of applying the Bayesian algorithm, it was necessary to look at the group frequencies for the individual questions illustrated by Table 17. The following would have been the probabilities of selecting answer C, given that the person were in each of the tenure groups:

P(C|T1) = 21/45	.4667
P(C|T2) = 21/35	.6000
P(C|T3) = 141/195	.7230
P(C|T4) = 61/95	.6421
P(C|T5) = 161/195	.8256
P(C|T6) = 51/55	.9273
P(C|T7) = 91/145	.6276
P(C|T8) = 11/25	.4400

If, for example, all four T1 superintendents picked answer C as did the T6 superintendents, then the probability of C if the person were T6 was .9273, while the probability for T1 would be 41/45 or .9111. The higher likelihood of T6 was based only on the fact that more persons from T1 happened to answer Question #275. This bias toward the tenure group with the most respondents for a question was compounded by the next mathematical step of multiplying the above value by the proportion of members in the tenure group.

Adding a value of one to each cell tended to assign relatively higher weights for the non-selected responses in those cases where there were fewer persons in the tenure group. This also increased the probability of the most populous groups. The repeated use of the probability of group membership with the non-influential weighting from the items increased the probability of the largest groups, and the effect was distributed across all tenure groups.

Comments on the Research

This study provided a comprehensive data source, both in numbers and national representation of all types of superintendencies, to compare to the findings in the research literature. The correlations in Appendix C were based on the data from which no outliers had been deleted, while those in Appendix D have had the outliers removed. In the following commentary, the first correlation includes all cases, and the second reflects the correlation with the outliers deleted.

A review of the relationships of the variables to tenure found by Samson (1955) compared to the present study (indicated in parentheses) revealed the following:

> Smaller school districts have higher turnover. This was also a finding by March and March, and Lange (correlation of tenure and enrollment: r = .04, .07).
>
> A lower salary is associated with higher turnover (adjusted salary: r = .21, .34).
>
> The median length of service of board members is lower in low turnover districts (contrary to this finding, board instability and tenure: r = -.20, -.17).
>
> Boards with low superintendent turnover tend to promote from within the system (a local superintendent: r = .18, .18).

The study by Puffer looked only at school systems in Michigan with superintendent tenures of 20 years or more, inviting the following comparisons:

> No relationship was found between tenure and community property valuation (correlation of tenure with per capita income: r = .03, .05).
>
> No relationship was found in per pupil expenditure except in very small schools (per pupil expenditure was negatively associated with tenure: r = -.15, -.18).

No relationship was found for highest degree earned (the higher the degree, the shorter the tenure: r = -.07, -.01).

No relationship was found in the length of the contract (the shorter contract the longer tenure: r = -.12, -.11).

No relationship was found between the national backgrounds of the community and the superintendent (correlation of whether the superintendent had the same ethnic background: r = .06, .06).

No relationship was found with the types of community, urban, suburban or rural (community type in criterion scaled form: r = .13, .12).

Puffer advised superintendents to orient new board members. This study supports that advice (giving the orientation: r = .10, .11).

The study by March and March provided strong direction to the present study. For example, their data indicated that both enrollment and tenure were variables which should be treated in their logarithmic forms and that the relationship of age and tenure exhibited some curvilinearity. These were confirmed.

The present study in part attempted to provide data to respond to the March and March comment that, "there is considerable lore and some data about what kinds of administrators succeed - have long careers - when and what kinds of districts are attractive - have low turnover - to whom" (1977, p. 378). The present study also tried to respond to their call for performance sampling through the decision-making items. The results of that effort, however, were not conclusive.

An important assertion by March and March was that successful managers are promoted, which in this case implies that a good superintendent will move more quickly to another, better superintendency. This was an important issue to check because an assumption of the present study was that better superintendents would not be asked to leave as soon and would thus have relatively longer tenures. To check the March and March assertion, question #26 was included in the survey. That question was not able to identify "successful" superintendents, but was able to identify those who were probably

induced to leave. It was found that these 29 persons, 3.6% of the total group, had an average tenure of 6.27 years, compared to the others with 7.53 years. The mean tenure for the total sample was 7.46 years.

Lange brought up the related issue of the personal expectations of the superintendent. The present study examined motivation with the question which asked if the superintendent had intended to use this position as a stepping stone to another superintendency. The average tenure for these superintendents who had stepping stone intentions was 6.20 years in contrast to others with an average tenure of 8.76 years. This variable was retained as a making significant contribution to explaining tenure.

Lange made some specific comparisons of age to tenure and found that younger superintendents had a shorter tenure. The present study carefully examined age in relation to tenure anticipating a curvilinear relationship. Two traits of age were hypothesized to affect tenure: (1) the number of working years available; this would favor the young superintendent, and (2) the association of the superintendent's age with acceptance of that person's leadership (Szilagyi and Wallace, pp. 280, 282); this would favor the older superintendent. The meeting of these two countervailing traits would favor a superintendent in his or her late 30's or early 40's.

A scattergram of age and tenure indicated that there was an indication of curvilinearity with longer tenures for the youthful starting superintendents, shorter tenure for those starting in their 30's, lengthening again for superintendents in their 40's and becoming shorter after that. The dispersion of the points was so great, however, that curvilinearity could not statistically be established. Age raised to the third power explained more variance than age to the first power, but this capitalized on the very young superintendents at the tail of the distribution. The correlation of age and tenure was $r = -.06, -.01$.

The last two relevant findings by Lange were the following items associated with tenure:

> A shorter time given in the contract was associated with shorter tenure, while a longer time was associated with longer tenure (contrary to this finding, the correlation of tenure and contract length: r = -.12, -.11).
>
> No significant difference was found in education (degree: r = -.07, -.01, the higher the degree, the shorter the tenure).

One of the valuable insights available using an All Possible Regressions approach was the identification of multiple candidate equations, each of which accounted for about the same amount of variance in tenure. Although only one was selected as the best equation, the following subsets, along with Subsets C and E, were legitimate rivals; each was no more than a C_p value of 1 different from the $C_p = p$ line. All have had the outliers removed. They are listed here to identify the other variables which could, in a multiple regression situation, contribute significantly:

Subset F	Subset G	Subset H	Subset I
12 variables p = 13	12 variables p = 13	13 variables p = 14	13 variables p = 14
PERPUPIL	PERPUPIL	PERPUPIL	TURNOVER
BDDEFEAT	BDDEFEAT	BDDEFEAT	PERPUPIL
CONTRACT	CONTRACT	CONTRACT	BDDEFEAT
INTERVIEW	INTERVIEW	INTERVIEW	CONTRACT
AGE	AGE	AGE	INTERVIEW
ETHNIC	ETHNIC	ETHNIC	AGE
STPSTONE	STPSTONE	STPSTONE	ETHNIC
ORIENT	ORIENT	ORIENT	STPSTONE
XSALARY	XSALARY	CHANGES	ORIENT
LOGENROL	LOGENROL	XSALARY	CHANGES
BDSTABLE	BDSTABLE	LOGENROL	XSALARY
PROPFOR	SPOWER	BDSTABLE	LOGENROL
		SPOWER	BDSTABLE
R^2 = .398185	.397950	.401505	.401036
C_p = 13.77	13.96	13.01	13.40

Subset J	Subset K	Subset L
13 variables p = 14	13 variables p = 14	13 variables p = 14
PERPUPIL	PERPUPIL	PERPUPIL
BDDEFEAT	BDDEFEAT	GRADES
CONTRACT	CONTRACT	BDDEFEAT
INTERVIEW	INTERVIEW	CONTRACT
AGE	GENDER	INTERVIEW
ETHNIC	AGE	AGE
STPSTONE	ETHNIC	ETHNIC
EVALUATE	STPSTONE	STPSTONE
ORIENT	ORIENT	ORIENT
CHANGES	CHANGES	CHANGES
XSALARY	XSALARY	XSALARY
LOGENROL	LOGENROL	LOGENROL
BDSTABLE	BDSTABLE	BDSTABLE
R^2 = .400640	.400042	.399931
C_p = 13.73	14.23	14.32

Subset M	Subset N	Subset O
14 variables p = 15	14 variables p = 15	14 variables p = 15
PERPUPIL	PERPUPIL	PERPUPIL
MEMBERS	BDDEFEAT	BDDEFEAT
BDDEFEAT	CONTRACT	CONTRACT
CONTRACT	INTERVIEW	INTERVIEW
INTERVIEW	AGE	AGE
AGE	ETHNIC	ETHNIC
ETHNIC	LOCAL	STPSTONE
STPSTONE	STPSTONE	ORIENT
ORIENT	ORIENT	CHANGES
CHANGES	CHANGES	XSALARY
XSALARY	XSALARY	LOGENROL
LOGENROL	LOGENROL	BDSTABLE
BDSTABLE	BDSTABLE	PROPFOR
PROPFOR	PROPFOR	SSEARCH
R^2 = .402434	.402348	.402166
C_p = 14.24	14.31	14.46

Many issues raised by the review of the underlying variables affecting tenure were also addressed by this study. Most of them did contribute significantly to

explaining the variance in tenure. In the following summary, the convention of reporting the correlation with the full data set first, and that with the outliers removed second will continue to be followed.

Region of the country. March and March had asserted that there was hierarchy among superintendencies favoring certain geographic areas, possibly associated with urban centers. The regions, in relationship with the other variables, made a significant contribution to explaining the variance in tenure in the equation selected as the best one, but not in any candidate equations. Taken alone, the mean difference in tenures between regions was no more than 1.1 years, and as a criterion-scaled variable, its correlation with tenure was r = .09, .12.

State turnover rate. The average annual rate of turnover was 13.5%. While the turnover rate was not selected in the final equation, it was included in one rival equation. Its correlation to tenure was a scant r = -.02, -.04.

Type of community. In the light of the mixed research findings, this study found that the type of community was not important when other variables were taken into consideration. On the other hand, taken alone there was a two year difference in average tenure between suburban (8.9 years) and rural (6.8) communities. In criterion scaled form, its correlation to tenure was r = .13, .12.

School district enrollment. The correlation of enrollment to tenure was r = .04, .07; however, the correlation using the logarithm of enrollment to tenure was r = .19, .24, confirming a large number of the research findings that smaller districts were associated with shorter tenures.

Average family income. Although March and March found a relationship between poorer districts and superintendent vacancies, confirmation was not found in the present study. This variable did not contribute along with the other variables, and its correlation with tenure was a mere r = .03, .05.

Board member defeat. There was a very large amount of literature associating the defeat of a board member with superintendent turnover. This was confirmed in this study as the variable was included in all candidate equations. The correlation was r = -.15, -.16.

Per pupil expenditure. Per pupil expenditure also played a role as an important variable. Berger had found that higher per pupil expenditure was associated with greater superintendent succession, as this study found with a correlation of r = -.15, -.18. Puffer had not found a relationship except that smaller districts tended to spend more per pupil. Berger had speculated that the negative correlation might be caused by larger districts having a greater per pupil expenditure. The present study indicated that the relationship of enrollment to per pupil expenditure was only r = -.03, -.01; however, use of the logarithm of enrollment resulted in r= -.14, -.12.

Board elected or appointed. Nothing was found in the research, and it was not included in any candidate subset. The correlation was r = -.04, -.04.

Community power structure. This variable appeared to relate to tenure, and it didto som extent. There was a range of 2.4 average years of tenure between pluralistic and factional communities, and the correlation with the criterion scaled variable was r = .12, .11. It was included in two candidate equations.

Number of board members. This variable contributed to only one of the rival equations. There was little research to support it, and its correlation to tenure was r = .05, 07.

Grade levels. Contrary to a finding by Dils, shorter tenure was not found in the elementary districts. This study found elementary districts enjoyed an average 8.8 years of superintendent longevity compared to 7.3 years in the kindergarten through 12th grade districts. It was included in one candidate equation. The correlation was r = -.11, -.05.

Board instability. This variable, formed as a ratio of new board members to the total board was an important factor. A large number of studies had also associated board member turnover with that of the superintendent. The correlation was r = -.20, -.17.

Proportion of Board support. The average superintendent had the initial support of 96% of the board members, and 84% of all superintendents had unanimous support. This measure of initial board member support had intuitive appeal and factored into four of the candidate equations; although its correlation to tenure was only r = .03, .05.

Changes expected. Requiring the superintendent to make changes in the school system was associated with shorter tenure in several studies. It also played a factor in ten of the rival equations in this study. The correlation with tenure was r = -.15, -.18.

Salary. Higher salary was associated with higher tenure in two studies, and confirmed in this study. The correlation with the adjusted salary was r = .21, .34. This difference in the correlation with the outliers in and out of the sample was the largest of all variables. Annual salary ranged from $1700 to $80,000 and may have contributed to identifying some cases as outliers.

Years on the initial contract. In contradiction to the findings by Lutz and Lange, this study found that the shorter contracts were correlated with higher tenure, r = -.12, -.11. This variable proved to be important in the regression analyses.

Regular written evaluation. Wilson, Fultz and Sitter had reported the value of a written evaluation to tenure. The present study found the opposite, that superintendents having the evaluation had an average of 6.7 years compared to 8.6 for those who did not. The correlation was r = -.14, -.12. This variable appeared in only one candidate equation.

Board member orientation. Puffer and Kerr recommended that superintendents orient new board members. This study would concur as the correlation was r = .10, .11. The variable also played an important role in all rival equations.

Board agenda. There was no research on this issue. This study found that all 805 superintendents set the Board agenda, some in conjunction with the Board president.

Formal interview format. Contrary to Fowler's advice, this study found a negative relationship between the formal interview and eventual tenure, r = -.12, -.13. The variable was important and was included in all rival subsets of variables.

Education. Puffer and Samson reported that the research was unclear on the level of the superintendent's education; however March and March found a slight relationship (R^2 = .02) that more education was associated with shorter tenure. This study found that degree did not contribute to any rival equation, but that there was a negative correlation of r = -.07, -.01. The higher degree, probably not a cause of shorter tenure itself, might be associated with a more mobile individual.

Gender of the superintendent. One study by Saunders reported that men had significantly longer tenure, but she also noted that the position had traditionally been held by men. This study found men to have a longer tenure with a correlation of r = .10, .09. The variable played a factor in one rival equation.

Age of the superintendent. This issue was discussed in comments on Lange above. The variable was included in all rival subsets, and correlated with tenure with r = -.06, -.01.

Ethnic/race the same as the district. Puffer reported that this did not matter; however, this study found that the ethnic/racial match with the district was in all candidate subsets. The correlation with tenure was r = .06, .06, favoring those of the same ethnic/racial group who have an average of 7.5 years compared to 6.9 years for those who were not of the same ethnic/racial group.

Insider/outsider superintendent. The research, whether it examined this issue from the perspective of the Board's wanting change and hiring an outsider, or the superintendent's preferring to remain in the location, found longer tenure associated with

hiring a local person. This study confirmed that finding with r = .18, .18. The variable, however, was included in only one candidate subset.

As researchers and educators continue to study the relationships of the various characteristics of school districts, superintendents, and longevity, the matrices of correlations (Appendices C and D) and the careful review of variables provided in this study can be useful in addition to the method for predicting tenure.

Chapter 5: Discussion

The purpose of this study was to develop a model, a quantitative method, for capturing all of the factors which impact upon a superintendent. Once these were identified, an outcome measure, a result of these factors, had to be selected. Superintendent tenure, the most viable outcome measure, was directly affected by the many forces faced in a superintendency.

In constructing a model, forces from the community, the Board of Education and the school system itself could be easily measured. Characteristics describing the superintendent could also be identified. The other major sources of influence on a superintendent were the knowledge, attitudes, values, and other mental constructs that he or she brought to each situation. These factors either were not easily measured or could not be measured at all. The problem, then, was to arrive at a way of measuring these mental processes, as they are synthesized by a person in a thinking-acting process.

Presenting a superintendent with forced-choice decision of the best course to take, given a situation sometimes faced in a superintendency, would provide that measurable synthesis of the person's thinking.

One concern of this study was that the results be relevant and usable by superintendents, Boards of Education and all persons concerned with the school superintendency. Another was that it provide a model which could be applied to many fields to predict outcome measures based upon defining situations and measuring the decisions a person made in those situations.

A synthesis of new statistical techniques was applied in this study. The new approaches included Mallows C_p in an All Possible Regressions approach to variable selection, application of criterion scaling for categorical variables, use of the Least

Median of Squares (LMS) technique for outlier diagnostics, and reliance on the PRESS statistic for optimal predition.

The method used to select the best subset of variables appeared to be the most reasonable of the range of possibilities; that is, plotting of the "best" C_p values against the $C_p = p$ line, making sure to include the "best" R^2/stepwise subsets, then calculating the PRESS statistic to make the final selection.

A major issue in selecting subsets was whether one should choose the subset with the lowest C_p, meaning the greatest R^2, as assumed by the BMDP program (1985, p. 268), or the C_p value which nearly equals p. $R^2_{predict}$, generated by the PRESS statistic, when used as the final criterion, selected the subset with the C_p value most equal to p, as opposed to the R^2/stepwise selection. However, an examination of the $R^2_{predict}$ values for other equations identified the "next best" subsets as ones which formed no consistent pattern in relationship to the best C_p or R^2 equations. Thus, PRESS, along with C_p and R^2, identified its best subset of variables. In any case, the use of the $C_p = p$ plot could identify all the candidate equations for consideration using one of the three statistics.

The initial challenge of the decision-making items was to use a technique which could use the decisions of superintendents of known tenure on items for which there were no right or wrong answers. This lack of a correct answer ruled out traditional item analyses. Similarly, the technique had to be capable of recovering from the occasional times when a superintendent would make a decision associated with other tenure groups. These two issues made Bayesian probabilities a fruitful course to pursue.

Unfortunately, the probabilities generated from the decision-making items did not accurately predict tenure. The reason was still not clear, but several ideas could be considered. One was to use a different mathematical approach; although no technique besides the Bayesian one appeared feasible.

This study identified two approaches which might build upon the Bayesian application. One was to focus on the mental constructs that go into a decision, such as locus of control, need for achievement, employee centered, etc., and use items which measured those personal leadership characteristics, in which case high discrimination would be desirable. Then a probability of tenure group membership could be based on each of the constructs, and a Bayesian prediction with the assignment of the theoretical prior and posterior constructs could be used. If a theoretical hierarchy were not proposed, then the Bayesian joint probabilities formula could be applied.

The other approach was touched on by March and March. In addition to asking for a sampling of performance, they called for a complicated model in which the outcome of one performance affected the probability of success on a subsequent performance. That also was important suggestion, and a Bayesian application would again be appropriate. The feasibility of developing such a model might have to wait, however, on the availability of artificial intelligence computer programs and a mechanism for assigning valences to earlier decisions based upon the outcomes to later decisions.

A final issue for inquiry was raised by March and March; that is, that any individual will remain in the position a given time regardless of the decisions he or she makes: "Even if there were significant differences among superintendents in their capabilities for survival, the chance model would give a fair first approximation under many circumstances" (1977, p. 398).

Studies in leadership theory have evolved in a way which also might leave decision-making as a less relevant factor. Szilagyi and Wallace related, "Many of the early studies of leadership in the 1940's and 1950's focused on the traits of the leader" [intelligence, physical characteristics, etc.] (p. 279) "During the 1950's, the dissatisfaction with the trait approach to leadership led behavioral scientists to focus their attention on the actual leader behavior" (p. 283).

> During the late 1960's, researchers recognized the limitations of the behavioral theories and began to refine and develop new approaches . . . . This approach focuses on the more complex situational theories of leadership. The work of the trait and behavior style researchers provided a significant foundation for the study of leadership in organizations because the results of these approaches strongly suggested that the most effective way to lead is a dynamic and flexible process that adapts to the particular situation. (p. 288)

As one respondent (an elected superintendent) to this survey commented, "In retrospect, I have probably tried all four suggested actions under each section and would again if circumstances dictated such." It might be that success in the superintendency and potential for long tenure are entirely situational and a person's decisions not that crucial.

Without improving the understanding of how the decisions made in the office affect tenure, this study did clearly identify characteristics a person should consider in examining a superintendency. The following 11 variables were significant in all the candidate equations. Their contribution to the prediction was in relation to the other variables, but are being described here as they individually correlated to tenure.

Per pupil expenditure. Higher expenditure is not related to longer tenure.

Recent board member defeat. Even though it happened during the predecessor's term, it still is associated with shorter tenure.

Contract years. The shorter contract years were associated with more longevity than the longer contracts. The explanation for this is not obvious, and this variable may be a surrogate for another unmeasured influence.

Use of a formal interview format. School districts which use this approach do not keep their superintendents as long; however, the interview is probably not a cause. Like shorter tenure, it is a characteristic of a situation not as conducive to longevity.

Age. This is a mixed issue, but the young beginning superintendents have the best potential for a very long job duration.

Ethnic group the same. The difference was not great, but it helped to be in the same ethnic group.

Intention to use this job as a stepping stone. People who intend to move on do so sooner - at about 6.2 years compared to others at 8.8 years. The correlation was r = -.23, -.32.

Orienting new board members. Superintendents are strongly urged to do the orientation.

Salary. The message is clear: The higher the salary, the longer the tenure. In most likelihood, a higher salary indicates more desire on the part of the Board to keep this superintendent, and, of course, a higher salary is greater inducement for a superintendent to stay.

Enrollment. Smaller districts don't hold superintendents as long. There are many factors involved, included are the associated lower salaries, less prestige, and the stepping stone intentions of some superintendents.

Board instability. The greater the proportion of new board members, the sooner the superintendent can be expected to leave.

There were four characteristics which did not contribute to any candidate equation. Although they may individually influence tenure, they were not as important when considered among a set of variables. These were per capita income, whether the Board was elected or appointed, educational degree, and type of community. Eleven other variables were included in some of the candidate equations.

The interesting perspective provided by the All Possible Regressions approach was the identification of differing subsets of variables, all of which made about the same contribution toward explaining tenure. This study selected the best subset (Table 12) and described the equation. Prospective superintendents and their Boards of Education can

look at their situations, enter the data on the variables into the equation and make a prediction of tenure.

Although the findings should be generalized only to superintendents who tend to remain in the field of education even after they leave the position, the model was successful in that it accounted for 40% of the variance in tenure.

The present study captured traits of the situation and the leader, and it captured the decisions a person said he or she would make in specified situation. The traits made a significant contribution in measuring the favorableness of the situation, while the decision-making items did not. Resolution of the full complexity of the superintendency, including the role of decision-making, might have to await future theories and mathematical applications to explain the remaining 60% of the variance in the length of time a superintendent remains in office.

References

Allen, D. M. (1971). Mean square error of prediction as a criterion for selecting variables. Technometrics. 13, 469-475.

Ashmore, H. C. (1981). A study of the relationship between superintendent turnover and the conflict management style of Maine superintendents (Doctoral dissertation, Peabody School at Vanderbuilt University, 1979). Dissertation Abstracts International, 41(09.A), 3789, 81-05429.

Bentley, D. W. (1976). A study of variables related to turnover of superintendents in selected North Carolina school systems (Doctoral dissertation, Virginia Polytechnic Institute and State University, 1976). Dissertation Abstracts International, 37(05.A), 2522, 76-24312.

Berger, M. A. (1984). Predicting succession under conditions of enrollment decline. Educational Administration Quarterly, 20, 93-107.

Carlson, Richard O. (1962). Executive succession and organizational change. Chicago: Midwest Administration Center.

Castleberry, J. T. (1964). The turnover of public school superintendents in Arkansas (Doctoral dissertation, University of Arkansas).

Chase, W. M. (1982). Superintendent turnover - antecendent conditions and subsequent organizational changes (Doctoral dissertation, University of California, Santa Barbara, 1981). Dissertation Abstracts International, 42(12.A), 4984, 82-07650.

Childress, J. R. (1950). A study of attitudes and certain other factors in two selected communities which may have affected the tenure of superintendents of schools (Doctoral dissertation, Northwestern University).

Consumer Price Index, U. S. City Average. (1986, August 21). Washington, D. C.: U. S. Bureau of Labor Statistics.

Crosby, C. W. (1972) Impact of selected community variables upon involuntary superintendent turnover: A case study (Doctoral dissertation, Rutgars University).

Cooper, B. S., Beni, V. T., & Muth, R. (1984, April). The strong superintendent as "enabler": An ethnographic analysis of the superintendent - board relationship. Paper presented at the annual meeting of the American Educational Research Association, New Orleans, LA.

Cunningham, L. L. & Hentges, J. T. (1982). The american school superintendency, 1982, a summary report. Arlington, VA: American Association of School Administrators.

Daniel, C., & Wood, F. S. (1980). Fitting equations to data. New York: John Wiley and Sons.

Dils, E. (1954, September). How administrators climb the ladder. The School Executive, pp. 62-63.

Dixon, W. J., Brown, M. B., Engelman, L., Frane, J. W., Hill, M. A., Jennrich, R. I., Toporek, J. D. (Eds.), (1985). BMDP statistical software. Berkeley: University of California Press.

Dorland, L. T. (1973). A study of Colorado school district superintendent mobility (Doctoral dissertation, University of Colorado).

Draper, N. R., & Smith, H. (1981). Applied regression analysis. New York: John Wiley & Sons.

Eblen, D. R. (1975). School district conflict and superintendent turnover in transitional suburban communities (Doctoral dissertation, University of Chicago, 1975). Dissertation Abstracts International, 36(07.A), 4151, 75-60180.

Engel, R. A.(1985, March). Think you know what makes a great superintendent? Guess Again. The Executive Educator, pp. 40-39.

Feilders, J. F. (1982) Profile: the role of the chief superintendent of schools. Belmont, CA: Pitman Learning.

Fowler, C. W. (1973, March) How you hire your next superintendent can foretell how he'll work out on the job. American School Board Journal. pp. 32-33.

Freeborn, R. M. (1966) School board change and the succession pattern of superintendents. Dissertation Abstracts International.

Fultz, D. A. (1976) A study of the reasons why Michigan school superintendents were dismissed or encouraged to leave their positions between 1965 and 1975 (Doctoral dissertation, Michigan State University, 1976). Dissertation Abstracts International, 37(02.A), 729, 76-18619.

Furnival, G. M., & Wilson, R. W., Jr. (1974). Regression by leaps and bounds. Technometrics, 16, 499-511.

Gerardi, R. J. (1980) A study of the significance of selected variables and leadership behavior of career bound and place bound superintendents in Massachusetts (Doctoral dissertation, Boston College, 1980). Dissertation Abstracts International, 41(02.A), 476, 80-17611.

Grieder, C., Pierce, T. M. & Jordan F. (1969). Public school administration. New York: Ronald Press.

Hocking, R. R. (1976). Analysis and selection of variables in linear regression. Biometrics, 32, 1-49.

Iannaccone, L.& Lutz, F. W. (1970) Politics, power and policy: The governing of local school districts. Columbus, OH: Charles E. Merrill.

Iverson, G. R. (1984). Bayesian statistical inference. Beverly Hills, CA: Sage Publications.

Jensen, L. (1967) Characteristics of superintendents in innovative and noninnovative school systems and interaction with the Iowa department of public instruction (Doctoral dissertation, University of Iowa).

Kerlinger, F. N. (1973). Foundations of Behavioral Research. New York: Holt, Rinehart and Winston.

Kerr, N. D. (1964, Fall) The school board as an agency of legitimation. Sociology of Education, 38, pp. 34-59.

Lange, R. C. Jr. (1981) A profile of selected factors contributing to job stability as perceived by Nebraska public school superintendents (Doctoral dissertation, University of Nebraska, 1981). Dissertation Abstracts International, 42(03.A), 222, 81-18169.

Lutz, R. G. (1963) Factors associated with short tenure of school superintendents in Michigan (Doctoral dissertation, University of Michigan). Dissertation Abstracts International, 24(02.A), 590, 63-04989.

Mallows, C. L. (1973). Some Comments on Cp. Technometrics, 15, 661-675.

March, J. C., & March, J. G. (1977). Almost random careers: the wisconsin school superintendency, 1940-1972. Administrative Science Quarterly, 22, 377-409.

March, J. C., & March, J. G. (1978). Performance sampling in social matches. Administrative science quarterly, 23, 434-453.

March, J. C., & March, J. G. (1981) Performance sampling and weibull distributions. Administrative science quarterly, 26, 90-92.

McCarty, D. J. & Ramsey, C. S. (1967) A study of community factors related to the turnover of superintendents: community power, school board structure, and the role of the chief school administrator (Contract No. OE-5-0325-2-12-1). Washington, DC: Office of Education. (ERIC Document Reproduction Service No. ED 014 130)

McCarty, D. J.& Ramsey, C. S. (1968) Community power, school board structure, and the role of the chief state administrator. Educational Administration Quarterly, 4, 19-33.

Merrow, J., Foster, R., & Estes, N. (1974). Networking, a survival mechanism for urban superintendents. Phi Delta Kappan, 56, 283-285.

Moen, A. (1971). Superintendent turnover as predicted by school board incumbent defeat in Pennsylvania partisan elections (Doctoral dissertation, Pennsylvania State University).

Myers, R. H. (1986). Classical and modern regression with applications. Boston: Duxbury Press.

Montgomery, D. C., & Peck, E. A. (1982). Introduction to linear regression analysis. New York: John Wiley & Sons.

Musella, D. F., & Joyce D H. (1973) The director of education: an in-basket simulation exercise. Toronto: Ontario Institute for Studies in Education.

Novick, M. R., & Jackson, P. H. (1974) Statistical Methods for Educational and Psychological Research. New York: McGraw-Hill.

Owen, B. (1961). Factors associated with the educational administration of schools in Michigan school districts adjudged to have superintendents of schools who are among the more effective in the state (Doctoral dissertation, University of Michigan).

Pasekoff, G. A. (1978). An exploratory study of the identification of early warning signals which may be precursors to the terminiation of employment of selected school superintendents in Western Pennsylvania (Doctoral dissertation, University of Pittsburgh, 1978) Dissertation Abstracts International, 39,(03.A), 1240, 78-16808.

Pedhazur, E. J. (1982). Multiple regression in behavioral research (2nd ed.). New York: CBS College Publishing.

Porter, W. S. (1970). A study of selected factors related to the turnover of public school superintendents in Connecticut (Doctoral dissertation, University of Massachusetts).

Preising, P. (1968). The relationship of staff tenure and administrative succession to structural innovation (Doctoral dissertation, Stanford University).

Puffer, K. H. (1959). Factors associated with long tenure of school administrators in Michigan (Doctoral dissertation, University of Michigan, 1959) 19(12) 3192, 59-02168.

Raiffa, H. (1968). Decision Analysis. New York: Random House.

Rousseeuw, P. J. (1984). Least median of squares regression. Journal of the American Statistical Association, 79, 871-880.

Rousseeuw, P. J. & Leroy, A. M. (1987). Robust regression and outlier detection. New York: John Wiley & Sons.

Russo, P. J. (1981). Factors which discriminate between retained and dismissed superintendents in selected urban city school systems (Doctoral dissertation, Virginia Polytechnic Institute and State University, dissertation, 1980). Dissertation Abstracts International, 41(10.A), 4244, 81-05345.

Samson, G. E. (1955). School board effectiveness and the tenure of administrators (Doctoral dissertation, University of Chicago).

Samson, G. E. (1956, January). School boards and the tenure of administrators. Administrator's Notebook. University of Chicago, pp. 1-4.

SAS Institute, Inc. (1985). SAS Users Guide: Statistics, Version 5 Edition. Cary, NC: Author.

Sales, M. V. & Taylor, J. C. (1973, October). The arkansas school superintendent. Research Bulletin. Arkansas State University, p. 19.

Saunders, M. B. (1976). A comparative study of the perceived behavioral dispositions of female and male superintendents (Doctoral dissertation, Virginia Polytechnic Institute and State University, 1976). Dissertation Abstracts International, 37(05.A), 2564, 76-24340. 1976.

Schmittlein, D. C., & Morrison, D. G. (1981) On individual-level inference in job duration research: A reexamination of the wisconsin school superintendents study. Administrative Science Quarterly, 26, 84-89.

Scott, L. K. (1978). Charismatic authority in the rational organization. Educational Administration Quarterly, 14, 43-62.

Sitter, L. R. (1972). A Study of factors affecting the dismissal of superintendents in selected school corporations in Indiana and Illinois. (Doctoral dissertation, Indiana University, 1972). Dissertation Abstracts International, 33(11.A), 6034, 73-10867.

Sequeira, P. V. (1980) Longevity in relationship to the leadership styles of Superintendents (Doctoral dissertation, Columbia University Teachers College, 1980). Dissertation Abstracts International, 41(01.A), 51, 80-15102.

Szilagyi, A. D., Jr. & Wallace, M. J., Jr. (1980). Organizational Behavior and Performance. Santa Monica, CA: Goodyear Publishing.

Tate, M. W. (1965). Statistics in education and psychology. London: Collier-Macmillan.

Todd, E. A. (1963) The administration of change: a study of administrative tenure (Doctoral dissertation, University of Houston, 1963). 24(04), 1470, 63-06786.

Umberger, G. R. (1982) A national study of public school board member demographics: Management concerns and opinions on critical issues in education (Doctoral dissertation, Virginia Polytechnic Institute and State University, 1982). 44(01.A), 39, 83-12324.

Underwood, K. E., Fortune, J. C., & Cleary F. J. (1985, January) Seventh annual survey of board members. American School Board Journal, pp. 30-31.

Walden, J. C. (1966) School board changes and involuntary superintendent turnover (Doctoral dissertation, Claremont Graduate School).

Walden, J. C. (1967, January). School board changes and superintendent turnover. Administrators Notebook. University of Chicago, pp. 1-4.

Wilson, R. E., (1981, September) The anatomy of success in the superintendency. Phi Delta Kappan, pp. 20-21.

Appendix A

Sample of a Survey Form

DR JOHN DOE
ANYTOWN SCHOOL DISTRICT IL
ENROLLMENT: 3245

SURVEY OF FACTORS WHICH MAY AFFECT TENURE

PART I: CHARACTERISTICS

The following characteristics are asked **ONLY** in the context of the Superintendent position described above.

WHAT YOU KNEW WHEN YOU BEGAN THE ABOVE SUPERINTENDENCY

1. Type of community (check one): ___urban, ___suburban, __rural, __small town, __other.

2. The community power structure was (check one):
   __ a pyramid with a few or even one man at the top.
   __ two distinct poles with relatively even strength.
   __ pluralistic or diffused with many poles of power.
   __ not active with regard to school matters.

3. An estimate of the average family income in the district: _____.

4. An estimate of the per pupil expenditure: _____.

5. Grade levels in the district (check one): __elementary only, __elementary and secondary, __secondary only.

6. The board members were (check one): __elected, __appointed.

7. How many members were on the Board of Education? _____.

8. Had an incumbent board member been defeated or involuntarily lost his or her appointment on the board during the four years prior to your becoming superintendent? __yes, __no, __don't know.

9. How many board members had served four years or less? _____.

10. What was your starting salary? _____.

11. What was the number of months specified on your original contract? _____.

12. In selecting you, how wide a geographic area did the Board search? (check one): __within the district, __in the same region of the state, __statewide, __in the same region of the country, __nationwide?

13. In your interview with the Board of Education, was a detailed candidate interview format used? __yes, __no, __don't know.

14. Your educational attainment was (check one): __bachelors, __masters, __specialist, __doctorate.

(PLEASE CONTINUE ON THE OTHER SIDE OF THIS PAGE)

15. Your sex: __male, __female.

16. Your age at the time of your appointment was: _____.

17. Was your racial/ethnic group the same as most of the people in your district? __yes, __no.

18. How many of the board members supported your appointment? _____.

19. Had you worked in this school system previously? __yes, __no.

20. Did you plan to use this superintendency as a stepping stone to another superintendency? __ yes, __no.

DESCRIPTION OF THE SUPERINTENDENCY

21. Did you have regular (for example: annual, twice-yearly) written evaluations by the Board of Education? __yes, __no.

22. Were you the person primarily responsible for orienting new board members? __yes, __no.

23. Did you prepare the agendas for the board meetings? __yes, __no.

24. Did the School Board expect you to make major/radical changes in the school system? __yes, __no.

25. How many months did you remain in this superintendent position? _____.

FOLLOWING THE SUPERINTENDENCY

26. When you left this superintendency, did you go to another superintendency? __yes, __no.

If so, did the new superintendency provide (check if appropriate):

____ increased income
____ more prestige
____ a preferred location
____ none of the above.

PART II: DECISION MAKING

The following situations or events have been randomly chosen from a pool of about 300 situations. Please select the action you would most likely take as Superintendent. Make your decision quickly and don't ponder too long.

The time and consideration you are giving to answering these questions is greatly appreciated. The information will be used for research purposes only. Thank you for your contribution.

THE FOLLOWING ITEMS ARE A SELECTION
OF DIFFERENT SITUATIONS FACING A SUPERINTENDENT.
PLEASE SELECT THE PRIMARY ACTION THAT YOU WOULD MOST LIKELY TAKE.

273. The petty decisions seem at times to dominate your attention. For example, the current decision on whether to purchase radial or regular tread tires, and ad infinitum. To improve this situation, you will:
A. Establish decision-making priorities for staff to use to decide.
B. Assign an aide to screen all decisions before they reach you.
C. Make the petty decisions but dispense with them quickly.
D. Require subordinates to provide rationales for all recommendations.

061. Several years ago, the education of handicapped and mentally retarded children was made the responsibility of the city government to contract with private institutions to educate the children. The city didn't want the responsibility and has has not contracted for adequate schooling for the children. Recently, a suit was filed against the city and the school system under Public Law 94-142 because a child wasn't being educated.
A. It's the city's job; let them do it.
B. Call the Mayor to suggest that a joint effort be made.
C. Ask your staff to prepare detailed responsibility guidelines.
D. Offer to take over the whole process if funding is provided.

008. It has just been announced by the national press that major textbook publishers have been deleting certain sections from the plays of Shakespeare because they might be offensive, or because the size of the play didn't fit the pages.
A. Don't worry about it unless parents or teachers complain.
B. Ask the head of the English Department to make a recommendation.
C. Buy the plays in original form for teachers' optional use.
D. Take a position that the condensed, cleaned-up versions are best.

120. The Board is critical of your publicly discussing the possibility of charging tuition at a traditionally free evening school.
A. Get some group to sponsor a public forum on the issue.
B. Back off your position, and say you prefer the school stay free.
C. Put the issue on the Board agenda.
D. Take the Board criticism, and drop the discussion.

004. Some Board Members are coming up for re-election/reappointment. Your test director strongly asserts that the old district-wide test must be replaced, and that the scores will go down. Results would be published just before election/appointment.
A. Put the test change off for at least another year.
B. Tell the director to find a test where the scores won't go down.
C. Go ahead with the new test, but postpone releasing the scores.
D. Provide information on the likelihood of low scores to the press.

THE FOLLOWING ITEMS ARE A SELECTION
OF DIFFERENT SITUATIONS FACING A SUPERINTENDENT.
PLEASE SELECT THE PRIMARY ACTION THAT YOU WOULD MOST LIKELY TAKE.

256. The custodial crews in the school buildings are not overworked, but simply are not doing a good enough job keeping the schools clean and in good repair.
A. Involve them in the schools' goals and instructional programs.
B. Begin firing those who don't improve after being warned.
C. Meet custodians to hear their goals and convince them of yours.
D. Bear down on principals to get tough with custodians.

220. You have to decide how to tell the School Board that their function is policy-making, not the administration of schools.
A. Request a joint effort to set out Board vs. Superintendent roles.
B. Work with the Board Members individually to define their limits.
C. Arrange for a workshop/retreat to resolve this issue for everyone.
D. Work the issue out with the Board President, then support him/her.

123. The original Board which hired you agreed that certain changes were necessary for the benefit of the school system. However, with each change of the Board, the new Members have voiced their opposition to the "radical" changes you have been incorporating into the system.
A. Slow the implementation of the "radical" changes.
B. Incorporate Members' suggestions as revisions to the changes.
C. Maintain your changes, but introduce no new initiatives.
D. Order an evaluation of the changes.

100. In your new position, you feel that all the staff are well qualified; although you are warned about the probable disloyalty of certain individuals to you as Superintendent.
A. Replace immediately anyone you have heard might be disloyal.
B. Inform your new staff that all positions are acting positions.
C. Make assignments based upon qualifications, not rumored disloyalty.
D. Place your own people in key positions.

034. In the face of declining enrollments, elementary schools are incorporating 7th grades, and high schools are adding 9th grades. Junior high schools have a bad reputation. The more affluent neighborhoods are asking for middle schools, while other neighborhoods are scorning this perceived "elitism." The Board is undecided.
A. As the first move, try to improve current junior high schools.
B. Convert to middle schools in those communities which want it.
C. Halt the incorporation of new grades pending a facility survey.
D. Ask the Board for a policy on grades levels, building use, etc.

289. School bus transportation is costing a mint, and you receive more complaints about the buses and Drivers almost than you do the classrooms and Teachers. If nothing else can be done, at least you would like to get it out of your hair.
A. Keep it under your control; it's too likely to cause problems.
B. Delegate all bus problems to your Assistant for Transportation.
C. Since the contact points are Bus Drivers, train them extensively.
D. Pay for a study of the bus system for economy and student service.

THE FOLLOWING ITEMS ARE A SELECTION
OF DIFFERENT SITUATIONS FACING A SUPERINTENDENT.
PLEASE SELECT THE PRIMARY ACTION THAT YOU WOULD MOST LIKELY TAKE.

164. You have become unpopular because an intensive drug investigation you ordered has resulted in the arrest of an unexpectedly high number of students.

A. Implement a rehabilitation program for those arrested.
B. Praise the Board for their foresight and courage in fighting drugs.
C. Ask the Chief of Police to make some supportive statements.
D. Call together a citizens' committee on public attitudes about drugs.

161. The County has voted to trim all budgets, including the school budget. In response, the Board has eliminated your staff for teacher training and instructional supervision.

A. Object and point out the value of those activities.
B. Propose other options for cutting.
C. Support the Board's will without comment.
D. Try to maintain the programs in other divisions.

031. Your school district must come up with a plan to prevent court-mandated bussing for the purpose of desegregation. Your district doesn't believe it's prejudiced and is offended at the charge of institutionalized segregation. No schools have been built near the borders of different ethnic neighborhoods.

A. Redraw school boundaries even though it breaks up neighborhoods.
B. Institute several magnet schools with bussing for all enrollees.
C. Pair different ethnic schools and bus students to mix students.
D. Since there is no community support, wait for the court's plan.

287. The State is pressuring yours and the neighboring districts to seriously consider school district consolidation in the face of enrollment decline and increasing costs. The consolidation would merge administrative staffs and possibly eliminate your job, but not cause any school closings.

A. Oppose consolidation from the beginning.
B. Authorize a study of consolidation.
C. Decide what is best for your district and support that.
D. Follow what the School Board wants to do.

057. The Mayor has cut all services, including your budget, by 5%, even though you needed an 8% increase just to maintain the current services and pay teachers' negotiated salary increases. What is your first step?

A. Support the teachers, and pay their salaries by reducing services.
B. Cut everything 5% across the board, including salaries.
C. Maintain teachers' salaries at current levels, and cut elsewhere.
D. Cut services by 5%, and pay the increase by laying off teachers.

THE FOLLOWING ITEMS ARE A SELECTION
OF DIFFERENT SITUATIONS FACING A SUPERINTENDENT.
PLEASE SELECT THE PRIMARY ACTION THAT YOU WOULD MOST LIKELY TAKE.

205. Under State law, textbooks must present evolution as one of several possible theories on the origins of life. The other theories don't have to be taught. Supporters of creationism are especially vocal in your district, complaining that their views aren't given equal treatment.
A. Share creationism materials with teachers, but don't require them.
B. Limit yourself to the strict enforcement of the law.
C. Present alternatives to the Board on this issue and request policy.
D. Direct teachers to mention all major theories on the origin of life.

262. The Chair of a subcommittee of the School Board changes the recommendation of his/her committee without any notification to the committee, the Board President or the Superintendent.
A. Require recommendations in writing and abide strictly to them.
B. It's a Board problem; stay out of it.
C. Talk to the Committee Chairperson about the difficulty.
D. Ask the President of the Board to resolve the problem.

223. In preparing the pilot project for the new teacher certification law, a committee of teachers is proceeding as though there will be no involvement of the Superintendent.
A. Write the committee to ask specifically when you will be consulted.
B. Meet with the committee to let them know you have final approval.
C. Abide by the committee's decisions even if you are not consulted.
D. Tell the Committee Chairman to explain your necessary involvement.

050. A recognized social leader has given a speech to your principals stressing the need to increase student awareness of national and international issues. The Social Studies Department has prepared a videotape of the speech to be shown in all high school social studies classes. At this point, the leader initiates an economic boycott of several major firms in your area.
A. Stop the preparation and distribution of the videotape.
B. Let the tapes be distributed since they are social studies issues.
C. Have one tape available at a central library for use on request.
D. Require guidelines, worksheets, etc. to accompany the videotape.

154. To meet with staff, you prefer:
A. To meet with your administrators in regular staff meetings.
B. To meet with individuals to deal with issues as they arise.
C. To have staff meet, with a spokesman assigned to report to you.
D. To convene different task forces for specific problems.

160. The Teachers' Union has voted "no confidence" in you. They feel that you are not fair and equitable, and that you support the authoritarian role of principals.
A. Declare that the schools are for kids, not just teachers.
B. Open communications with the Union, perhaps meeting regularly.
C. Announce you'll review the principals' roles.
D. Make public statements supporting some of the teachers' issues.

Appendix B

Copies of Major Correspondance

A LAND-GRANT UNIVERSITY

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

Blacksburg, Virginia 24061

College of Education

November 29, 1985

One of my graduate students is conducting a very interesting study, and I would like for you to participate. It is unique in terms of the approach and may provide significant insights for school administrators. Basically, it gives a person who is contemplating becoming a superintendent a way to assess the situation and himself or herself to get an idea of the length of tenure that might be expected.

The portion of the study where we need your help is in the review of situations that require a prospective superintendent to make a decision for action. A set of these decisions is attached. These items should be composed in such a way that long-tenured superintendents tend to select one of the four options, and short-tenured superintendents select another of the options.

We would like you to review these items and revise them as appropriate. The items must (1) present reasonable choices, (2) include all the major options to be considered, (3) not be biased toward any particular approach to decision-making or actions, and (4) make sense to those of us familiar with the superintendency.

I estimate that the review would take about an hour. Will you be able to look them over and get the set back to me by December 15? If you can't work it out, give me a call, and I'll find a back-up. And please call if you have any questions. Thanks. I'm looking forward to hearing from you.

Sincerely,

Kenneth E. Underwood
Professor of Educational Administration

A LAND-GRANT UNIVERSITY

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

Blacksburg, Virginia 24061

College of Education

January 14, 1986

Sandy Anderson, a doctoral student, is conducting a very interesting study, and I would like for you to participate. It is unique in terms of the approach and may provide significant insights for school administrators. Basically, it gives a person who is contemplating becoming a superintendent a way to assess the situation and himself or herself to get an idea of the length of tenure that might be expected.

The portion of the study where we need your help is in the piloting of the instrument. A questionnaire and set of sixty decision-making items are attached. Would it be possible for you to complete all the questions and items based upon a superintendent position you had previously held?

I estimate that the time required will be about an hour, but let me know how long the exercise actually does take. Could you also share any comments or suggestions? Please return the set to me by January 27. If you can't work it out, give me a call, and I'll find a back-up. Let me know if you have any questions, and thank you for your contribution.

Sincerely,

Kenneth E. Underwood

AMERICAN ASSOCIATION OF SCHOOL ADMINISTRATORS

LEADERSHIP FOR LEARNING

May 1986

Dear AASA Member:

AASA is endorsing a study which will assist educators in predicting their tenure as superintendent prior to taking the job. The prediction will be based upon the characteristics of the district, and the particular decision-making preferences of the person using the prediction model.

In order to develop this model, we need your participation and that of others who were superintendents in SY 1983-84. Please use the first page (front and back) to describe the superintendency indicated on the form, and the last four pages to select the major or primary action you would most likely take as a superintendent. The estimated time to complete all questions is 30 minutes.

Because of the need for a broad base of information representing the many different superintendencies in the country, please complete the survey and return it to AASA by Friday, May 30, 1986. If you do not want to participate, simply return the blank form. This will save on the cost of the follow-up letter to those persons who have not responded.

You are assured confidentiality. The district will not be identified, and your name will not be connected with the information in any way.

Thank you in advance for your contribution as we together support research activities and use them to provide a service to superintendents and other school administrators.

Sincerely,

Richard D. Miller
Executive Director

Attachment

(703) 528-0700
1801 North Moore Street • Arlington, Virginia 22209

July 1986

Dear AASA Member:

In May the attached survey was sent to persons who had been superintendents during the 1983-84 school year, but had since left that position. The survey is part of a study endorsed by AASA which is intended to help educators predict their tenure prior to taking a position as superintendent of schools.

The response to the first mailing has been very good. However, we would like to receive as close to 100% of responses as possible. If you can complete the survey, we would greatly appreciate it.

Could you use the first page (front and back) to describe the superintendency indicated on the form, and the last four pages to select the major or primary action you would most likely take as superintendent?

Confidentiality is assured. The district will not be identified, and your name will not be connected with the information in any way.

Please try to respond during the month of August since that is the time established for data entry of the survey results. The study should make a major contribution to educators in coping with the various factors impacting on the superintendency. Thank you in advance for completing the survey.

Sincerely,

Richard D. Miller
Executive Director

Attachment

(703) 528-0700
1801 North Moore Street • Arlington, Virginia 22209
An Equal Opportunity Employer

Appendix C

Correlation Matrix for All Cases

		ID	TENURE	PREDICT	GROUP8	REGION	TURNOVER
		1	2	3	4	5	6
ID	1	1.0000					
TENURE	2	0.0533	1.0000				
PREDICT	3	-0.0136	0.0538	1.0000			
GROUP8	4	0.0692	0.9012	0.0466	1.0000		
REGION	5	0.0055	-0.0807	-0.0635	-0.1156	1.0000	
TURNOVER	6	0.0012	-0.0164	-0.0477	-0.0370	0.4579	1.0000
ENROLL	7	0.0342	0.0399	0.0202	0.0569	-0.0598	0.0993
COMUNTY	8	-0.0174	-0.0675	0.0338	-0.0560	0.1756	0.0498
POWER	9	-0.0011	0.1000	0.0569	0.1014	0.0075	-0.0421
INCOME	10	0.0382	0.0285	0.0207	0.0369	-0.0882	-0.1142
PERPUPIL	11	0.0500	-0.1474	-0.0144	-0.1518	-0.0414	-0.0398
GRADES	12	-0.0096	-0.1130	-0.0012	-0.0875	-0.1097	-0.0360
BDAPPT	14	-0.0561	-0.0406	0.0374	-0.0532	0.1309	-0.1613
MEMBERS	15	0.0171	0.0454	-0.0279	0.0777	-0.4313	-0.2172
BDDEFEAT	16	0.0294	-0.1529	0.0803	-0.1312	-0.0311	-0.0370
NEWBD	17	-0.0030	-0.1543	0.0351	-0.1100	-0.1850	-0.1541
SALARY	18	-0.0301	-0.5673	-0.0303	-0.5339	-0.0816	-0.0540
CONTRACT	19	0.0306	-0.1215	-0.0038	-0.0771	-0.2497	-0.1146
SEARCH	20	-0.0317	-0.0394	0.0074	0.0022	-0.1002	-0.0892
INTERVIEW	21	-0.0750	-0.1183	-0.0292	-0.1160	0.0091	-0.0831
DEGREE	22	-0.0015	-0.0699	-0.0640	-0.0003	-0.0998	-0.1230
GENDER	23	0.0312	0.0996	0.0657	0.1238	-0.0487	-0.0145
AGE	24	0.0234	-0.0582	-0.0059	-0.0226	-0.0749	-0.0201
ETHNIC	25	0.0517	0.0639	0.0293	0.0523	0.0441	-0.0642
SUPPORT	26	0.0276	0.0548	-0.0163	0.0913	-0.4118	-0.2225
LOCAL	27	0.0379	0.1817	0.0339	0.1440	-0.0111	0.0800
STPSTONE	28	-0.0141	-0.2332	-0.0233	-0.2504	0.0861	-0.0014
EVALUATE	29	-0.0803	-0.1352	-0.0387	-0.0899	0.0774	-0.0112
ORIENT	30	-0.0606	0.0970	0.0228	0.1083	0.0668	0.0146
CHANGES	32	0.0249	-0.1504	-0.0071	-0.1400	-0.1098	-0.0294
BOOTED	33	-0.0463	-0.0571	-0.0491	-0.0648	0.0120	-0.0285
XSALARY	34	0.0195	0.2059	0.0195	0.2906	-0.1710	-0.0855
OUTLIER	35	-0.0012	-0.2590	-0.0505	-0.1188	-0.0714	-0.0752
LOGTENURE	36	0.0691	0.9058	0.0502	0.9635	-0.1101	-0.0408
LOGENROL	37	0.0450	0.1922	0.0121	0.2329	-0.1873	0.0115
BDSTABLE	38	-0.0091	-0.1978	0.0642	-0.1616	0.0174	-0.0500
AGEX3	39	0.0309	-0.0741	0.0005	-0.0433	-0.0600	-0.0197
PROPFOR	40	0.0348	0.0328	0.0310	0.0389	0.0404	-0.0218
SREGION	41	-0.0150	0.0915	0.0678	0.1269	-0.8139	-0.3312
SCOMUNTY	42	0.0331	0.1338	0.0047	0.1380	-0.2024	-0.0756
SPOWER	43	-0.0028	0.1227	0.0806	0.1265	0.0251	-0.0309
SSEARCH	44	0.0237	0.1998	0.1269	0.1304	-0.0310	-0.0060

		ENROLL	COMUNTY	POWER	INCOME	PERPUPIL	GRADES
		7	8	9	10	11	12
ENROLL	7	1.0000					
COMUNTY	8	-0.4637	1.0000				
POWER	9	-0.0131	0.0004	1.0000			
INCOME	10	0.0226	-0.2727	0.0298	1.0000		
PERPUPIL	11	-0.0267	-0.1204	-0.0044	0.4490	1.0000	
GRADES	12	0.0950	0.0582	-0.0898	-0.2340	-0.0804	1.0000
BDAPPT	14	-0.1119	0.1137	0.0517	0.0790	0.0750	-0.0702
MEMBERS	15	0.1017	-0.1136	0.0140	0.0554	0.0088	0.0344
BDDEFEAT	16	0.0557	-0.0451	-0.0336	0.0349	0.0542	0.0889
NEWBD	17	0.1001	-0.0233	-0.0532	-0.0065	0.0353	0.0781
SALARY	18	0.3371	-0.3189	-0.0498	0.2922	0.2963	0.0948
CONTRACT	19	0.2087	-0.2458	-0.0220	0.1056	0.0399	0.0917
SEARCH	20	0.3682	-0.3763	-0.0186	0.3106	0.1876	0.0542
INTERVIEW	21	0.0533	-0.1274	-0.0366	0.2277	0.1436	-0.0636
DEGREE	22	0.2160	-0.2258	0.0070	0.1808	0.0172	0.0556
GENDER	23	0.0174	0.0089	0.0689	-0.0115	0.0119	0.0650
AGE	24	0.2782	-0.1827	-0.0495	0.0816	-0.0308	0.0398
ETHNIC	25	-0.1360	0.1003	0.0222	0.1064	0.0130	-0.0192
SUPPORT	26	0.0342	-0.1057	0.0327	0.0740	0.0141	0.0437
LOCAL	27	0.0908	-0.0174	-0.0141	-0.0385	-0.0377	0.0204
STPSTONE	28	-0.2017	0.0754	0.0269	-0.0843	0.0512	-0.0531
EVALUATE	29	0.0473	-0.0437	0.0664	0.1539	0.1490	-0.0364
ORIENT	30	0.0097	-0.0260	0.0532	0.0049	0.0137	0.0430
CHANGES	32	0.0952	-0.0999	-0.0366	0.1036	0.1085	0.0470
BOOTED	33	0.0214	-0.0269	-0.0112	0.0639	0.0006	-0.0282
XSALARY	34	0.3809	-0.3683	0.0227	0.3330	0.1879	0.0224
OUTLIER	35	0.0466	0.0263	-0.0215	-0.0808	-0.1707	0.1622
LOGTENURE	36	0.0623	-0.0695	0.0816	0.0292	-0.1399	-0.0772
LOGENROL	37	0.6885	-0.4931	-0.0029	0.1291	-0.1350	0.1695
BDSTABLE	38	0.0559	0.0467	-0.0808	-0.0342	0.0355	0.0537
AGEX3	39	0.2710	-0.1818	-0.0479	0.0775	-0.0245	0.0328
PROPFOR	40	-0.1749	0.0291	0.0413	0.0301	0.0024	0.0393
SREGION	41	0.0563	-0.1553	0.0072	0.0363	-0.1073	0.1275
SCOMUNTY	42	0.4148	-0.7801	0.0226	0.4436	0.1902	-0.1092
SPOWER	43	-0.0211	-0.0059	0.8158	0.0752	0.0073	-0.0883
SSEARCH	44	0.0482	-0.0147	0.0237	-0.0404	-0.0606	0.0124

		BDAPPT	MEMBERS	BDDEFEAT	NEWBD	SALARY	CONTRACT
		14	15	16	17	18	19
BDAPPT	14	1.0000					
MEMBERS	15	0.0393	1.0000				
BDDEFEAT	16	0.0909	0.0834	1.0000			
NEWBD	17	0.0332	0.4431	0.2764	1.0000		
SALARY	18	-0.0118	0.0966	0.1539	0.1808	1.0000	
CONTRACT	19	-0.1092	0.1005	0.0903	0.0949	0.3530	1.0000
SEARCH	20	0.0233	0.1141	0.0746	0.1520	0.3949	0.3110
INTERVIEW	21	0.0740	0.0228	-0.0413	-0.0120	0.2821	0.1472
DEGREE	22	-0.0175	0.1001	0.1278	0.1442	0.3009	0.2205
GENDER	23	-0.0307	0.0021	-0.0359	-0.0188	-0.0781	-0.0419
AGE	24	-0.0259	0.1524	0.0761	0.1324	0.3342	0.1750
ETHNIC	25	0.0382	-0.0058	-0.0265	0.0191	-0.1428	-0.0743
SUPPORT	26	0.0464	0.9422	0.0523	0.4237	0.0688	0.0666
LOCAL	27	-0.0734	0.0150	-0.0640	-0.0765	-0.0863	-0.0241
STPSTONE	28	0.0508	-0.1031	-0.0170	-0.0750	-0.0349	-0.0022
EVALUATE	29	0.0661	0.0153	-0.0301	-0.0345	0.1734	0.0166
ORIENT	30	-0.0421	-0.0386	-0.0926	-0.0623	-0.0487	-0.0204
CHANGES	32	-0.0205	0.1140	0.0972	0.1774	0.1878	0.1382
BOOTED	33	0.0383	0.0723	0.1073	0.0415	0.0562	-0.0429
XSALARY	34	-0.0469	0.1693	0.0680	0.0941	0.5850	0.2812
OUTLIER	35	-0.0103	0.0771	0.0108	0.1344	0.1651	0.0738
LOGTENURE	36	-0.0701	0.0587	-0.1397	-0.1055	-0.5093	-0.0648
LOGENROL	37	-0.1759	0.2073	0.0873	0.1200	0.3769	0.3592
BDSTABLE	38	-0.0127	-0.0357	0.2623	0.8519	0.1445	0.0468
AGEX3	39	-0.0212	0.1387	0.0625	0.1219	0.3258	0.1472
PROPFOR	40	0.0391	-0.0902	-0.0814	-0.0585	-0.0696	-0.0845
SREGION	41	-0.1884	0.2467	0.0682	0.1025	0.0289	0.1857
SCOMUNTY	42	-0.0807	0.0991	0.0235	0.0400	0.3575	0.2532
SPOWER	43	0.0387	-0.0004	-0.0668	-0.0677	-0.0850	-0.0238
SSEARCH	44	-0.0238	0.0323	-0.0693	-0.0888	-0.0942	-0.0024

		SEARCH	INTERVIEW	DEGREE	GENDER	AGE	ETHNIC
		20	21	22	23	24	25
SEARCH	20	1.0000					
INTERVIEW	21	0.2641	1.0000				
DEGREE	22	0.3321	0.2346	1.0000			
GENDER	23	-0.1007	-0.0638	-0.0479	1.0000		
AGE	24	0.2168	0.1245	0.1613	-0.0680	1.0000	
ETHNIC	25	-0.0560	-0.0054	-0.0217	0.0675	-0.1126	1.0000
SUPPORT	26	0.1070	0.0166	0.0991	0.0206	0.1335	0.0103
LOCAL	27	-0.1330	-0.2123	-0.2079	0.0316	0.0096	0.0604
STPSTONE	28	-0.1032	0.0420	-0.0194	-0.0511	-0.4411	0.0143
EVALUATE	29	0.1378	0.2213	0.0881	-0.0251	0.0169	-0.0094
ORIENT	30	0.0185	0.0132	-0.0424	0.0249	-0.0879	-0.0129
CHANGES	32	0.1824	0.1245	0.1576	0.0030	0.0146	-0.0577
BOOTED	33	-0.0179	-0.0152	0.0749	0.0307	-0.0410	0.0046
XSALARY	34	0.3922	0.1912	0.3125	0.0237	0.3558	-0.0793
OUTLIER	35	0.0865	-0.0210	0.1356	0.0589	0.0721	0.0372
LOGTENURE	36	-0.0028	-0.1151	-0.0202	0.1312	-0.0490	0.0378
LOGENROL	37	0.4451	0.1389	0.3791	0.0400	0.3896	-0.1259
BDSTABLE	38	0.1052	-0.0313	0.1082	-0.0471	0.0582	0.0268
AGEX3	39	0.1983	0.1123	0.1429	-0.0574	0.9832	-0.1086
PROPFOR	40	-0.0121	-0.0061	0.0169	0.0292	-0.0449	0.0577
SREGION	41	-0.0221	0.0078	0.1088	0.0878	-0.0101	-0.0058
SCOMUNTY	42	0.4566	0.1805	0.3011	-0.0046	0.2725	-0.0456
SPOWER	43	0.0362	-0.0245	0.0547	0.0481	-0.0825	0.0822
SSEARCH	44	-0.0742	-0.2394	-0.1123	-0.0047	-0.0163	0.0457

		SUPPORT	LOCAL	STPSTONE	EVALUAT	ORIENT	CHANGES
		26	27	28	29	30	32
SUPPORT	26	1.0000					
LOCAL	27	-0.0301	1.0000				
STPSTONE	28	-0.0646	-0.1804	1.0000			
EVALUATE	29	0.0134	-0.1498	0.0734	1.0000		
ORIENT	30	-0.0003	0.0789	-0.0232	-0.0047	1.0000	
CHANGES	32	0.1093	-0.1583	0.0723	0.1106	-0.0694	1.0000
BOOTED	33	0.0262	-0.0870	-0.0900	-0.0661	-0.1006	0.0205
XSALARY	34	0.1615	0.0302	-0.2903	0.0804	0.0403	0.0313
OUTLIER	35	0.0864	-0.0507	-0.0152	0.0764	-0.0187	-0.0362
LOGTENURE	36	0.0701	0.1704	-0.2421	-0.1026	0.1097	-0.1414
LOGENROL	37	0.1578	0.1563	-0.3274	0.0229	0.0463	0.1233
BDSTABLE	38	-0.0401	-0.0821	-0.0342	-0.0451	-0.0533	0.1385
AGEX3	39	0.1178	0.0085	-0.4348	0.0212	-0.0905	0.0163
PROPFOR	40	0.2311	-0.1548	0.1288	-0.0061	0.0859	-0.0183
SREGION	41	0.2544	0.0148	-0.0495	-0.1157	-0.0173	0.0497
SCOMUNTY	42	0.0933	0.0649	-0.1919	0.0783	-0.0061	0.1458
SPOWER	43	0.0182	-0.0619	0.0291	0.0769	0.0300	-0.0147
SSEARCH	44	-0.0041	0.5757	-0.1050	-0.1177	0.0496	-0.1241

		BOOTED	XSALARY	OUTLIER	LGTENUR	LGENROL	BDSTABL
		33	34	35	36	37	38
BOOTED	33	1.0000					
XSALARY	34	-0.0110	1.0000				
OUTLIER	35	0.0103	0.1349	1.0000			
LOGTENURE	36	-0.0563	0.2918	-0.0879	1.0000		
LOGENROL	37	0.0097	0.5647	0.0832	0.2441	1.0000	
BDSTABLE	38	0.0185	0.0122	0.1183	-0.1472	0.0186	1.0000
AGEX3	39	-0.0450	0.3264	0.0630	-0.0657	0.3505	0.0559
PROPFOR	40	-0.1302	-0.0134	0.0319	0.0295	-0.1255	-0.0362
SREGION	41	-0.0160	0.1388	0.0723	0.1284	0.1953	-0.0084
SCOMUNTY	42	0.0237	0.4743	-0.0554	0.1479	0.5787	-0.0198
SPOWER	43	0.0047	0.0240	-0.0104	0.1071	-0.0122	-0.0705
SSEARCH	44	-0.0225	0.0027	-0.0617	0.1630	0.1297	-0.1107

		AGEX3	PROPFOR	SREGION	SCOMUNTY	SPOWER	SSEARCH
		39	40	41	42	43	44
AGEX3	39	1.0000					
PROPFOR	40	-0.0565	1.0000				
SREGION	41	-0.0302	0.0354	1.0000			
SCOMUNTY	42	0.2580	-0.0314	0.1663	1.0000		
SPOWER	43	-0.0867	0.0496	0.0131	0.0586	1.0000	
SSEARCH	44	-0.0200	-0.1323	-0.0086	0.0189	-0.0175	1.0000

Appendix D

Correlation Matrix with Outliers Removed

		ID	TENURE	PREDICT	GROUP8	REGION	TURNOVER
		1	2	3	4	5	6
ID	1	1.0000					
TENURE	2	0.0386	1.0000				
PREDICT	3	-0.0278	0.0333	1.0000			
GROUP8	4	0.0599	0.9040	0.0293	1.0000		
REGION	5	0.0021	-0.1214	-0.0651	-0.1280	1.0000	
TURNOVER	6	-0.0088	-0.0397	-0.0478	-0.0461	0.4644	1.0000
ENROLL	7	0.0300	0.0690	0.0273	0.0771	-0.0649	0.1027
COMUNTY	8	-0.0164	-0.0549	0.0518	-0.0444	0.1815	0.0496
POWER	9	0.0017	0.1050	0.0510	0.1052	0.0090	-0.0506
INCOME	10	0.0362	0.0451	-0.0238	0.0567	-0.0848	-0.1260
PERPUPIL	11	0.0472	-0.1808	-0.0813	-0.1769	-0.0634	-0.0887
GRADES	12	0.0065	-0.0491	0.0167	-0.0467	-0.1035	-0.0014
BDAPPT	14	-0.0527	-0.0429	0.0281	-0.0494	0.1271	-0.1564
MEMBERS	15	0.0079	0.0720	-0.0244	0.0897	-0.4320	-0.2147
BDDEFEAT	16	0.0451	-0.1635	0.0799	-0.1429	-0.0257	-0.0383
NEWBD	17	-0.0065	-0.1192	0.0362	-0.0927	-0.1770	-0.1426
SALARY	18	-0.0432	-0.5069	-0.0418	-0.4832	-0.0865	-0.0515
CONTRACT	19	0.0406	-0.1117	-0.0216	-0.0768	-0.2343	-0.1056
SEARCH	20	-0.0427	0.0090	0.0008	0.0373	-0.0932	-0.0784
INTERVIEW	21	-0.0879	-0.1274	-0.0318	-0.1137	0.0137	-0.0880
DEGREE	22	0.0036	-0.0137	-0.0489	0.0433	-0.0816	-0.1108
GENDER	23	0.0346	0.0892	0.0483	0.1108	-0.0556	0.0150
AGE	24	0.0258	-0.0081	0.0212	0.0161	-0.0649	-0.0287
ETHNIC	25	0.0424	0.0642	-0.0050	0.0463	0.0593	-0.0682
SUPPORT	26	0.0206	0.0866	-0.0227	0.1071	-0.4101	-0.2197
LOCAL	27	0.0202	0.1753	0.0304	0.1366	-0.0274	0.0618
STPSTONE	28	-0.0109	-0.3203	-0.0208	-0.3112	0.0842	0.0016
EVALUATE	29	-0.1099	-0.1237	-0.0458	-0.0869	0.0961	-0.0114
ORIENT	30	-0.0590	0.1115	0.0245	0.1284	0.0516	-0.0011
CHANGES	32	0.0114	-0.1847	-0.0079	-0.1532	-0.1114	-0.0253
BOOTED	33	-0.0382	-0.0739	-0.0532	-0.0824	0.0073	-0.0256
XSALARY	34	0.0118	0.3432	0.0087	0.3885	-0.1767	-0.0862
LOGTENURE	36	0.0576	0.9210	0.0258	0.9681	-0.1199	-0.0368
LOGENROL	37	0.0308	0.2353	-0.0005	0.2600	-0.1859	0.0170
BDSTABLE	38	-0.0047	-0.1667	0.0666	-0.1467	0.0340	-0.0337
AGEX3	39	0.0329	-0.0309	0.0258	-0.0103	-0.0489	-0.0261
PROPFOR	40	0.0381	0.0547	0.0024	0.0559	0.0515	-0.0238
SREGION	41	-0.0113	0.1226	0.0620	0.1329	-0.8098	-0.3311
SCOMUNTY	42	0.0348	0.1233	-0.0281	0.1313	-0.2044	-0.0819
SPOWER	43	-0.0035	0.1131	0.0655	0.1159	0.0409	-0.0318
SSEARCH	44	0.0144	0.1772	0.1362	0.1102	-0.0543	-0.0212

		ENROLL	COMUNTY	POWER	INCOME	PERPUPIL	GRADES
		7	8	9	10	11	12
ENROLL	7	1.0000					
COMUNTY	8	-0.4670	1.0000				
POWER	9	-0.0103	-0.0079	1.0000			
INCOME	10	0.0399	-0.2602	0.0374	1.0000		
PERPUPIL	11	-0.0059	-0.1281	-0.0129	0.4497	1.0000	
GRADES	12	0.0870	0.0392	-0.1002	-0.2152	-0.0334	1.0000
BDAPPT	14	-0.1091	0.1219	0.0573	0.0823	0.0763	-0.0664
MEMBERS	15	0.0949	-0.1140	0.0058	0.0761	0.0150	0.0205
BDDEFEAT	16	0.0503	-0.0317	-0.0191	0.0509	0.0365	0.0907
NEWBD	17	0.1026	-0.0263	-0.0527	-0.0130	0.0376	0.0614
SALARY	18	0.3573	-0.3641	-0.0624	0.2913	0.2989	0.0539
CONTRACT	19	0.2119	-0.2482	-0.0322	0.1135	0.0422	0.0720
SEARCH	20	0.3791	-0.3964	-0.0183	0.3047	0.2234	0.0426
INTERVIEW	21	0.0653	-0.1225	-0.0385	0.2093	0.1313	-0.0444
DEGREE	22	0.2276	-0.2325	0.0056	0.1832	0.0461	0.0653
GENDER	23	0.0085	0.0267	0.0440	-0.0170	-0.0072	-0.0019
AGE	24	0.2792	-0.2025	-0.0540	0.1174	-0.0099	0.0370
ETHNIC	25	-0.1226	0.0918	0.0049	0.0835	0.0028	-0.0016
SUPPORT	26	0.0316	-0.1113	0.0218	0.0898	0.0181	0.0325
LOCAL	27	0.0838	-0.0239	-0.0303	-0.0135	-0.0716	0.0123
STPSTONE	28	-0.1992	0.0796	0.0200	-0.0916	0.0573	-0.0376
EVALUATE	29	0.0526	-0.0618	0.0801	0.1765	0.1735	-0.0659
ORIENT	30	0.0097	-0.0361	0.0581	0.0055	0.0266	0.0279
CHANGES	32	0.0949	-0.0767	-0.0339	0.0685	0.1031	0.0716
BOOTED	33	0.0245	-0.0186	0.0070	0.0446	0.0129	-0.0076
XSALARY	34	0.3922	-0.3916	0.0247	0.3424	0.1616	-0.0065
LOGTENURE	36	0.0799	-0.0511	0.0996	0.0454	-0.1738	-0.0454
LOGENROL	37	0.6883	-0.4942	-0.0121	0.1475	-0.1177	0.1633
BDSTABLE	38	0.0605	0.0459	-0.0792	-0.0505	0.0339	0.0381
AGEX3	39	0.2714	-0.1982	-0.0494	0.1062	-0.0035	0.0394
PROPFOR	40	-0.1676	0.0101	0.0262	0.0245	-0.0096	0.0402
SREGION	41	0.0602	-0.1507	-0.0000	0.0300	-0.1042	0.1149
SCOMUNTY	42	0.4277	-0.7779	0.0186	0.4320	0.1893	-0.0796
SPOWER	43	-0.0123	-0.0169	0.8159	0.0761	0.0112	-0.0946
SSEARCH	44	0.0367	-0.0159	0.0195	-0.0198	-0.0515	0.0098

		BDAPPT	MEMBERS	BDDEFEAT	NEWBD	SALARY	CONTRACT
		14	15	16	17	18	19
BDAPPT	14	1.0000					
MEMBERS	15	0.0528	1.0000				
BDDEFEAT	16	0.1058	0.0731	1.0000			
NEWBD	17	0.0306	0.4446	0.2709	1.0000		
SALARY	18	-0.0229	0.0868	0.1704	0.1653	1.0000	
CONTRACT	19	-0.1181	0.0933	0.0843	0.0817	0.3758	1.0000
SEARCH	20	0.0218	0.1142	0.0884	0.1370	0.3926	0.3159
INTERVIEW	21	0.0672	0.0224	-0.0274	-0.0117	0.2909	0.1463
DEGREE	22	-0.0255	0.0877	0.1400	0.1279	0.2901	0.2178
GENDER	23	-0.0293	-0.0153	-0.0442	-0.0234	-0.1067	-0.0647
AGE	24	-0.0228	0.1484	0.0818	0.1310	0.3523	0.1620
ETHNIC	25	0.0458	0.0053	-0.0057	0.0144	-0.1701	-0.0861
SUPPORT	26	0.0514	0.9444	0.0492	0.4224	0.0506	0.0575
LOCAL	27	-0.0624	0.0106	-0.0858	-0.0730	-0.0866	-0.0199
STPSTONE	28	0.0421	-0.1063	-0.0050	-0.0644	0.0068	0.0046
EVALUAT	29	0.0612	0.0091	-0.0254	-0.0524	0.1543	0.0165
ORIENT	30	-0.0429	-0.0237	-0.0891	-0.0581	-0.0508	-0.0057
CHANGES	32	-0.0349	0.1167	0.1099	0.1877	0.1928	0.1486
BOOTED	33	0.0389	0.0900	0.1044	0.0484	0.0789	-0.0399
XSALARY	34	-0.0509	0.1595	0.0634	0.0808	0.5517	0.2803
LOGTENURE	36	-0.0691	0.0654	-0.1660	-0.0992	-0.4691	-0.0735
LOGENROL	37	-0.1696	0.1988	0.0899	0.1207	0.3995	0.3584
BDSTABLE	38	-0.0214	-0.0452	0.2581	0.8457	0.1279	0.0336
AGEX3	39	-0.0199	0.1348	0.0663	0.1200	0.3445	0.1352
PROPFOR	40	0.0184	-0.0889	-0.0575	-0.0708	-0.1014	-0.0949
SREGION	41	-0.1864	0.2369	0.0576	0.0899	0.0411	0.1674
SCOMUNTY	42	-0.0969	0.1052	0.0221	0.0507	0.4058	0.2565
SPOWER	43	0.0457	-0.0007	-0.0462	-0.0658	-0.0840	-0.0364
SSEARCH	44	-0.0240	0.0367	-0.0837	-0.0780	-0.0634	-0.0009

		SEARCH	INTERVIEW	DEGREE	GENDER	AGE	ETHNIC
		20	21	22	23	24	25
SEARCH	20	1.0000					
INTERVIEW	21	0.2726	1.0000				
DEGREE	22	0.3291	0.2330	1.0000			
GENDER	23	-0.1254	-0.0447	-0.0369	1.0000		
AGE	24	0.2291	0.1173	0.1500	-0.0347	1.0000	
ETHNIC	25	-0.0676	-0.0153	-0.0400	0.0853	-0.1095	1.0000
SUPPORT	26	0.1036	0.0113	0.0842	0.0083	0.1305	0.0083
LOCAL	27	-0.1199	-0.1847	-0.2046	0.0184	0.0086	0.0689
STPSTONE	28	-0.1033	0.0291	-0.0193	-0.0866	-0.4654	0.0219
EVALUATE	29	0.1287	0.2266	0.0832	-0.0317	0.0136	-0.0209
ORIENT	30	0.0186	0.0224	-0.0276	0.0327	-0.0708	-0.0094
CHANGES	32	0.1837	0.1091	0.1570	-0.0006	0.0308	-0.0587
BOOTED	33	-0.0162	-0.0049	0.0868	0.0293	-0.0223	0.0005
XSALARY	34	0.3902	0.1809	0.3060	-0.0004	0.3689	-0.1021
LOGTENURE	36	0.0260	-0.1101	0.0196	0.1048	-0.0069	0.0399
LOGENROL	37	0.4581	0.1575	0.3996	0.0114	0.4074	-0.1374
BDSTABLE	38	0.0872	-0.0307	0.0940	-0.0448	0.0558	0.0177
AGEX3	39	0.2086	0.1054	0.1299	-0.0206	0.9834	-0.1075
PROPFOR	40	-0.0243	-0.0247	0.0070	0.0449	-0.0528	0.0192
SREGION	41	-0.0301	0.0072	0.0952	0.0857	-0.0111	-0.0196
SCOMUNTY	42	0.4815	0.1737	0.3119	-0.0244	0.3088	-0.0548
SPOWER	43	0.0348	-0.0230	0.0557	0.0151	-0.0794	0.0377
SSEARCH	44	-0.0650	-0.2180	-0.1044	-0.0119	-0.0148	0.0643

		SUPPORT	LOCAL	STPSTONE	EVALUATE	ORIENT
		26	27	28	29	30
SUPPORT	26	1.0000				
LOCAL	27	-0.0301	1.0000			
STPSTONE	28	-0.0710	-0.1748	1.0000		
EVALUATE	29	-0.0016	-0.1464	0.0795	1.0000	
ORIENT	30	0.0131	0.0757	-0.0164	0.0069	1.0000
CHANGES	32	0.1157	-0.1554	0.0744	0.1124	-0.0666
BOOTED	33	0.0460	-0.0845	-0.0836	-0.0612	-0.1068
XSALARY	34	0.1478	0.0379	-0.2996	0.0425	0.0608
LOGTENURE	36	0.0832	0.1658	-0.3086	-0.1049	0.1337
LOGENROL	37	0.1497	0.1526	-0.3305	0.0240	0.0531
BDSTABLE	38	-0.0533	-0.0738	-0.0180	-0.0590	-0.0547
AGEX3	39	0.1156	0.0104	-0.4535	0.0180	-0.0703
PROPFOR	40	0.2264	-0.1499	0.1186	-0.0375	0.0853
SREGION	41	0.2428	0.0288	-0.0520	-0.1274	-0.0094
SCOMUNTY	42	0.0987	0.0805	-0.2046	0.0875	0.0057
SPOWER	43	0.0122	-0.0736	0.0205	0.0855	0.0359
SSEARCH	44	0.0077	0.5648	-0.1058	-0.0868	0.0424

		CHANGES	BOOTED	XSALARY	LGTENUR	LGENROL	BDSTABL
		32	33	34	36	37	38
CHANGES	32	1.0000					
BOOTED	33	0.0141	1.0000				
XSALARY	34	0.0211	-0.0023	1.0000			
LOGTENURE	36	-0.1619	-0.0773	0.3922	1.0000		
LOGENROL	37	0.1228	0.0177	0.5844	0.2695	1.0000	
BDSTABLE	38	0.1489	0.0191	0.0007	-0.1416	0.0208	1.0000
AGEX3	39	0.0275	-0.0344	0.3377	-0.0287	0.3655	0.0531
PROPFOR	40	-0.0033	-0.1063	-0.0305	0.0545	-0.1309	-0.0501
SREGION	41	0.0491	-0.0067	0.1548	0.1327	0.1862	-0.0237
SCOMUNTY	42	0.1198	0.0114	0.5011	0.1405	0.5950	-0.0114
SPOWER	43	-0.0126	0.0149	0.0297	0.1065	-0.0221	-0.0684
SSEARCH	44	-0.1266	-0.0260	0.0340	0.1466	0.1269	-0.0984

		AGEX3	PROPFOR	SREGION	SCOMUNTY	SPOWER	SSEARCH
		39	40	41	42	43	44
AGEX3	39	1.0000					
PROPFOR	40	-0.0598	1.0000				
SREGION	41	-0.0310	0.0266	1.0000			
SCOMUNTY	42	0.2868	-0.0289	0.1621	1.0000		
SPOWER	43	-0.0829	0.0285	-0.0052	0.0499	1.0000	
SSEARCH	44	-0.0175	-0.1126	0.0079	0.0248	-0.0216	1.0000

The vita has been removed from the scanned document