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COMMON DIMENSIONS OF THE SCHOOL, SOCIAL, AND ECONOMIC ENVIRONMENT IN FLORIDA: AN EMPIRICAL STUDY

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SUMMARY

Forty-six variables descriptive of the 67 Florida School systems and their coterminous counties were subjected to a principal axis factor analysis. Seven interpretable factors were extracted.

Two of the seven factors were school factors and tentatively labeled "School Holding Power" and "Expenditure Per Pupil." Two other factors were determined by cultural attributes of the community and labeled "Social and Economic Stratification" and "Minority Group." Three additional community factors were labeled: "Growth Rate," "Community Size," and "Local School Support."

The two output variables, "County Achievement Mean" and "Percent Attending College," loaded appreciably on only three of the factors: "Social and Economic Stratification," "School Holding Power," and "Minority Group."

Approximately one third of the systematic variance in achievement means was unrelated to the variables used in this study.

The purpose of this study was to determine, through factor analysis, the common dimensions of a large number of measures typically used to describe the educational, economic, and social environments of communities. Special attention was given to the relationships between the academic achievement of pupils enrolled in the school systems and the remaining educational, economic, and social variables.

The study is based on data from all 67 counties in Florida and their coterminous school districts. The county-district was the unit of analysis. Variables were included which reflect the following characteristics of the school systems or of their environments:

a. Educational and economic status of the citizens.

b. Wealth of the county.

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c. Level of local financial support of the school system.

d. Size of the school system: number of pupils enrolled and number of staff employed.

e. Qualifications of the school professional staff.

f. Pupil attendance patterns.

g. Financial expenditure pattern for schools.

h. General academic achievement and college attendance rates.

Forty-six variables were selected for the analysis. All variables except the achievement means were taken from the Florida State Department of Education *Research Report No. 54* and are descriptive of the 1966-67 school year.

The county-district achievement means are total scores on the School and College Ability Test (SCAT) from the 1967 fall administration of the Florida Ninth Grade Testing Program.

Other achievement tests: science, math, English, and social studies, were available in the ninth grade battery. The intercorrelations among the various test means exceed .94 indicating that the means have high reliability and that the results of the analysis would not differ appreciably if one of the other specific achievement tests were used so only SCAT was carried into the analysis.

Analysis

A principal axis analysis of the 46 variables was performed with the initial communality estimates set at 1.0. This resulted in twelve eigenvalues greater than 1.00. The multiple R^2's were then used as communality estimates and 12 factors were rotated. Kaiser's normal varimax criterion was used as an approximation of simple structure.

The factor structure is shown in Table 1. Factor loadings below .200 are not reported and loadings between .300 and .399 are not shown but are indicated by an asterisk, with a minus sign for negative loadings.

While it may appear that the ratio of sample size (67) to the number of variables (46) is below that usually allowed in factor analytic studies, Cattell (1967) has found stability of factor structures using ratios of this magnitude when the observations consisted of mean values computed over many cases. We submit that the reported factor structure is stable and internally valid for the same reason.

Discussion of the Factor Structure

Factor I is clearly an economic and educational factor. It is determined primarily by variables 4 and 5 which reflect the educational level in the county and by variables 7, 8, 9, and 10 which reflect the economic conditions in the county. Variables relating to the counties' overall size and wealth load moderately on this factor. Noticeable also is the tendency for the higher socioeconomic stratification (SES) counties to provide better financial support for their school districts (items 12, 13, 14). This latter finding is somewhat contrary to Burkhead's (1967) and Johns and Kimbrough's (1968) results. The general conclusion of their studies is that social stratification indices do not systematically relate to levels of local support. Finally it should be noted that Factor I exhausts approximately one-half of the variance in the output measures (45,46) and is the only factor on which these measures have appreciable common loadings. The zero-order correlation of .69 between SCAT means and Median Years School Completed and of .70 between SCAT means and Percentage of Population in White Collar Occupations are higher than that of any other variable with SCAT.

Factor II is a growth factor. As Florida is one of the fastest growing of the 50 states this probably represents, comparatively speaking, a rather rapid rate. The fact that no variables indicating county size or SES show moderate loading on this factor indicates that the population influx is not limited to the more urban or higher SES counties. The factor also indicates some interesting covariations between growth and school personnel variables. As would be expected, in the more rapidly growing systems there are fewer teachers on continuing contract and fewer teachers teaching in their field of certification. This latter fact probably indicates that the rapidly expanding counties have a demand for additional staff that precludes rigid adherence to area or subject matter certification guidelines. It will also be noted that these same systems have proportionally more teachers with master's or higher degrees. Assuming that the staffing needs of these rapidly expanding school systems are filled by younger, less experienced teachers this finding indicates that the more recent the teacher's date of graduation, the more likely he is to have obtained an advanced degree. The loading of variable 20, the school system's utilization of earned instructional positions, on Factor II appears to indicate that the most rapidly growing counties employ more professional personnel than the state allocates on the basis of instructional units earned the previous year.

Table 1 FACTOR LOADINGS

Variable	Social & Economic I	Community Growth II	Expenditure per pupil III	School Holding Power IV	Community size V	Local School Support VI	Minority Group VII	Correlation with SCAT VIII
1. Enrollment	.53				.78			.36
2. Number of High School Graduates	.51				.79			.35
3. % of Graduates not continuing education	−.44							−.50
4. Median School Yrs. Completed (Pop. over 25)	.89							.69
5. % of Population in White Collar occupations	.82							.70
6. Total Non-Exempt Assessed Valuation	.46				.78			.34
7. Per Capita Personal Income	.83							.43
8. Median Family Income	.92							.56
9. % Families over $10,000 Annual Income	.82							.60
10. % Families Less than $3,000 Annual Income	−.90							−.57
11. Personal Income Per Pupil (1-12)	.73					•		.50
12. Local Revenue Per Capita	.48					.72		.34
13. % of Total Revenue from local sources	.57					.67		.44
14. % Tax Exceeds minimum required	.44					.76		.35
15. Expenditure Per Pupil for Aux. Services	−.70		.50					−.43
16. Av. Salary : Teachers & Principals	.50				.49	.55		.52
17. Average Length of Enrollment		−.83						−.08
18. Out-of-State Transfers as % of Total Enrollment		.94						.16
19. Out-of County Transfers as % of Total Enrollment		.95						.15
20. Instruc. Positions as % of Instruc. Units Earned		.93						.11
21. Teachers holding Rank II or Above		.57						.02
22. % of Instruc. Personnel on Cont. Contract Status		−.65						.10
23. % of Elem. Classes taught by In-Field teachers		−.83						.04

24. Av. Pupils Per Instruction (1-6)			−.71					.12
25. Av. Pupils for Instruction (7-12)	*		−.54					.23
26. Expenditure per Pupil			.92					.83
27. Expenditure Per Pupil for Administration	−*		.75	−*				−.31
28. Expenditure Per Pupil for Instruction			.82		*	*		.22
29. Expenditure Per Pupil for Plant Operation			.67					.38
30. Expenditure Per Pupil for Maintenance			.49					.09
31. H.S. Enrollment as % of Elem. Enrollment				.66				.86
32. % Teachers holding Rank III or Below	−*			−.44				−.38
33. Percentage Male Instructors (1-6)				−.37			−.44	.89
34. % of 14-17 Pupils Enrolled				.60				.12
35. Percentage Expense for Instruction			−*		.41			.17
36. % of Population over 65						.73		.21
37. Non-Exempt Valuation Per Pupil	*					.73		.32
38. Local Source Revenue as % of Personal Income						.77		.18
39. % Salary Increase: Teacher & Principal						.46		.22
40. Average % Attendance	*			−*			−.72	.35
41. Percentage Male Instructors (7-9)							−.65	.16
42. % of Population Non-White	−*						.76	−.65
43. % of Graduates Entering Trade &Voc. Training								−.11
44. Outstanding Indebtedness Per Pupil								−.25
45. % of Graduates Entering College	.61			.54				.55
46. County-District SCAT Means	.64	−.02	.05	.25	.03	.16	−.44	
Cumulative Percent of Variance	.290	.402	.496	.559	.615	.658	.701	

Factor III is a school-expenditure-per-pupil factor. That these variables group together in the analysis is not surprising. The fact that the per pupil expenditures are not at least moderately related to the citizenry's ability to support the schools (Factor I), or the system's growth rate (Factor II), or the proportion of the county's tax base allocated to the schools (Factor VI) was unexpected. While it must be understood that the principal axes solution guarantees orthogonal factors this in no way explains the existence of the three clearly distinguishable financial factors (I, III, VI). In effect, the analysis indicated that the income level of the county residents (Factor I) is only moderately related to the county tax base in support of the school system (Factor VI), and that both of these are unrelated to the principal expenditures of the school system. Expenditures for capital outlay building programs and the corresponding bond issues are not included in any of these variables.

There are three conditions that may systematically operate to reduce the degree of relationship between the sets of variables loading on the respective factors. First, Florida specifies minimum standards for school operations and allocates monies to the individual county on a basis of the county's ability to provide for the school system. This systematically reduces the covariance between ability to pay and amount actually paid in that the poorer counties receive proportionally more and the more able counties proportionally less state subsidizing. Second, is the effect of federal support, which is substantial in several counties due to the existence of military bases and National Aeronautic and Space Administration (NASA) projects. Third, it is generally agreed by "knowledgeable persons" that, even though all Florida counties are legally bound to assess property at full value, 100% evaluation in some counties is not the same as 100% in other counties.

Factor IV is somewhat less clear than the previous ones. It is tentatively labeled "School Holding Power". School systems scoring high on this factor have a lower dropout rate (variables 31 and 34), proportionally fewer teachers holding less than a bachelor's degree, and fewer male professionals in elementary school. Factor IV is the only factor reflecting characteristics of the school systems which are not related to the county environments. It should be noted that both variables 45 and 46 have moderate positive loadings on this factor.

Factor V clearly represents that portion of the size of the enrollment and of the total property assets of the supporting county which is independent of the social stratification factor.

Factor VI is a tax base in support of the school system factor. Notable is the fact that no school system variables other than salary and instructional expense load appreciably on either this or the size-wealth factor (V). The high loading of variable 37 on this factor indicates that the level of local financial support is greatest in those counties where the value of property-per-pupil-enrolled is greatest. Also, as mentioned previously, the level of local support is independent of per-pupil expenditures.

Factor VII is labeled as a minority group factor. As expected, those counties with large proportions of minority groups have the lowest attendance rates. The loading of the SCAT mean on this factor is in sharp contrast to Wilson's (1966) findings. Wilson found that after the pupils' social class (roughly equivalent to Factor I in this study) was covaried, the relationship between race and achievement tended to disappear. The zero-order correlation between district achievement mean and proportion of the county population which is non-white is -.65. A substantial proportion of this shared variance is independent of Factor I.

Discussion of County Characteristics and School Characteristics as They Relate to Achievement and College Attendance Rates:

Approximately two thirds of the total variance in college attendance rates, variable 45, is exhausted by Factors I and IV. The overriding importance of social stratification indices in the determination of the output variables, assuming the usual direction of causality, is consistent with the general conclusion of those studies which may be termed school effect studies (Burkhead, 1967; Coleman, 1966; Flanagan, 1960; Mollenkopf and Melville, 1957; Wilson, 1966).

Concerning the zero-order correlations the only variable relating appreciably to the SCAT means independent of district-county size, SES, and percent minority group, is the number of teachers without a bachelors degree. Because this variable loads appreciably on the holding power factor the importance of this factor, even though it is tentatively labeled, is further supported.

It appears that variables which have traditionally been of such great interest to professional educators: teacher experience, level of advanced training, expenditures per pupil, or pupil to teacher ratio, do not appreciably affect achievement, at least at the district level. This conclusion is consistent with the findings of the school effect studies mentioned earlier. However, it should not be inferred from these data that the school systems do not affect achievement independently of their local environments; only that these particular variables have little influence.

How does one explain the fact that some seven different achievement test means correlate so highly, .94 or better, within the school district when only slightly over one-half of their total variance is attributable to the best known and established environmental or extra-school-system predictors? We would maintain that because this unaccounted for achievement variance is so systematic within the school district it suggests that treatments differ from one district to another in ways not related to these traditional measures of school quality. Further we would suggest that one of the frequent interpretations of the school effect studies—that schools do not appear to contribute greatly to the characteristics of their pupils independent of other environmental characteristics—is quite premature. More specifically we suggest that this study, and the school effect studies, should be construed not as studies assessing the independent contributions of school or school systems to pupil achievement but rather as studies which assess the validity (or invalidity) of such measures as teacher experience, level of training, salary, teacher pupil ratios, and per pupil expenditures for assessing qualitative differences between schools or between school systems.

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