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ABSTRACT

This study tested all children (N=1163) in one open classroom school and five "traditional" schools, using Stanford Achievement Tests, the Children's Self Concept Indicator, and the Children's Attitudinal Range Indicator. Data were collected four to five months after the initiation of the open classroom methods, as a preliminary indicator of the effects of these methods. No significant differences in achievement were found between "open" and "traditional" schools, with the effects of intelligence and parental socioeconomic status controlled by covariance methods. Both self concept and attitude toward school were significantly less positive in the "open" school than in the "traditional" schools. These results are viewed as tentative, because of the very limited time elapsed between the introduction of open education and the collection of the data. The self concept and attitudinal measures have been omitted from the Appendix. (Author/NE) ,

State University of New York at Binghamton

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A STUDY OF THE EFFECTS OF OPEN CLASSROOM EDUCATION ON CHILDREN'S ACHIEVEMENT, SELF CONCEPTS AND ATTITUDES

By

Mary Ann Scheirer

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By Mary Ann Scheirer

Abstract

This study tested all children (N=1163) in one open classroom school and five "traditional" schools, using Stanford Achievement Tests, the Children's Self Concept Indicator, and the Children's Attitudinal Range Indicator (with the permission of the Westinghouse Learning Corporation/Ohio University). Data were collected four to five months after the initiation of the open classroom methods, as a preliminary indicator of the effects of these methods. No significant differences in achievement were found between "open" and "traditional" schools, with the effects of intelligence and parental socio-economic status controlled by covariance methods. Both self concept and attitude toward school were significantly less positive in the "open" school than in the "traditional" schools. These results are viewed as tentative, because of the very limited time elapsed between the introduction of open education and the collection of the data.

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I - INTRODUCTION

A visitor to an open education classroom might be amazed to see some children lying on the floor reading brightly colored books, others making notes on the activities of a hamster in a box on the windowsill, and one boy pounding nails into wood on a corner workbench, while the teacher divided her attention between asking questions to a small group working with cuisenaire rods, giving suggestions to several children measuring the amount of cupboard space available in the classroom, and responding to several others who come to her for the spelling of words needed in stories they are writing. The visitor may recall a childhood spent endlessly sitting in one of a row of precisely lined up desks, with the teacher's directives interrupting thoughts about the interesting things to be done after school would finally be over for the day, or better yet, for the whole school year.

The contrast in classroom activites and atmosphere, as illustrated by these brief hypothetical examples, is a major impetus underlying the adoption of what is most commonly called "open classroom education", or just simply "open education". Hoping to attract children's interest in learning without sacrificing the development of essential educational skills, U.S. educators have begun to experiment with this new structural development. It has followed largely from the example of British infant schools, in which several decades of innovation have resulted in elementary-level schools which

appear to fully engage children in creative learning experiences, by which process they painlessly both learn basic skills and develop self confidence. As generally favorable reports of the British educational developments were disseminated in the U.S. (e.g. Weber, 1971; Featherstone, 1971; Brown and Precious, 1969), along with detailed descriptions of how to accomplish the transition (e.g. Kohl, 1969; Hassett and Weisberg, 1972), a number of American school districts or individual schools have introduced open education.

One of these innovative American school systems is the Johnson City, N.Y. Central School District which began to introduce open education in the 1971-72 school year. With the stimulation of a newly hired Superintendent of Schools, Dr. John R. Champlin, the teachers of grades 2,3, and 4 at Johnson City's Oakdale School decided to convert their classrooms to the open concept. After visiting other schools using open education, the teachers began implementing the new ideas in January, 1972. While both the Johnson City school administrators and the Oakdale teachers were enthusiastic about the initial impact of the new system of the Oakdale students, a more systematic evaluation was thought desirable. Therefore, an evaluative research program was projected as a four-year longitudinal panel study of the children's achievement and affective development within both "open" and "traditional" schools. The data to be reported here are the results from the first year's measurements, collected in April and May, 1972. Thus, the primary purpose of these measurements was as

a baseline report. The length of time during which change toward open education had occurred at Oakdale was much too short for these results to be taken as an adequate evaluation of the effectiveness of open education. Nevertheless, the results are useful for an analysis of the ways in which changes in the structure of an organization affect individual functioning.

A number of social theorists have proposed that adult personal variables, such as values and attitudes, are related to structural characteristics of their social environments. Inkeles, for example, found that such diverse characteristics as job satisfaction, sense of environmental mastery, and child rearing values were all patterned in relation to socio-economic status in a number of modern societies (Inkeles, 1960). A very recent study found a number of adult orientations such as "intolerance of external constraints" (non-authoritarian attitudes, receptivity toward change, etc.), flexibility in intellectual functioning, and subjectivism of self evaluation to be related to aspects of the individual's childhood environment, including region of the United States and urban versus rural origin (Schooler, 1972). In the same theoretical framework, organizational analysts have proposed that the functioning of individuals in organizations might be changed by altering the structure of the organization. For example, an experimental change in the authority structure for decision making in a large business enterprise led to greater satisfaction among those workers with greater autonomy, but no short term

differences in productivity (Morse and Reimer, 1956; Katz and Kahn, 1966). Applying the assumptions underlying these research findings to the educational setting yields the hypothesis that a promising means to change educational outcomes is to change the structure of schools: the movement toward open education incorporates the assumption that children's attitudes toward school and their achievement can be changed by modifications of their institutionsl environment.

An analysis of the literature on open education reveals that its proponents do not advocate a systematic, theoretically based set of educational structures. Rather, the approach stresses flexibility of procedures for both teacher and students in each particular classroom. Since these methods were developed originally by English classroom teachers to meet their everyday needs in working with children, most discussions of open education emphasize concrete details about the innovations in practice rather than theoretical analysis of why the methods are appropriate. However, there are a number of common themes in these accounts about the structural changes characteristic of open education, as well as some underlying assumptions about learning and child development in general.

The changes in structuring of the classroom under open education may be classified into six broad themes. First, the classroom's physical facilities are flexibly arranged to permit movement of children and furniture as activities require.

The physical environment is provisioned with an abundance of stimulating materials drawn both from tradition "educational" resources as books, paper, and pencils, and from what are commonly thought of as objects for play, such as old clothes for dress up, games and puzzels, and a variety of artistic and construction materials.

Second, within this highly stimulating environment, each child has a large degree of choice among the possible activities, rather than being directed by the teacher to follow a set curriculum. The extent of real freedom of choice for each child apparently varies considerably: in open British infant schools (for ages 5 to 7), children actually are completely free to choose their activities for all or nearly all the school day (see Brown and Precious, 1969; Featherstone, 1971; Weber, 1971), while most American schools, particularly for older children, tend to assume some requirements for completing certain types of "academic" work. Regardless of the amount of choice concerning content of school activities, open education emphasizes individualized study. Rather than a whole class or a large part of it doing the same thing at the same time, each child chooses his activity or works on an assigned area at his own pace.

Following from this emphasis on individual work, a third structural element often found in open classrooms is the "integrated" time schedule and curriculum. When the interests of the child stimulate him to undertake a project

involving several of the traditional disciplines, such as reading for information or directions, measuring materials for construction, and writing records of his activities, he is not constrained by a time schedule and strict curriculum dictating 30 minutes for reading, 40 minutes for arithmetic, and a paragraph composition each week. Further, as there is little need for homogenous grouping when children are pursuing individual interests, a fourth structural development in open education is "family grouping", or combining children of several ages in one classroom. In this way, children can learn from each other, yet not be stigmatized by being placed in a "slow group", or constantly bored because the general level of the class is too slow.

Fifth, the teacher's role in an open classroom is as important as in a traditional classroom, but it becomes one of stimulating, guiding, and facilitating the children's learning rather than directing, disciplining, and didactic teaching. One writer on open education describes the role of teacher as similar to a travel agent, in assisting children to "get where they're going", in other words, to help facilitate the learning processes that naturally motivate children (Rathbone, 1971). Finally, many open educators stress that traditional evaluative devices, particularly standardized tests, are built on the assumptions that one child's learning should be compared with that of other children, and that children of the same age levels should be learning approximately the same things. Declaring these assumptions invalid, open educators advocate

records of individual accomplishments to be kept by the teacher in the form of regular written comments on each child's work. Written examinations, if used at all, should be viewed solely as diagnostic measures to uncover areas where specific children need further work, not to compare one child with another.

Underlying these structural changes in the open classroom are several assumptions about the ways children learn. A major theme is that a child's natural curiosity is assumed to be intrinsically motivating (e.g. Barth, 1971). This innate urge to explore, to manipulate, and thus to learn from a stimulating environment is thought to be all a child needs for motivation if these desires are not destroyed by authoritarian directives. This idea is the basis of open educator' emphasis on a richly provisioned environment in the in the classroom. A question not addressed by these writers is whether manipulative and curiosity motives are likely to lead to the types of learning needed for adult functioning in the various roles of a complex, modern society. Secondly, there is a strong value orientation favoring individualism underlying most discussions of open education, without significant analysis of its relation to an encompassing social system. Thus, Lillian Weber summarized her descriptive account of English infant schools by stating, "Everything is directed toward maintaining a child as a unique individual . . . " (Weber, 1971, p.132). In a listing of twenty-four assumptions concerning open education, Barth states that, "Children have

both the competence and the right to make significant decisions concerning their own learning." (Barth, 1971. p.123). This assumption underlies the emphases on individualized learning and free choice of activity found in open classrooms. Writers on open education take little notice of research findings concerning the important effects of social modeling and social reinforcement in child development.

A third assumption often made by open educators is that knowledge is unique to each individual, a product of his own subjective experience of the world (Rathbone, 1971, p.101-102). Thus, a former teacher who used open classroom techniques asserts baldly, "Actually, the whole notion of there being an 'orderly sequence' to learning is fallacious. Children's learning is episodic rather than vertical or linear." (Kohl, 1969, p.54). Ideas such as these justify the concept of an "integrated" schedual, without the "artificial" barriers between subjects inherent to a set curriculum. One writer points out the English infant school teachers often find that good work in artistic expression is the key to exploration of other fields (Featherstone, 1971). Thus, open educators appear to give more emphasis on the skills enhancing creative but subjective expression than they give to developing skills of more objective, logical analysis. Scientists and mathematicians would hardly agree that there is no need for systematic, sequential study of their disciplines.

Consistent with the emphases on individualism and free

choice, though more soundly based in psychological theory, is the idea that children pass through certain stages in their intellectual growth. Derived from the work of Piaget, the major assumption here is that most children need a period of learning from the manipulation of concrete materials before they are able to deal effectively with abstract concepts. Since these intellectual stages do not necessarily occur at the same ages for different children, the provisions for choice of activity and individualized rates of learning allow each child to learn in the ways best suited for him without unfavorable comparison with the accomplishments of other children.

Even this rather extensive discussion of the major features distinguishing open education from more traditional types of education has only touched upon the most important similarities within an already large and rapidly growing body of literature concerning open education. Since the movement toward open education is not based upon a single, systematic theoretical position, various writers and specific school systems may emphasize only some of the elements listed above, without adopting all of them. Thus, Oakdale school to be examined here has adopted individualized study, family grouping for some parts of the day, and has diversified modes of instruction (audio-visual aids, etc.), plus a structured system of student movement from one classroom to another each day. Oakdale has not, however, changed from a set curriculum to free choice of student activity, adopted

an "integrated" time schedual, modified the teacher's role from that of classroom director, nor changed the traditional emphasis on objective tests for evaluation. Thus, it remains similar to a traditional school in many respects.

Whether or not Oakdale's structural innovations are likely to be effective is difficult to predict, due to the scarcity of previous empirical studies of open education. Published evaluation of these techniques has been limited to one English study of dubious methodology.

An English educator, Dorothy Gardner, conducted intensive testing on groups of ten-year olds from both op n and traditional schools (Gardner, 1966). Through observation and discussion with administrators in a large number of open junior schools (for ages 8 to 11), classes were selected which had had "competent and fair" teachers throughout their careers in school. Children in these classes were matched for age, sex, intelligence, and "social background" with children in "good" traditional schools, used as control classes.

The analysis of data is presented in terms of these matched groups of students from twelve pairs of schools; the major unit of analysis is thus pairs of schools rather than individual students. Gardner indicates that much pilot work was done to devise appropriate tests in both academic areas, such as reading, written English, arithmetic, and free drawing, and in contributory skills or "attitudes", such as

concentration, listening and remembering, neatness, ingenuity, and social skills. In general, the results were more positive for the "experimental" or open schools: they were "undoubtedly superior" in six areas, including written English; the open schools were "somewhat ahead" of their controls on another six tests; and they were about equal on three other tasks. Only in arithmetic -- both problem solving and mechanical computation -- were the traditional schools ahead in at least half of the twelve pairs of schools.

It is unfortunate that the selection of schools for this study was not a random sample from an overall population of "open" junior schools. The selection procedures used make it impossible to determine whether the results obtained are likely to be found in most schools using the new methods, or whether in fact the specification that open classes to be tested had had "competent and fair" teachers throughout their educations might have eliminated a great many typical classes. Nevertheless, Gardner's results do provide some support for the positive reports generally given by the proponents of open education; this is the only research thus far reporting comparative data on the effectiveness of open education.

One reason for the scarcity of solid research in this area is that many proponents of open education are strongly opposed to most kinds of objective testing, declaring that the accomplishments of one child cannot and/or should not

be compared with those of another child, but only with his own previous performance. For example, Hassett and Weisberg declare that "the most important norm here is self-development, not the meeting of 'objective standards'....If you view the child as a unique individual who should be allowed to grow and mature according to his own physiological abilities, then it is apparent that his growth cannot be adequately compared with anyone else's". (1972, p.60). Other open educators are not necessarily against objective testing per se, but feel that the type of items included in most widely used standard achievement tests do not adequately sample the objectives emphasized in open classrooms, such as problem solving and creativity (Featherstone, 1971, p.19). Furthermore, objects the open educator, traditional schools teach students to take conventional tests through their heavy emphasis on work sheets and frequent testing.

These objections have some merit, particularly concerning possible "practice effects" in traditional schools, and the inappropriateness of conventional tests for changed objectives. Nevertheless, the subjective impression of teachers immersed in their daily classroom activities seem hardly an adequate basis for judging whether open educational methods will have actual beneficial results if they are adopted on a wide scale. Much additional objective research is essential, using the most nearly appropriate measuring instruments available, and interpreting their results cautiously.

II - RESEARCH METHODS

Variables and Propositions

Undertaken as a preliminary evaluation of the effects of open education, this study focuses primarily on propositions concerning the academic achievement and the affective development of the children involved. Specifically, the criterion variables for assessing possible effects of different school structures are achievement scores on language skills, arithmetic, and science-social studies tests; several measures of attitude toward school; and a measure of self concepts. Operational definitions for these variables are discussed in detail below.

Some previous research, as well as common sense, both indicate that such school-related criterion variables as achievement and personal attitudes are likely to be strongly influenced by factors in each child's background that are not controlled by the school itself, specifically his intelligence and the socio-economic status of his family (Coleman, et al., 1966; Lavin, 1965). Thus, any differences found between the open school and traditional schools on achievement or affective measures might be related simply to differences in the intelligence or socio-economic background of the students, rather than a result of different educational structures. For this reason, it is necessary to control for the influence of these background variables when examining the substantive relationships between different

patterns of education and the criterion variables.

However, while the hypothesized relationships between academic achievement and both intelligence and parental socio-economic status have been substantially confirmed for students at higher educational levels, (Colman, et al., 1966), they have rarely been documented for elementary level students, according to a recent review of studies on the prediction of academic achievement (Lavin, 1965). The data collected here thus enable examination of these often assumed relationships. Therefore, the first propositions to be examined in the results section, which are preliminary to the major findings, are as follows:

> 1. The academic achievement of elementary school children is positively related to their measured intelligence, even when the effects of parental socio-economic status, are controlled.
>
> 2. The academic achievement of elementary school children is positively related to their parents' socio-economic status, even when the effect of intelligence is controlled.

As will be shown, analysis of these relationships also confirms the utility of including intelligence and socio-economic status as control variables for the major propositions investigated.

Returning to our criterion variables, then, there are three major propositions to be examined:

> 3. When samples are equated for intelligence and parental socio-economic background, children in an open classroom school have higher achievement scores in language skills, in arithmetic, and in science-social studies than do children in traditional schools.

4. When samples are equated for intelligence and parental socio-economic background, children in an open classroom school have more positive self concepts than do children in traditional schools.

5. When samples are equated for intelligence and parental socio-economic background, children in an open classroom school have more favorable attitudes toward school than do children in traditional schools.

Of course, it is the null forms of these propositions which are actually tested in the statistical analyses reported below.

The Population of Children Studied

The Johnson City Central School District provides public education for an area of approximately 25,000 population, of whom about eighty percent live in the unincorporated village of Johnson City, N.Y. As the home of Endicott-Johnson Shoe Company, Johnson City is an older industrial community which forms part of the over-200,000 in population Binghamton, N.Y. metropolitan area. For this study, its total population of elementary school children in grades 1 through 4 was selected. These approximately 1200 children are being educated in six elementary schools, of which one, Oakdale, had instituted open education before this study began. The total number of pupils tested for this study is 1163; as the n's for individual analyses will indicate, missing data often reduced the number of measurements available for particular instruments. The major analyses included grades 2, 3, and 4 only.

Indicated in Tables 1 and 2 are data concerning the background of the student population studied. Intelligence

scores, as measured by the Analysis of Learning Potential (see below for information on this instrument), are shown as percentages with quartiles based on national norms, by school and for all schools together. Thus, 38% of the sample population had intelligence scores in the highest (75th to 99th percentiles) quartile nationally, 35% in the third quartile, 19% in the second quartile, and only 8% in the bottom quartile. The pupils of Johnson City thus scored well above the national averages for intelligence; 73% above the national median. Socio-economic background data is presented in Table 2, showing a breakdown of parental occupations into white collar and blue collar jobs (see below for measurement details). As indicated, more parents (55%) held the higher SES white collar jobs overall, although this percentage differs considerably from one school to another.

An inspection of Tables 1 and 2 reveals, the open education school, Oakdale, has a pupil population considerably above the district parameters in both intelligence (83% of Oakdale pupils scored above the national median) and parental socio-economic status (65%in white collar occupations). The only school similar to Oakdale which has a large enough pupil population for analysis is Roosevelt, with 79% above the median in intelligence and 61% having parents in white collar jobs. It was decided, therefore, to compare Oakdale's results on the dependent variables with both the scores from the rest of the district as a whole, and with the corresponding data from Roosevelt School.

Table 1 - Percentage Distribution of Scores on Intelligence Test (ALP) into Quartiles of National Percentile Ranks, By School

(Grades 2, 3, 4)

ALP Quartile	School C.Fred	HarryL	Lincoln	Oakdale	Roose-velt	West-over	All
4 (75-99%)	32.1	39.8	29.5	48.7	43.8	30.6	38.1
3 (50-74%)	33.3	29.9	40.5	33.9	35.2	44.4	34.7
2 (25-49%)	24.7	22.1	20.8	13.9	11.4	22.2	19.4
1 (1-24%)	9.9	8.2	9.2	3.5	9.5	2.8	7.8
Total	100.0	100.0	100.0	100.0	99.9	100.0	100.0
N	81	244	173	115	105	36	754

Table 2 - Distribution of Parental Occupations, By School, in Percentage of Students

(Grades 2, 3, 4)

Parental Occupation	School C.Fred	HarryL	Lincoln	Oakdale	Roose-velt	West-over	All
White Collar (HH 1-4)	43%	54%	44%	65%	61%	73%	55%
Blue Collar (HH 5-7)	57%	46%	56%	35%	39%	27%	45%
Total	100%	100%	100%	100%	100%	100%	100%
N	80	261	174	114	170	37	836

As the section on results indicates, an analysis of covariance was another means used to control for the effects of differences in intelligence and parental socio-economic status.

Measuring Instruments

Operational definitions of the background variables, intelligence and parental socio-economic status, were derived from widely known instruments. Intelligence was measured by the Analysis of Learning Potential, a published test designed to predict success in academic learning by identifying skills and abilities basic to such success. This instrument has been in use for several years in Johnson City. The test scores used here were obtained from the normal testing schedule used in the district: grades 2 and 4 were measured in January, 1972; scores for the present grade 3 were obtained from their testing in January, 1971 when they were in the second grade.

Information concerning parental socio-economic background was obtained by pupil take-home cards requesting information on parents' occupation and education. Ninety-four percent were returned which included adequate information for coding the occupation; the Hollingshead seven level scale of occupations was used for coding this data (Hollingshead, 1957). Two coders rated each occupation; any initial disagreement concerning the appropriate category for a particular occupation (about 10% of the cases) was resolved by discussion among the coders. For some analyses,

the seven level scale was further collapsed into white collar occupations (codes 1 to 4, professionals and business managers to clerical and sales workers), and blue collar occupations (codes 5 to 7, skilled workers to unskilled laborers and welfare recipients).

Stanford Achievement Test scores were used as the measure of academic achievement, specifically the Primary II battery for grades 2 and 3, and the Intermediate I battery for grade 4. These were administered by the classroom teachers in April 1972, and machine scored by the publisher. These nationally normed tests have had wide useage for many years; the reliabilities for the 1964 editions used were quite high, ranging from .66 to .94 on the various subtests (Kelley, T.L., et al., 1966). Percentile rank scores were used for analysis rather than grade equivalent scores in order to compare schools of slightly different grade composition.

To consolidate the number of scores to be discussed, several subtests were combined to form language, arithmetic, and science-social studies indices. The Language Skills Index was formed by an arithmetic mean of the percentile scores for the Word Meaning, Paragraph Meaning, Spelling, Word Study Skills and Language subtests. Similarly, the Arithmetic Skills Index is composed of the mean percentile scores of the Arithmetic Computation and Arithmetic Concepts subtests (the score for the Arithmetic Applications subtest included in the Intermediate I battery was deleted). Finally, the Primary II battery taken by the second and third grades contained a

single subtest for Science - Social Studies, and the grade 4 subtests on these subjects were again combined to form a mean score.

For the measurement of affective aspects of the students' reaction to open education, instruments were used which were developed by Ohio University and Westinghouse Learning Corporation for a national evaluation study of the Head Start program (Cicirelli, Victor G. et al., 1969). The Children's Self Concept Indicator (CSCI) is a semi-projective test which uses a series of picture stories, each including statements about a "flag child" and a "balloon child". The child taking the test is to indicate which pictured child is more like himself. For example, item 1 reads, "The balloon child is learning a lot in school. The flag child isn't learning very much." The classroom teacher read each item aloud, then each child being tested marked his choice in his test booklet. The Self Concept score was computed from the number of positive choices made by the child. A copy of the complete instrument is found in Appendix B. It was administered in the normal classroom groups near the end of May, 1972. As a part of its test development, the Westinghouse Ohio University researchers obtained an internal consistency reliability coefficient of .80 for a sample of 100 pupils, and test-retest reliability after two weeks of .66. For our Johnson City sample of 1159 scores on the CSCI, an internal consistency reliability of .82 was obtained.

The Children's Attitudinal Range Indicator (CARI) attempts to assess a child's positive or negative feelings toward his surroundings by a series of picture stories. Each item is developed by three pictures showing a child in a particular situation; a fourth picture contains a stylized happy face, a neutral face, and a sad face. The respondent is to complete the story by choosing which face represents the feelings of the person in the story, thus inviting the child responding to identify with the pictured child. The CARI as a whole consisted of 32 items; eight each for measuring the respondent's attitude toward school, home, peers, and his neighborhood (society). A copy of this instrument is also in Appendix B. Items included within each of the four attitudinal dimensions are numbered as follows:

School: 2,8,12,16,19,21,25,31.

Home: 4,7,10,13,20,24,26,29.

Peers: 1,6,9,15,18,22,27,30.

Society: 3,5,11,14,17,23,28,32.

This instrument was also read aloud by each teacher to the pupils, who marked their responses in the test booklets. It was given at the same time as the CSCI in May, 1972.

The Westinghouse-Ohio University researchers reported internal consistency reliabilities on the CARI, computed for a sample of fifty second graders, as follows: Peers - .66, Society - .70, Home - .68, and School - .59. However, the Johnson City population failed to reach even this level of

reliability, for our inter-item internal consistency (alpha) coefficients were Peers - .43, Society - .45, Home - .53, and School - .51. These coefficients indicate a rather low degree of internal consistency among the eight test items supposed to be tapping one coherent attitude. For this reason, a number of factor analyses were performed on the CARI items, using both orthogonal and oblique rotations on the unrotated factor matrix, and systematically removing up to seven items of low communality from the analysis. However, none of these methods yielded a factor structure at all similar to the dimensional structure assumed by the Westinghouse-Ohio researchers to be measured by the CARI. That is, the items did not cluster into the dimensions of attitudes toward Home, School, Peers, and Society as the instrument was designed. In fact, the factors determined by factor analysis were not easily interpretable, perhaps being related more to the nature of the interpersonal situation pictured in each item than to the place where the situation occured. In addition, no analysis yielded less than nine separate factors, each including only two or three items having high enough loadings (above .40) to justify possible construction of new indices based on the factor analysis. This would have led to a large number of conceptually vague new dimensions, with few items on each, having even lower reliability estimates. Therefore, factor scores for subjects were not analyzed; no further analysis was conducted using factor analytic tech-

niques. It should be emphasized, however, that these results from factor analysis indicate the attitudes measured by the CARI are most likely not unidimensional, but whole clusters of feelings reflecting the sometimes positive, sometimes negative outcomes of diverse interpersonal situations encountered within different environments. Thus, a child's reported score for favorability toward "School", for example, is most likely an oversimplified combination of his separate feelings about the physical appearance of the school building, the friendliness of his teacher, his total experience with teachers, his apprehension concerning the quality of his school work, and so forth. The CARI attitude scales do not reveal clearly which aspects of a child's experiences are most determinate of his response.

In an attempt to tap a more specific dimension of attitude toward school, one new index was constructed, primarily by combining CARI items which correlated moderately highly with scores on the Language Skills and Arithmetic Skills achievement indices. This new index contains items picturing parent's, teacher's, and peer's evaluations of schoolwork, for example, along with some items apparently reflecting a global reaction toward school; its major component appears to be the degree of anxiety felt by the child concerning the evaluation of his schoolwork. It will be labeled the CARI Schoolwork Evaluation Index (CARI E) in later analyses, and is computed from the responses to items 2, 7, 16, 19, 21, and 22. Its internal consistency reliability of .52 com-

pares favorably with reliability coefficients for the original CARI indices, particularly since it contains only six rather than eight items.

III - RESULTS

Academic Achievement, Intelligence, and Parental Occupation

The first two propositions concern the relationship of academic achievement with intelligence and with parental occupation. Table 3 shows the zero-order correlations for these variables. As expected, both background variables are significantly associated with achievement in all areas measured -- Language Skills, Arithmetic Skills, and Science - Social Studies. As indicated in Table 3, the relationship of intelligence with achievement is much stronger than the relationship of parental occupation with achievement. However, the intelligence-achievement correlations are similar in magnitude to the correlation coefficients of about .60 found in the few previous reports of this association for elementary level children (Lavin, 1965, p.58). It should be noted that these zero-order correlation coefficients do not control the possible effects of each background variable on the other. That is, the significant association found between achievement and parental occupation might in fact be accounted for by intelligence alone, because children of higher status are more likely to have higher intelligence. Or, conceptually, the relationship between achievement and intelligence might be due to parental status alone, if children of high intelligence originated only in high status families.

To examine the possible effects of each background

Table 3 - Correlations of Achievement Indices with Intelligence and Parental Occupation

(All schools - Grades 2,3,4)

Achievement Index	Intelligence r	Intelligence N	Occupation r	Occupation N
Language Skills	.63	753	.18	836
Arithmetic Skills	.60	753	.16	836
Science-Social Studies				
Grades 2 & 3	.47	476	.12	550
Grade 4	.72	255	.28	263

(All correlations significant beyond .01 level)

variable on their mutual relationships with achievement, Table 4 shows the partial correlations of the achievement indices with intelligence, controlling for parental occupation, and the partial correlations of the achievement indices with parental occupation, controlling for intelligence. As indicated, the association of achievement with intelligence remains strong over all three achievement indices, even when the effect of parental occupation is controlled. However, Table 4 indicates that the zero-order positive associations between achievement and parental occupation (shown in Table3) are greatly attenuated when the influence of intelligence is controlled: the correlation between score on the Language Skills Index and parental occupation drops from .18 to .06; the correlations of the other achievement indices with occupation are similarly reduced. Thus, most of the influence of parental occupational status on achievement is shown to operate through the association of higher status with higher intelligence, although positive, but statistically non-significant, associations remain consistently for all achievement measures. These findings are also consistent with previous research indicating that the positive correlation between school grades and socio-economic status is greatly reduced when differences in intelligence are controlled (Lavin, 1965). A tabular analysis of these variables (not shown) confirmed the strong relationship of achievement with intelligence regardless of status level, and the much weaker association of achievement with occupation with the effects of

intelligence controlled. The data thus provide strong confirmation of the first proposition regarding the association of achievement and intelligence, but only weak support for the second proposition of the association of achievement and parental status with effects of intelligence controlled.

Achievement in Open and Traditional Classrooms

We can now turn to an examination of the impact for academic achievement of the structural changes instituted at Oakdale school. Table 5 shows the mean percentile achievement scores on Language Skills, Arithmetic Skills, and Science-Social Studies for Oakdale, all Johnson City elementary schools except Oakdale (including Roosevelt), and for Roosevelt school. It will be recalled that Roosevelt is the school most similar to Oakdale in the intelligence and parental occupations of its student body, and is thus being used as a comparison school. As the table indicates, achievement at Oakdale was not significantly different from that at all other schools, except that Oakdale students in grades 2 and 3 achieved better in Science-Social Studies than did children at all other schools (difference significant at the .05 level). However, Table 5 reveals that children at a traditionally structured school, Roosevelt, achieved significantly better than children at Oakdale in both Language Skills and Arithmetic Skills, with both differences significant at the .01 level. Figure 1 illustrates these results

Table 4 - Partial Correlations of Achievement Indices With Background Variables

(All schools - Grades 2, 3, 4)

Achievement Index	Correlation with Intelligence, with Parental Occupation Controlled	Correlation With Parental Occupation Intelligence Controlled
Language Skills	.61**	.06
Arithmetic Skills	.59**	.04
Science-Social Studies		
Grades 2 and 3	.46**	.03
Grade 4	.71**	.19**

**p<.01

Table 5 - Mean Percentile Scores on Achievement Indices by School, Grades 2, 3, and 4

Achievement Index	All Schools Except Oakdale	Oakdale	t Oakdale vs. all Others	Roose-velt	t Oakdale vs. Roosevelt
Language Skills	58.9	57.5	.60	68.7	4.22**
N	(736)	(120)		(167)	
Arithmetic Skills	60.5	58.3	1.00	74.3	6.00**
N	(738)	(120)		(166)	
Science-Social St. Gr. 2 & 3	65.9	73.2	2.38*	77.9	1.43
N	(514)	(70)		(110)	
Science-Social St. Gr. 4	53.8	56.0	.57	61.5	1.06
N	(224)	(51)		(55)	

*p<.05
**p<.01

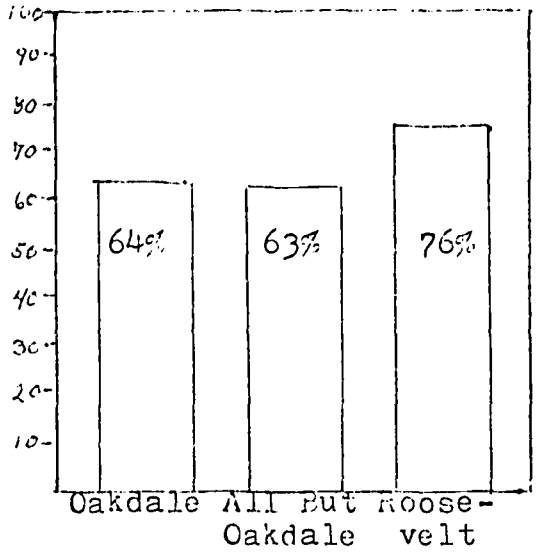
graphically by showing the percentage of students who scored above the national median on the three achievement skills. Oakdale was predominately at district level, while Roosevelt was distinctly ahead of district level.

An analysis of covariance was computed to adjust these scores for the differences among the schools in intelligence, parental occupations, and sex composition. This statistical technique, in effect, predicts the most likely mean scores for the schools under comparison, given the differences in their student body composition along the control variables considered. The covariance technique then enables a test of the statistical significance of differences among the adjusted mean scores. Table 6 presents the resulting adjusted mean percentile scores on the Language, Arithmetic, and Science-Social Studies indices for Oakdale, other schools (excluding both Oakdale and Roosevelt), and Roosevelt. It indicates that Oakdale's achievement results were still not significantly different from those of most other Johnson City schools except that Oakdale's second and third grade pupils achieved better on Science-Social Studies. If Roosevelt is compared with other schools, even with the effects of intelligence and parental occupation controlled, its students achieved significantly better on all three measures than students in other schools, excluding Oakdale. A tabular analysis to control for the effects of intelligence and parental occupation was also constructed. It is shown as Tables 1 to 3

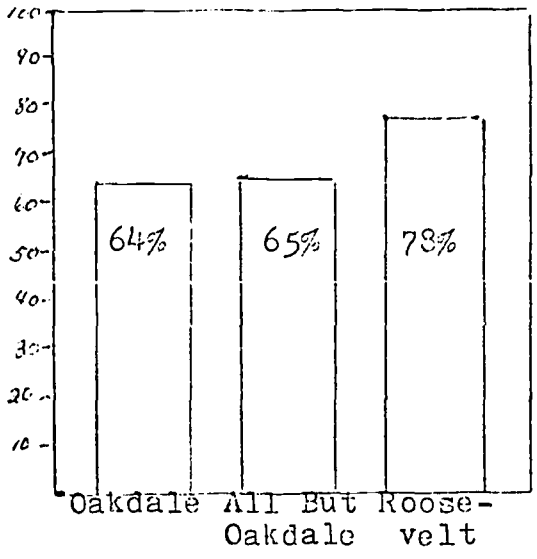
of Appendix A; its results confirm the results derived from the analysis of covariance.

Additional interesting results were revealed by analyzing the achievement test scores separately for boys and for girls, then examining differences between the schools. On the Language Skills indices, the general trend was for larger percentages of girls than boys to achieve above the national median (69% of the girls versus 58% of the boys on Language Skills; 69% of the girls versus 61% of the boys on Arithmetic Skills). This general trend has been found in previous studies (Lavin, 1965, p.129), and was followed at Oakdale school. This pattern of higher achievement by girls was not generally affected by either intelligence or or parental social status (data not presented). However, it was not found at Roosevelt school; there, both boys and girls scored equally highly on both Language Skills and Arithmetic Skills. Examining achievement on the Science-Social Studies Index, slightly more boys than girls scored above the national median in all schools combined, and in Oakdale. Again this difference was not found at Roosevelt; thus, it appears that by unknown means, Roosevelt school has been able to substantially eliminate the sex differentials in achievement; both its boys and its girls achieved consistently well. The elimination of the differences by sex largely accounts for the overall differences in achievement between Roosevelt and the other schools; that is, Roosevelt's girls achieved at

Combined Language Skills



Combined Arithmetic Skills



Science and Social studies

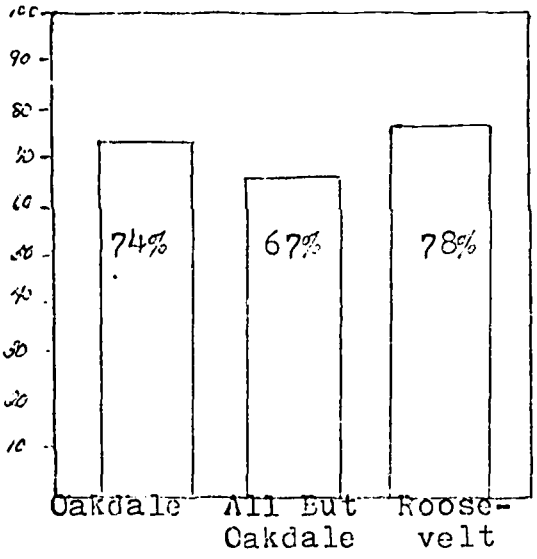


Figure I

Percentage of Students Above National Fiftieth Percentile on Stanford Achievement Tests

Grades 2, 3, & 4

Table 6 - Results of Analysis of Covariance - Mean Percentile Scores on Achievement Measures Adjusted for Effects of Intelligence, Sex, and Parental Occupation

(Grades 2, 3, 4)

Achievement Index	Oakdale	Others	F Oakdale vs. Others	Roose-velt	F Roosevelt vs. Others
Language Skills	55.3	57.8	1.92	65.5	17.7**
Arithmetic Skills	54.8	58.7	3.60	67.0	14.4**
Science					
Social St.					
Gr. 2 & 3	70.1	63.6	3.85*	74.2	7.53**
Gr. 4	50.1	53.8	1.63	59.6	4.52*

*p<.05
**p<.01

about the same level on language and Arithmetic as the girls at other schools while Roosevelt's boys scored higher than did boys at other schools.

To summarize the results from the achievement test data, the major finding is that the open school, Oakdale, did not differ significantly in achievement from the level of the rest of the district as a whole. Thus, proposition three is not supported, for the children in open classrooms have not achieved better than children in the district's traditional schools, even when the scores were adjusted for the influences of intelligence and socio-economic status. The fact that one traditional school, Roosevelt, which was quite similar to Oakdale in the composition of its student body, attained signigicantly higher achievement than the district's level, was shown to be substantially related to the higher achievement level of its boys than was typical for Johnson City as a whole.

Results of Affective Data

Previous studies of children's self-concept or self-esteem have found it to be weakly related to social class (Rosenberg, 1965), but perhaps more strongly related to academic achievement (Johnson, 1970). Correlates of attitudes toward school have not been extensively studied. This may be because an overall index of attitude or "satisfaction" with school is such a mixture of feelings toward separate aspects of school life that one attitude score is

Table 7 - Percentage of Students Scoring Above National Fiftieth Percentile on Achievement Indices, By Sex and By School

(Grades 2, 3, 4)

Achievement Index	All Schools		Oakdale		Roosevelt	
	Boys	Girls	Boys	Girls	Boys	Girls
Language Skills	58%	69%	56%	74%	76%	77%
Arithmetic Skills	61%	69%	57%	74%	77%	79%
Science-Social St.	72%	64%	76%	71%	77%	78%
N	476	407	70	51	107	73

not very exact, as is pointed out by Jackson (1968), and as was found by the factor analysis for this study, discussed previously.

Table 8 shows the district-wide intercorrelations of our self concept and attitude toward school measures, along with their correlations with the background variables of intelligence and parental occupation, and their associations with achievement indices. As the table indicates, positive self concept is not associated here with parental occupation, but is slightly related to higher intelligence and sex (girls have more positive self concepts). It is more strongly associated with high academic achievement. The CARI attitude toward school index is not associated with intelligence or parental occupation, nor to sex, is moderately related to a positive self concept, and rather weakly associated with academic achievement. The schoolwork evaluation index is more highly related to the achievement scores, and is also somewhat correlated with intelligence. It is not associated with level of parental occupation, nor to sex of the respondent, but again is related to the self concept score. From the low relationships found between these affective measures and the background variables, is appears that the measures do tap affective dimensions which operate independently of the child's social status or intelligence. Of course, these correlations can not indicate a causal direction for the association of achievement with positive self concept and attitudes toward school; further long term study

Table 8 - Coefficients of Correlation of Affective Measures With Other Variables

(Grades 2, 3, 4 - All Schools)

Variables Correlated	Self Concept Index	CARI School Index	CARI School-work Eval. Index
Sex (1=Male, 2=Female)	.11**	.04	.07
Intelligence	.17**	.04	.15**
Parental Occupation	.04	.04	.06
Language Skills Index	.30**	.11**	.23**
Arithmetic Skills	.34**	.17**	.23**
Science-Social Studies Grade 4	.25**	.07	.15**
Grades 2 & 3	.06	.05	.16**
CARI School Index	.23**	-	.74**
CARI Schoolwork Evaluation Index	.26**	.74**	-

**p<.01

(Note: All correlations above have been signed according to their substantive meaning; thus, the scales for parental occupation and the two CARI indices are reversed so that higher values represent higher SES and more positive attitudes.)

would be necessary for that.

Our substantive propositions concerning these affective measures predicted more positive self concepts and more favorable attitudes toward school for children in the open classroom school, Oakdale. These predictions were not supported by the data, for in fact the Oakdale students, in comparison with students at all other schools, had significantly less positive self concepts, were less favorable toward school, and showed more anxiety about having their schoolwork evaluated, as indicated by Table 9. Furthermore, students at the comparison school, Roosevelt, had significantly higher self concepts than did Oakdale students, and more favorable attitudes toward both school in general and having schoolwork evaluated. The differences in these measures are illustrated graphically in Figures 2, 3, and 4, which show consistently greater proportions of Oakdale students in the less positive scale ranges, with fewer students in the more favorable ranges. An analysis of covariance was also computed for these affective variables to control for the possible effects of intelligence, sex, and parental occupation. The resulting adjusted scores, shown in Table 10, further support the finding that Oakdale students had less positive self concepts and attitudes than did students at the remaining schools. Roosevelt students scored slightly higher, but not significantly so, than students at the rest of the district's schools.

These measures were also analyzed for differences by sex,

as shown in Table 11. In general, slightly higher percentages of girls than boys scored above the district-wide median on each measure. On the self concept index, the boys and girls at both Oakdale and Roosevelt were consistant with this pattern, with more girls than boys scoring above the median at each school. However, on the attitude toward school index and on the schoolwork evaluation index, a somewhat lower percentage of Oakdale girls than boys scored above the median, while Roosevelt girls and boys were consistent with the district pattern of more girls scoring above the median. For these attitude measures, lower percentages of both boys and girls scored above the median at Oakdale than at Roosevelt, but the differences between the two schools were particularly large for the girls.

Tabular analyses for these measures were also constructed in order to examine possible effects of intelligence and parental occupation on the affective differences by sex (results not shown). While there are too few students at Oakdale to permit strong confidence in this component analysis, the results do indicate a possible interaction of parental social status with the affective differences by sex at that school. The low percentage of all Oakdale girls scoring above the median on both attitude measures is mostly a result of very low attitude scores among the daughters of blue collar parents: on the CARI School Index, only 13% of the 16 lower status girls scored above the median, while 38% of the 32

Table 9 - Mean Scores on Affective Measures for Oakdale, Other Schools, and Roosevelt

Affective Index	All Schools Except Oakdale	Oakdale	t Oakdale vs. Others	Roose-velt	t Oakdale vs. Roosevelt
Self Concept Index[1]	23.40	22.57	2.20*	23.94	3.41**
CARI School Index[2]	6.39	7.21	4.03**	5.99	5.42**
CARI Schoolwork Evaluation Index[2]	3.75	4.39	3.25**	3.39	4.39**

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

[1]Higher score = more positive self concept.

[2]Lower score = more positive attitude.

Table 10 - Analysis of Covariance - Mean Scores on Affective Measures Adjusted for Effects of Intelligence, Sex, and Parental Occupation

(Grades 2, 3, 4)

Affective Index	Oakdale	Others[1]	F Oakdale vs. Others	Roose-velt	F Roosevelt vs. Others
Self Concept Index[2]	22.26	23.10	4.47*	23.68	2.12
CARI School Index[3]	7.47	6.85	7.07**	6.51	2.14
CARI Schoolwork Evaluation Index[3]	4.59	4.01	7.20**	3.74	1.66

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

[1]Others = C. Fred, Harry L., Lincoln, and Westover Schools.
[2]Higher score = more positive self concept.
[3]Lower score = more favorable attitude.

Figure 2 - Distribution of CSCI Scores, by School

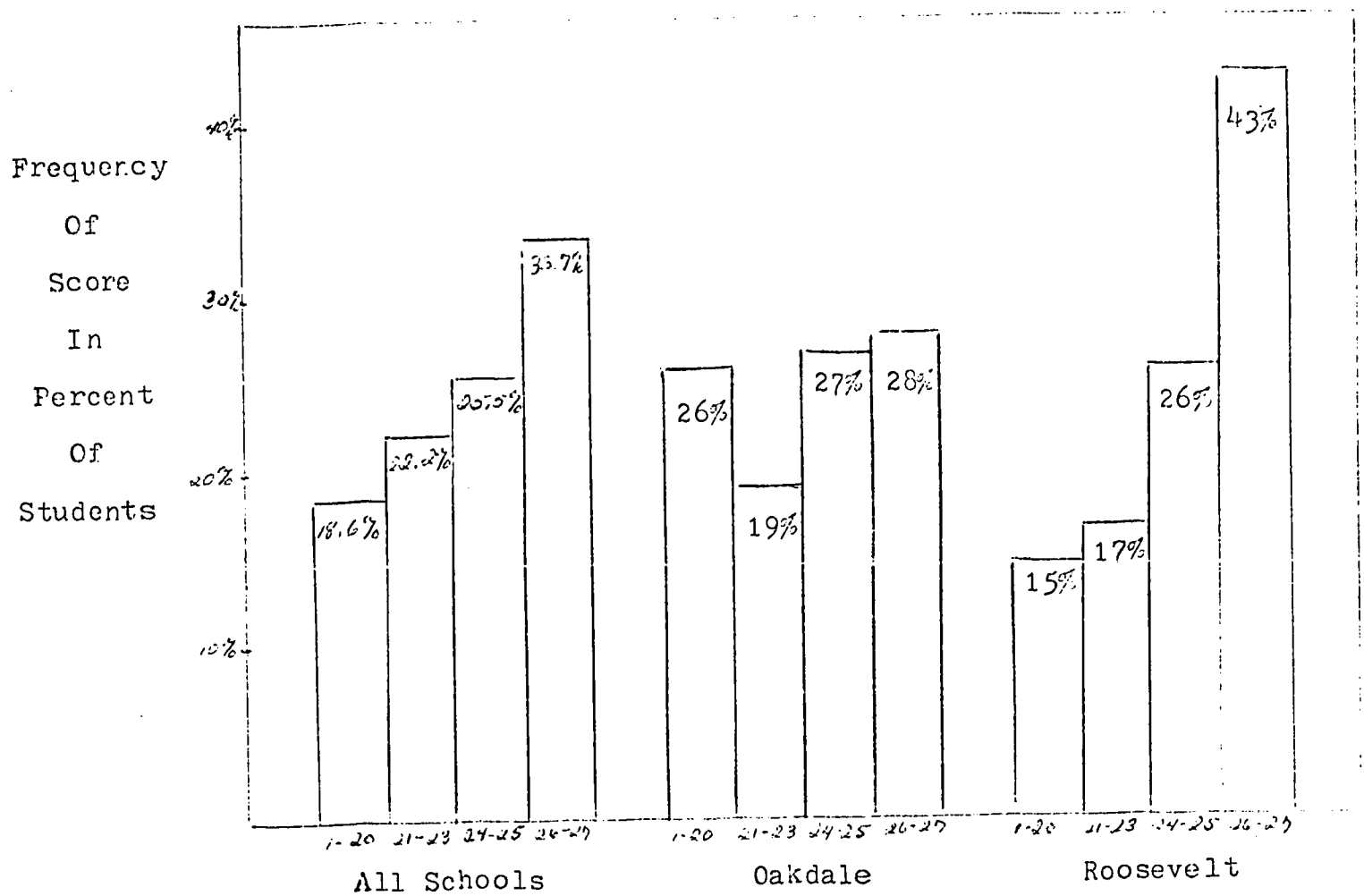
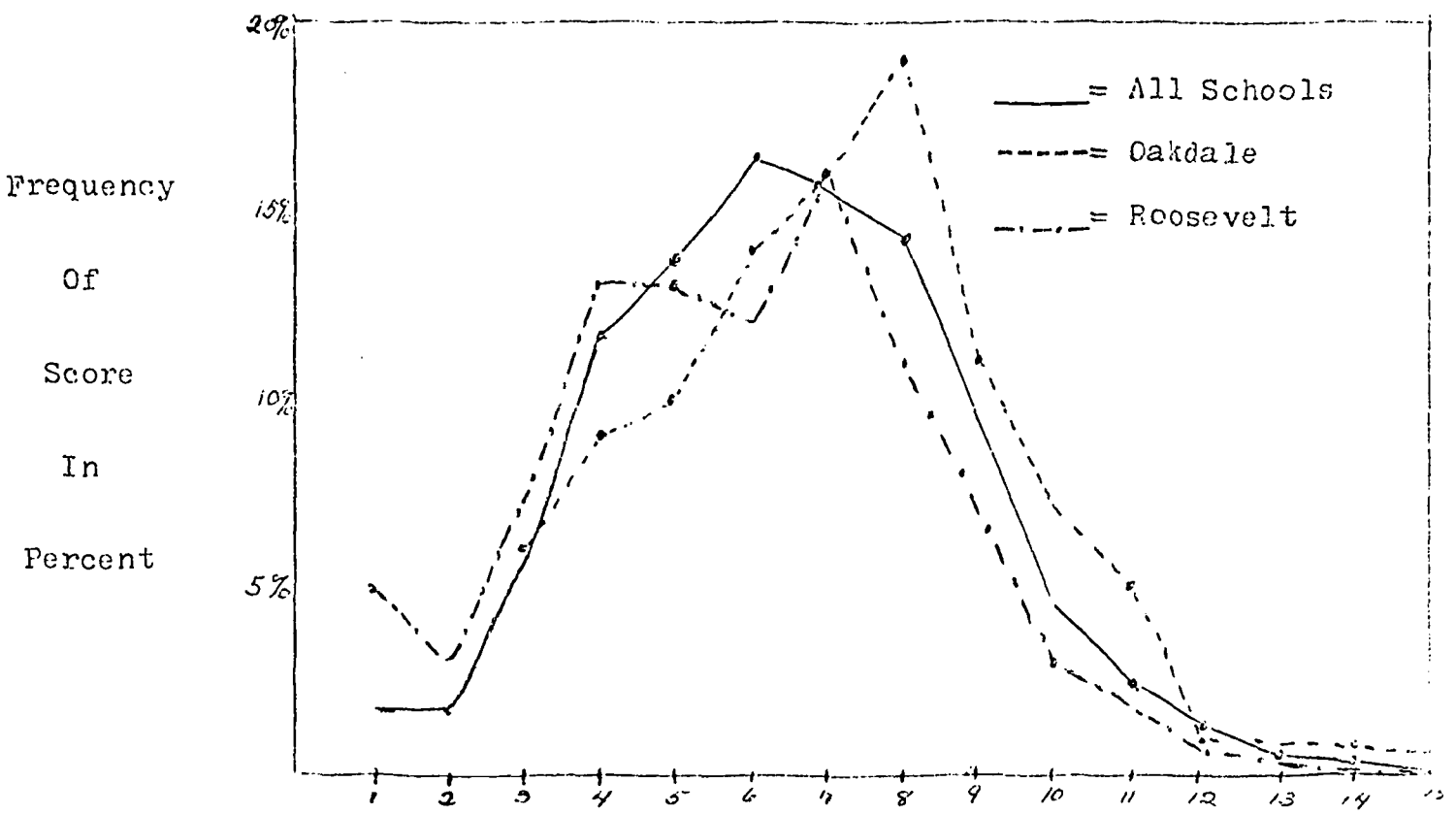


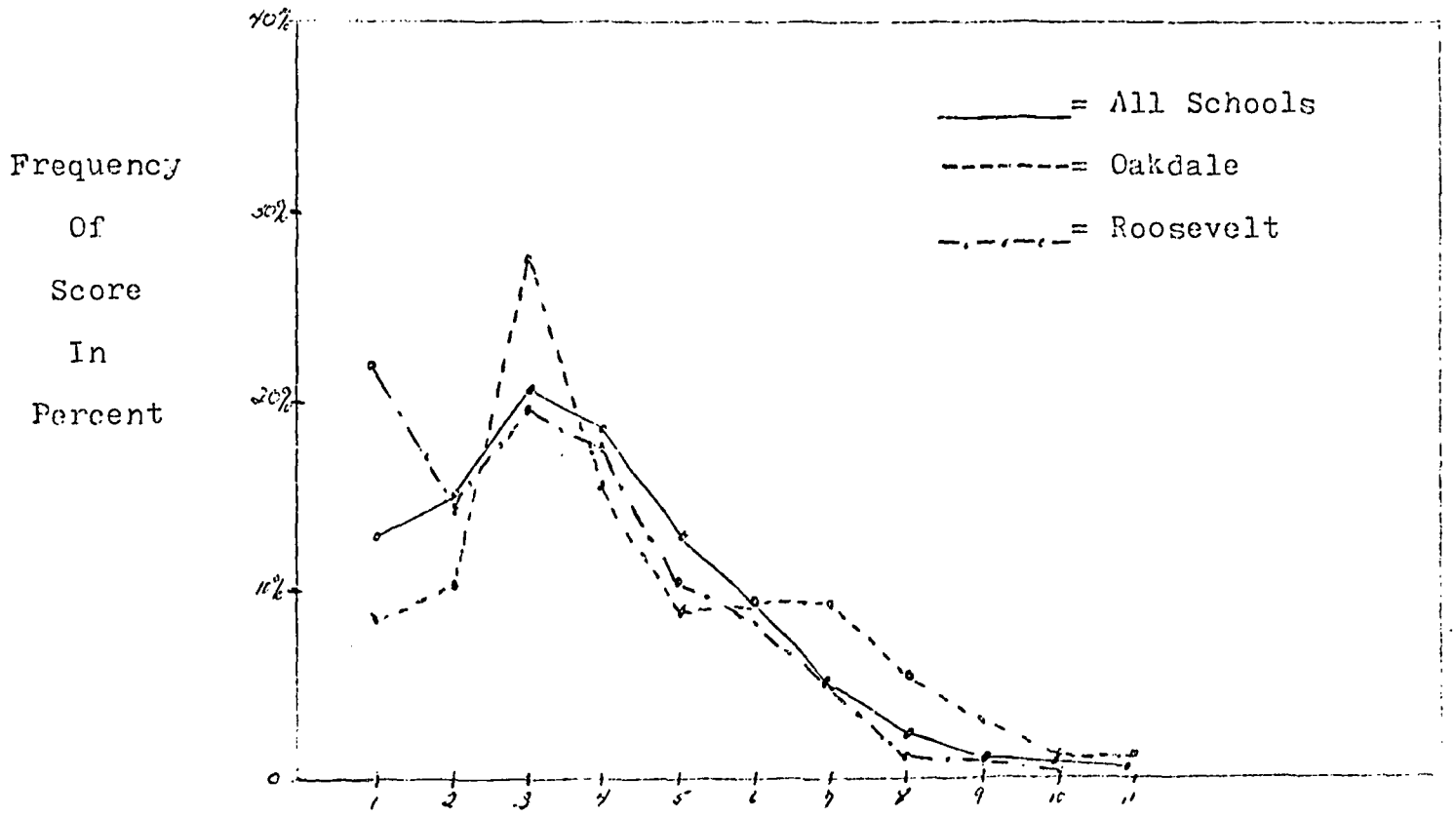
Figure 3 - Distribution of CARI - School Scores



Score on CARI Attitude Toward School Index

(Low Score=Positive Attitude)

Figure 4 - Distribution of CARI - Schoolwork Evaluation Scores



Score On CARI Schoolwork Evaluation Index

(Low Score=Positive Feeling)

Table 11 - Percentage Above Median on Affective Measures By Sex, Grades 2, 3, 4.

Affective Measure	Oakdale Boys	Oakdale Girls	Roosevelt Boys	Roosevelt Girls	All Schools Boys	All Schools Girls
Self Concept Index[1]	46%	53%	64%	67%	51%	58%
CARI School Index[2]	36%	27%	48%	55%	43%	47%
CARI Schoolwork Evaluation Index[3]	41%	37%	51%	59%	42%	46%

[1]Dividing point closest to median for Self Concept Index is top 55% of all students.
[2]Dividing point closest to median for CARI School Index is top 51%.
[3]Dividing point closest to median for CARI Schoolwork Evaluation Index is top 48%

higher status girls did so. The comparable figures for boys are 42% of 24 lower status boys and 31% of the 42 higher status boys. On the CARI Schoolwork Evaluation Index, only 20% of Oakdale's lower status girls scored above the median, while 47% of the higher status girls did the same. For Oakdale's boys, 46% of the lower status boys scored above the median on this measure, while 40% of the higher status boys did so. Thus, for these two attitude measures the differences among the girls related to their social status are both larger in magnitude and in the opposite direction from the differences among the boys (i.e., more lower status than higher status boys scored above the median on both measures, while larger percentages of higher status girls scored above the median). A further examination of the Self Concept Index revealed that part of this pattern of relationships between sex and parental occupation also occurred there: only 31% of the lower status girls had high self concept, compared with 66% of the higher status girls. For boys the figures are 46% of lower status boys versus 48% of the higher status boys. Thus, Oakdale's lower status boys score about as well as the higher status boys on these affective measures, and substantially better than the lower status girls. The higher status girls generally have higher percentages above the mean than the higher status boys, and also much higher percentages than the lower status boys. This interaction pattern does not appear to be affected by intelligence, nor does it occur at either

Roosevelt, nor in the district as a whole.

To summarize the results from the analysis of the affective measures, the test propositions were not supported, for the students at the open school did not have more favorable self concepts, nor did they have more positive attitudes toward school or their schoolwork, when the effects of intelligence and parental occupation were controlled. In fact, quite unexpectedly, both self concepts and attitudes toward school were significantly lower among students at Oakdale than among students in the rest of the district as a whole, or in the comparison school, Roosevelt. These results were found to be somewhat related to the particularly low self concepts and attitudes among Oakdale's lower status girls, although other groups of Oakdale's students were also below the district levels. By, contrast, consistently higher percentages of Roosevelt students scored above the district medians, and it followed the district wide pattern of higher percentages of girls than boys scoring above the medians for each measure. These unexpectedly low self concepts and attitudes found in the open classroom school, coupled with lack of differences between open and traditional schools found for the achievement measures, do not offer support for the proponents of open education. However, a number of different interpretations for these data are possible, as will be discussed in the next section.

IV - INTERPRETATION AND DISCUSSION OF RESULTS

Discussion of the results just presented might focus on one of a number of interpretations. At first one might simply decide to take the major results at face value as a disconfirmation of the hypotheses tested, concluding that open education is not effective either in increasing achievement or in improving attitudes toward school. However, several other interpretations are both possible and more fruitful in their implications for sociological knowledge as well as for understanding educational change. Therefore, four additional sets of ideas will be discussed: 1) the results, particularly those from the affective measures, as representing a low point in a curvilinear change process, 2) an examination of the possible influences of student peer group norms as an explanation for the differences by sex in both achievement and affective data, 3) the data as resulting from a failure to implement open education, thus nullifying the attempt to measure the effects of open education, and 4) an analysis of the initial theoretical assumption that effective organizational change can be stimulated by structural changes alone.

To interpret the data presented here as a negative judgement on the effectiveness of open education would be unfairly prejudging a potentially valuable educational program. Since the major structural changes toward

establishing open classrooms at Oakdale school had been made barely three months before the achievement tests were given, the achievement results reflect almost entirely the effectiveness of education prior to the changes made. This is the reason that the research program was originally projected as a four-year longitudinal panel study, with the first year's data forming a baseline for later comparisons. Similarly, the affective data may reflect only temporary variation in the children's self concepts and attitudes rather than an adequate measure of long term results of open classrooms. Clearly, measurements should be continued for several additional years in order to assess the overall effectiveness of open education.

Nevertheless, a discussion of the results on the affective measures can be illuminating. One perspective is to view the affective results as portraying one point in time within a continuous change process. Within as complex an organization as a school, change does not occur simply: a period of time is required for participants either to learn new roles or to adjust their old roles to new structural arrangements. Even if participants are initially receptive to the changes, they may undergo a period of confusion or uneasiness until new behavioral patterns become habitual. Unfortunately, this perspective has not been developed within the literature on organizational change, in which the major focus has been finding means of overcoming members' initial resistance to change (Gross, et al., 1971).

Yet there is precedent supporting this viewpoint in literature analyzing the adjustment of persons who move from one culture to another, particularly college students from foreign countries studying in the United States (for a summary of this literature, see Pool, 1965; and Brein & David, 1971). Researchers have typically found a U-curve pattern over time in the attitudes toward self and others among foreign students: initial arrival in a new country is accompanied by feelings of excitement and pleasant anticipation, even though there may be some anxiety about the newness of everything. After a period of from two to eighteen months, the newness wears off, but the foreign strdent's anxieties increase because he is unable to change his behavioral patterns to fit in easily with the expectations of a different culture. This is then the low point in the U-shaped curve, which may last for several months, in which the foreign student is likely to feel anxious or depressed, dissatisfied with himself and/or with those around him, or even physically ill. However, after a time this culture shock wears off for most students as they learn behaviors more appropriate for their surroundings and perhaps begin to receive the rewarding experience of accomplishment within the new setting. Of relevance here is the finding that adjustment to the expectations of a new culture is a process requiring considerable time, that usually takes a curvilinear form of excitement, then anxiety, then gradually increasing satisfaction over time.

If this theoretical framework is applied to an organizational setting, one would expect significant organizational changes to be followed by a period of less favorable attitudes or morale. Large scale changes in the structure of a school initiate changes in other aspects of its institutionsl culture, such as changes in the role requirements for both teachers and students, changes in expectations regarding accomplishment, and so forth. Thus, the less positive self concepts and less favorable attitudes toward school found in this study may be reactions to organizational change similar to that found among persons moving from one culture to another. Some support for this interpretation was found during informal conversations with a number of the Oakdale schoolchildren in October, 1972, about five months after the affective data was collected. Several children mentioned feeling "confused" when the changes first started at Oakdale, but it was not possible to determine whether they were referring to the first several days only or a longer period of time for this disoriented feeling. If this interpretation is valid, one would expect that over time the students' attitude will come to reflect the impact of the innovations alone, rather than being responses to the mere fact of change. That is, if open education has the effects its proponents claim for it, and if the most essential features of open education are successfully implemented at Oakdale, then positive changes in student self concepts and attitudes would be predicted for future measurements.

However, since both achievement and affective results did differ according to sex of the child, with different patterns of results at the various schools, it is likely that the introduction of additional variables will be necessary in future studies to account for similar findings. Several previous studies do provide interpretive leads. In a suggestive study by Jackson and Lahaderne (1970), observers classified teacher behavior in four sixth grade classrooms as instructional, managerial, or prohibitory, then analyzed the relation of these behaviors to the sex of the pupil on the recieving end. It was found that boys consistently received much more than their share of teacher managerial and prohibitory behaviors in all four classrooms. Unfortunately, this study did not measure pupil achievement or affect, so we do not know whether these differences in teacher behavior by sex of pupil were associated with pupil variabilty. However, since such differences have been found, it is plausible that variation in teacher differentiation by sex between Oakdale and Roosevelt teachers may be affecting the data results. Such variation in teacher behavior may or may not be related to the educational changes started at Oakdale.

A teacher confronted with the data from the Jackson and Lahaderne study just discussed would be likely to resist concluding that teachers discriminate arbitrarily against boys, and advance the explanation that teachers react to

provoking behavior from the boys, who therefore needed more managerial and prohibitory control. Following this line of thought, we would need to investigate why boys in some schools would exhibit more behavior provoking negative sanctions from teachers than would girls, or even than would boys in other schools.

The answer to this problem may possibly lie in the different peer group norms in different schools or by sex. While this is a relatively unexplored aspect of educational research, there is fairly firm evidence that individual achievement is related to the backgrounds and aspirations of the other students in a school (Coleman, et al., 1966), an effect which is likely to be mediated by content of the student peer culture within a school. Other studies have found that the structure of sociometric choices within elementary classrooms was associated with the utilization of academic abilities: pupils in a centralized or hierarchically arranged liking structure utilized their ability less than did students in classrooms with a diffuse structure (in which all pupils received some choices from others) (Schmuck, 1970). Further, Schmuck (1970) found that pupils who believed they had low sociometric status among their peers had more negative attitudes toward themselves and toward school, in comparison with pupils who believed they were highly liked, but that pupils in a centralized liking structure were more accurate in judging their actual status than were pupils in a diffuse structure.

These findings are suggestive only, since we have no data on the sociometric structure or peer group norms within the Johnson City Schools. We do not know whether the results obtained, particularly the differences related to sex of the child, are in fact attributable to differences in teacher behavior by sex, to different peer group norms in various schools, or to different sociometric structures in the various classrooms, but these would be fruitful variables to include in a future study of this nature. Furthermore, whether or not the structural changes initiated at Oakdale have any effects on its peer group relationships is a completely open question, but one which may have important implications for the students' academic and personal development within an open classroom.

Yet another whole area for discussion concerns the degree to which some essential features of open education have or have not been implemented at Oakdale. As described in the introduction to this paper, changes at Oakdale emphasize use of new learning technologies, individualized instruction, family grouping, and some scheduling changes, but not pupil free choice of learning activity, nor major changes in the role of the teacher. Yet most open educators put a primary emphasis on these latter two elements as essential aspects of open education. A successful attempt to produce measurement instruments to distinguish empirically between "open" and "traditional" classrooms has recently been reported by Walberg and Thomas (1972). Their items focus most heavily

on diversity of manipulative materials available for free pupil use, on openness and respect in teacher-pupil relations, and on the teacher's role as guide and stimulator rather than director and judge. Thus, if these are the essential features of open education, then Oakdale has not really implemented open education.

Problems of implementing attempted innovations are beginning to be discussed in the literature on organizational change. A recent case study of an unsuccessful attempt to implement educational innovations similar to those advocated by open educators has been reported by Gross, Giacquinta, and Bernstein (1971). They found that teachers in the experimental school under study had been initially favorable to the innovations proposed by school administrators, but were unable to implement them for several reasons: 1) the teachers did not clearly understand the nature of the changes desired, 2) they lacked capabilities to change their classroom behavior readily, but had no retraining provided by the administration, 3) necessary educational materials were not provided, 4) previously existing organizational conditions, such as set scheduling and periodic grade cards, worked against implementation of new methods, and 5) there was not adequate support from administrators. These writers emphasize that theoretical views of major change within complex organizations should focus on change as a long-term process, not simply as a matter of overcoming organizational members' initial resistances to innovation, which has been the major

focus of most analyses of organizational change.

Other analysts have emphasized the complexities of organizational systems which may present barriers to implementation of innovation. Katz and Kahn (1966) advocate greater attention to the fit between technological or structural changes and the social subsystems of the workers or participants within an organization. They detail an example in which introduction of supposedly highly efficient technology into some English coal mines did not lead to greater productivity because the resulting extreme job specialization broke up previously operating work groups which were very meaningful in the lives of the coal miners. Only when cohesive work groups were re-established was the new technology utilized for greater efficiency. Another writer, David Johnson, has reviewed studies on organizational change as applied to education (1970, Ch. 14). He states that it is a sociological fallacy to view changes in organizational structure alone as likely to lead to desired changes in individual behavior, for this neglects the strong influences of the person's previously existing behavioral habits. He also reccommends that those planning organizational changes should analyze clearly what organizational elements -- whether individual attitudes, role structures, technologies, organizational structures, ect. -- need changing for which purposes, after finding that many attempted educational innovations have failed because the most appropriate target for change was not involved. Thus, a number

of possible problems preventing implementation of organizational innovations have been identified in this literature, although little systematic analysis of them has been attempted.

That several of these ideas have possible application to the inadequate implementation of open education at Oakdale school can be shown by an examination of several additional informal sources of evidence utilized in this study. Evidence that the structural changes introduced into Oakdale have not substantially changed the teachers' approaches to working with children was obtained by their responses to the School Environment Measure (SEM), a written questionnaire completed in May, 1972 by all teachers in this study. This instrument was originally prepared for the study of Head Start conducted by the Westinghouse Learning Corporation and Ohio University (Cicirelli, Victor., et al., 1969), and is composed of items discriptive of the inter-personal environment of a school. While the results of this questionnaire have not been fully analyzed, a preliminary look at the data revealed some suggestive differences in response between teachers of Oakdale and Roosevelt Schools. For several items on classroom structural arrangements, such as "In my school one most frequently sees the teacher in front of the room," and "In my school, it is generally thought best if the children stay in their seats while class is in session", Oakdale teachers scored lower than Roosevelt teachers, indicating their disagreement with

these statements and thier less traditional structuring of their classrooms. However, on several other items concerning teacher-pupil relationships, such as "It is frequently necessary for the teachers to let the children know who is the boss," and "In my school there are a number of teachers who sometimes become very angry at the children," teachers at Oakdale were more likely to agree than were teachers at Roosevelt. Thus, it appears from this data that Oakdale teachers have adopted some structural features of open education, but have not internalized the differences in educational philosophy and in the role of a teacher which are supposed to underlie the new developments.

In fact, Oakdale teachers may have adapted the innovations into support for the teacher directed objectives characteristic of the traditional classroom. As part of an informal discussion session with most of the teachers at Oakdale in November, 1972, the teachers were asked to write down the educational features which they felt are different in an open classroom from a "traditional" classroom, as well as the features likely to be the same in both situations. It was surprising that nearly all wrote that the subject matter and concepts taught are the same in both situations. This discussion, along with classroom observation, indicated that Oakdale teachers are still primarily concerned to inculcate factual material included in subject areas normally found within a traditional

elementary curriculum. The individualization of instruction at Oakdale allows each student to proceed at his own pace through fairly rigid "learning centers" prepared by the teachers, but not often to work with activities or materials of his own choice.

Furthermore, one of the features most often mentioned by the Oakdale teachers as different under open education is the practice at Oakdale of frequent (about once a week), formal "conferences" between a teacher and each individual pupil. The teachers feel this gives them a much more personal relationship with each child, enabling them to guide his individual learning more effectively. Whether the children reciprocate these positive feelings about conferencing is perhaps doubtful, for none of the children encountered during two afternoons of informal discussions within the classes even mentioned the conferences. It may well be that the innovations introduced into Oakdale have succeeded in reducing the child's area for freedom and increased the teachers' capacity for control over pupil activities. This could occur because the individualization of instruction psychologically removes the pupil from the security of being a member of group engaged in similar activities. Instead, he must face the teacher alone and assume individual responsibility for the completion of assigned work. Perhaps from the viewpoint of many pupils, the teacher's wrath is no longer centered on an anonymous entity, "the Class", but is focused squarely on himself as a not yet competent learner.

Feelings of this nature, then, might be responsible for the apparent lowering of self esteem and of favorability toward school among Oakdale student's. As Katz and Kahn pointed out (1966), removal of the individual from satisfactory relations within a primary group may result in both less work and less satisfaction with the work. The incomplete implementation of open education as an organizational system might be resulting in unintended consequence for the affective development of the children.

If these speculations have validity, then one would not expect future measurements of pupil achievement or affective development to show much improvement, for the changes actually implemented may have reduced the capacity of the educational process to provide satisfactions for many pupils, rather than increasing their freedoms. In this case, less favorable attitudes toward school would be predictable, as would less positive self concepts, since a child's self concept is likely to be closely related to his interpersonal experiences at school. Whether or not levels of achievement would change is more difficult to predict, since so little is known concerning the ways in which pupil attitudes and academic achievement are interrelated. If the curriculum materials are well constructed and if the teacher's attention to individual learning problems is effective, many pupils might score better on achievement tests in spite of negative feelings about both school and themselves. On the other hand, the negative affect might be strong enough to

interfere with their abilities to concentrate on learning, and thus lower their achievement scores.

Of course, another line of reasoning is possible if the innovations instituted at Oakdale are actually beneficial, even though not fully implementing the characteristics of open education. In this case, the negative results on the affective measures could be viewed as temporary depressing of basically affirmative attitudes due to the processes of change alone. In the long run, the effects of the mainly structural changes undertaken at Oakdale might increase both achievement and improve student morale, as seems to be expected by the teachers. It would simply not be possible to evaluate the effectiveness of open education by analyzing Oakdale's results.

In conclusion, the main thrust of the discussion presented here is that there are precedents in previous literature to provide explanation for negative results as both short-term and long-term outcomes of changes within complex organizations, such as those being introduced into Oakdale School. While the results of this first year's data collection should not be taken as an overall evaluation of the effectiveness of open education, they should serve as a caution flag for those advocating change toward this type of classroom. Certainly, further research is essential, and to answer even some of the questions raised here will require research involving much greater complexity than has been attempted here, research that is equal to the intricate web

of social, organizational, and psychological relationships that underlie the process of education.

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APPENDIX A

Table 1

Percentage of Students Above National Fiftieth Percentile on Language Skills Index - Grades 2, 3, and 4

(Number in Parentheses is N upon which Percentage is Based)

Parental Occupation	ALP	School							
		C. Fred	Harry L.	Lincoln	Roosevelt	Westover	All Except Oakdale	Oakdale	All
White Collar	Hi	86% (22)	82% (100)	70% (56)	93% (46)	95% (19)	83% (243)	80% (61)	82% (304)
	Lo	22% (9)	19% (31)	53% (17)	50% (8)	33% (6)	32% (71)	9% (11)	29% (82)
	All	62% (34)	65% (143)	66% (77)	85% (104)	78% (27)	71% (385)	69% (74)	71% (459)
Blue Collar	Hi	71% (28)	62% (66)	71% (59)	76% (34)	86% (7)	70% (194)	70% (27)	70% (221)
	Lo	14% (14)	22% (41)	33% (30)	15% (13)	66% (3)	25% (101)	11% (9)	24% (110)
	All	57% (46)	44% (118)	58% (97)	62% (66)	80% (10)	54% (337)	53% (40)	54% (377)
All	Hi	75% (53)	73% (169)	71% (121)	87% (83)	89% (27)	76% (453)	77% (95)	76% (548)
	Lo	29% (28)	22% (74)	36% (52)	27% (22)	44% (9)	29% (185)	10% (20)	27% (205)
	All	59% (88)	55% (267)	61% (189)	76% (180)	76% (38)	63% (762)	64% (121)	63% (883)

Table 2

Percentage of Students Above National Fiftieth Percentile
On Arithmetic Skills Index - Grades 2, 3, and 4

(Number in parentheses is N upon which percentage is based)

Parental Occupation	ALP	School							
		C. Fred	Harry L.	Lincoln	Roosevelt	Westover	Oakdale	All Except Oakdale	All
White Collar	Hi	86% (22)	81% (100)	71% (56)	89% (46)	100% (19)	70% (61)	82% (243)	80% (304)
	Lo	22% (9)	29% (31)	47% (17)	63% (8)	50% (6)	27% (11)	38% (71)	37% (82)
	All	62% (34)	64% (143)	66% (77)	85% (104)	85% (27)	63% (74)	71% (385)	70% (459)
Blue Collar	Hi	82% (28)	64% (66)	78% (59)	71% (34)	71% (7)	67% (27)	72% (194)	71% (221)
	Lo	29% (14)	19% (41)	33% (30)	38% (13)	100% (3)	56% (9)	30% (101)	32% (110)
	All	63% (46)	44% (118)	62% (97)	70% (66)	80% (10)	65% (40)	58% (337)	59% (377)
All	Hi	83% (53)	74% (169)	75% (121)	81% (83)	89% (27)	69% (95)	77% (453)	76% (548)
	Lo	25% (28)	24% (74)	36% (52)	45% (22)	67% (9)	40% (20)	32% (185)	33% (205)
	All	60% (88)	55% (267)	64% (189)	78% (180)	81% (38)	64% (121)	65% (762)	65% (883)

Table 3

Percentage of Students Above National Fiftieth Percentile
On Science-Social Studies Index - Grades 2, 3, and 4

(Number in parentheses is N upon which percentage is based)

Parental Occupation	ALP	School C. Fred	Harry L.	Lincoln	Roosevelt	Westover	Oakdale	All Except Oakdale	All
White Collar	Hi	91% (22)	82% (100)	81% (56)	93% (46)	90% (19)	80% (61)	85% (244)	84% (305)
	Lo	11% (9)	23% (31)	47% (17)	50% (8)	33% (6)	40% (10)	31% (72)	32% (82)
	All	65% (34)	69% (143)	73% (77)	87% (104)	74% (27)	73% (74)	74% (385)	74% (459)
Blue Collar	Hi	79% (28)	65% (66)	76% (59)	77% (34)	72% (7)	85% (27)	73% (194)	74% (221)
	Lo	29% (14)	37% (41)	30% (30)	15% (13)	100% (3)	67% (9)	33% (101)	35% (110)
	All	63% (46)	53% (118)	60% (97)	65% (66)	80% (10)	78% (40)	60% (337)	62% (377)
All	Hi	83% (53)	75% (169)	79% (121)	85% (83)	85% (27)	81% (95)	79% (453)	80% (548)
	Lo	21% (28)	31% (74)	35% (52)	27% (22)	56% (9)	50% (20)	31% (185)	33% (205)
	All	61% (88)	61% (267)	65% (189)	78% (180)	76% (38)	74% (121)	67% (762)	68% (883)