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ABSTRACT

The study attempts to determine those factors which exist concurrent with high achievement as measured by the Iowa Test of Basic Skills (ITBS). The data were drawn from sixth grade students enrolled in the Des Moines, Iowa Public Schools during 1974-75. Based on the various analyses, a profile of the individual student most likely to be a high achiever has emerged. While the profile does not hold true in all cases, students exhibiting these characteristics seem to generally exhibit high achievement as measured by the ITBS: female, majority race, family not eligible for free hot lunches, has attended only one or two schools by the time they are enrolled in sixth grade, living with both natural parents, the father has completed at least some college, teacher ratings are high in virtually all areas, the number of brothers and sisters is fairly low, and the student has a higher than average IQ. Overall this study tends to confirm the findings of previous studies which indicate that the factors students bring with them to school are more influential in attaining high achievement, as measured by the ITBS, than any factors over which the school has control and which were included in this study. (RC)

A STUDY OF ACHIEVEMENT VARIABLES AMONG SIXTH GRADE STUDENTS IN THE DES MOINES INDEPENDENT COMMUNITY SCHOOL DISTRICT 1974-75

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I. INTRODUCTION

There has been increasing nation-wide concern with declining test scores in recent years. A considerable number of national research studies are currently being conducted in an effort to determine causes for this phenomena.

The Des Moines Public Schools, while not afflicted to the degree of some other urban school districts, has also seen a decline in past years. While some of the decline has been recovered in the most recent years, there is continuing concern within the district regarding student achievement in general and standardized test scores -- the more traditionally accepted measures of overall student achievement.

Since standardized test scores are indicators of success, rather than badges of success in their own right, the authors have undertaken a research effort to uncover elements which might influence the scores. This paper is an attempt to identify those various factors which seem to exist in relation to high (or low) achievement.

The ultimate value of the research which follows lies in its utility to those who direct the operations of the schools.

II. THE DES MOINES PUBLIC SCHOOLS

The Des Moines Independent Community School District serves an area of approximately eighty-four square miles of rolling prairie in central Iowa. The district has the largest enrollment of any school district in the state. During 1974-75 (the year of this study) the Des Moines School District had an enrollment of 40,737 students in grades K-12. It operated fifty elementary schools, fourteen junior high schools, six senior high schools, six special schools and two alternative schools. Minorities comprised approxi-

mately eleven percent of the total enrollment. The students were served by approximately 2,500 professional educators and 1,500 classified staff members.

Des Moines is the capital city of Iowa and the center of most state-wide activities for the state. Its estimated 1973 metropolitan area population was 325,220. While Des Moines is best known as an insurance, printing and convention city, some 380 factories in the area manufacture over 500 different products, ranging from cosmetics to combines, valued at 500 million annually. The city is heavily dependent on agri-business or agriculturally related businesses.

III. PURPOSE OF THE STUDY

1. To attempt to identify factors which operate concurrent with student achievement variables. The factors selected as independent variables were chosen due to their perceived importance by officials of the Des Moines Public Schools and their frequent inclusion in similar studies conducted elsewhere.

2. To determine which of these variables are significantly related.

3. To formulate a profile based on the independent variables which describes a high achieving student.

4. To provide clues regarding factors which might be manipulated by the schools in order to improve student achievement.

5. To present the findings to appropriate school authorities for their consideration and use.

IV. RELATED LITERATURE

Several research endeavors have been conducted during the past few years which attempted to discover existing relationships between various measures of student achievement and certain other selected variables. Research of

this nature specifically related to the Des Moines Independent Community School District had not been undertaken up to this point in time. The brief sampling of related literature which is presented below is intended to provide some minimal background regarding achievement variable research done elsewhere in the United States.

With reference to research conducted in the area of student achievement from a nation-wide student sampling, some of the following findings have been published.

The National Assessment of Educational Progress (NAEP) reported in 1975 that:[1]

1. (Science.) Knowledge in science is declining and this drop represented the loss of a half-year of learning experience between pre- and post-assessment in 1969-70 and 1972-73, respectively, for students (ages 9, 13, and 17). Suburban students at all three levels perform above the national level, while inner-city areas are well below the nation and are not improving. Furthermore, blacks and females almost always demonstrate scientific abilities below the national median.
2. (Mathematics.) Although the majority of 17-year-olds and young adults showed mastery of the fundamental mathematical operations (+, -, x, ÷), they were unable to apply these skills in everyday situations at all ages (9, 13, and 17). Males generally tended to do better than females on work problems. Whites perform three to four percentage points above the national level, while blacks were fourteen to twenty-one points below. In addition, socio-economic factors appear to be negatively related with student achievement in mathematics.
3. (Reading.) In reading, two percent more 17-year-old students in 1974 could answer basic reading questions correctly than could 17-year-olds in 1971.
4. (Writing.) Between 1970 and 1974, National Assessment found that in 1974, students (ages 13 and 17) used a more simple vocabulary, wrote in a shorter (primer-like) style, and had more incoherent paragraphs than did their counter parts in school four years earlier. Nine-year-olds showed improvement, with the proportion of good writers rising in 1974.

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[1]"Spotlight," NAEP Newsletter, Volume VIII, No. 6, National Assessment of Educational Progress, Education Commission of the States, December, 1975.

According to information included in a report by James[2], 23 million Americans - twenty percent of the nation - are functionally illiterate (study sponsored by the U. S. Office of Education), American College Testing Program (ACT) has shown a decline in average scores, and the Scholastic Aptitude Test (SAT) test scores (averages) has shown a steady drop over the past 13 years.

Socio-economic factors have been shown to affect student achievement much more than "school controlled" factors. Coler[3], in his landmark study of 1966, concluded that the family background had the greatest effect on school achievement when compared to any other single variable or group of variables which were included in his study. Also, Jencks[4] indicated that there is no evidence that school reform can substantially reduce the extent of cognitive inequality, as measured by lists of verbal fluency, reading comprehension, or mathematical skills. Neither school resources nor segregation has an appreciable effect on either test scores or educational attainment, according to Jencks.

In a study of Philadelphia school pupils conducted by the Federal Reserve Bank of Philadelphia some of the following findings (those which relate direcly to the Des Moines study) were reported:[5]

1. The socio-economic background of the pupil plays an important role in what the student achieves through the

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[2]Tom James, "Declining Test Scores: The States React," Compact, IX, 6(December, 1975), 9-12.

[3]James S. Goleman, et al., Equality of Educational Opportunity, (Washington: U. S. Government Printing Office), 1966.

[4]Christopher Jencks, "Inequality in Retrospect," Perspectives on Inequality, Harvard Educational Review, Reprint Series No., 8(1973), 103.

[5]Anita A. Summ[redacted] and Barbara L. Wolfe, "Which School Resources Help Learning? Efficiency and Equity in Philadephia Public Schools," Federal Reserve Bank of Philadelphia Business Review, February, 1975, 7-21.

school years.

2. A student's sex is related to his or her achievement. Males do more poorly than females in elementary school. In junior high school, only low ability males fall behind low ability females. In senior high school, males of average ability or less do better than females with equivalent ability.
3. The results suggest that coming from a family that moves more frequently has an adverse effect on achievement of junior high youth. This factor seems to have little effect on elementary and senior high students.
4. Head Start (preschool) participation does not improve a child's achievement growth by the latter half of elementary school. Such participation, however, does contribute to the child arriving in the third-grade at an improved level of achievement.

A compilation of research included in the book How Effective Is Schooling?[6] reveals the following outcomes as applied to this particular study:

1. Background factors are always important determinants of educational outcomes.
2. The socio-economic status of a student's family and community is consistently related to his educational outcome. More specifically, information regarding a student's background and the services he received from school enable us to predict his outcome somewhat more accurately.
3. There is little doubt that major determinants of learning style and ability are fixed in the early life of the individual and that environment plays a dominant role. However, it has also been pointed out that organized preschool interventions through day care, Head Start and other early childhood programs show contradictory results. There is no convincing evidence that early childhood interventions are more likely to improve educational effectiveness than regular school programs.

In summary, most of the research which was reviewed tended to emphasize the substantial influences of socio-economic status and early environmental conditions on achievement during the school years.

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[6]Harvey A. Averch, et al., How Effective Is Schooling?, A Rand Educational Policy Study (Englewood Cliffs, New Jersey: Educational Technology Publications, 1974), 51.

V. METHODS EMPLOYED

Sample Selection

A sample of 1974-75 sixth grade students enrolled in the Des Moines Public Schools was selected from the computer rosters for all 1975-76 seventh grade students by the following means:

1. A random selection was made to choose the first subject from among the first seven names on the alphabetical roster (schools were also arranged alphabetically).

2. Each seventh student was chosen from the alphabetical roster following the first subject. When the end of a roster for an individual school was reached the count of seven was extended into the next school roster to select the first subject from that school.

3. After selection of the sample subjects from the rosters, the subjects' scores on the October, 1974, administration of the Iowa Test of Basic Skills were obtained. Where scores were not available (or incomplete) for a given subject, that subject was discarded and the next following name below the original selection was chosen from the alphabetical roster. This process was continued until the complete sample of subjects was obtained. The population sampled thus became (1) those students enrolled in seventh grade in 1975-76, who (2) had complete ITBS results for 1974-75 (when they were in sixth grade).

Data Collection

As previously mentioned, data for the selection of sample subjects was obtained from alphabetical rosters of all seventh grade students enrolled in the Des Moines Independent Community School District which were provided by the Mid-Iowa Educational Computer Center. The roster contained names, school

identification numbers, student identification numbers, sex identification, and ethnic codes. This data was arrayed on a 4" x 6" card to facilitate collection and later keypunching.

ITBS scores were obtained from records of testing results maintained by the Department of Pupil Services of the Des Moines Independent Community School District.

The following data was obtained from the students' cumulative records for the 1974-75 school year (the same year the subjects took the ITBS test):

1. Number and category of parents (or other adults) in the subject's home. This data was classified as follows: Living with both parents, Living with the mother only, Living with the father only, or Some other arrangement (e.g., stepparents, guardian, grandparents, etc.).

2. Father's highest year of school completed.

3. Number of siblings.

4. Number of schools attended (a mobility factor).

5. Most recent IQ score. Most of these were from a Lorge-Thorndike full scale test given in 1974-75; however, a few were from a fourth grade testing with the same instrument (1972-73).

6. Number of days attended during the 1974-75 school year.

7. Staff evaluations completed by the student's major or attendance center teacher at the end of the 1974-75 school year. These included the following items: (1) Cooperation, (2) Initiative, (3) Reliability, (4) Conduct, (5) Courtesy, (6) Respect for Authority, and (7) Leadership.

After the students' cumulative records had been screened and the data recorded, the Pupil Services and Food Services Departments' records were screened to determine which of the subjects were (1) eligible for free hot lunches, (2) eligible for reduced price hot lunches, or (3) not eligible for

either free or reduced hot lunches. This data provided an economic indicator for each sample subject. Eligibility requirements for obtaining reduced or free hot lunches during 1974-75 were established by the federal hot lunch program. A copy of the 1974-75 eligibility requirements are contained in Appendix A.

A total of 2,881 students[7] were enrolled in the sixth grade of the Des Moines Public Schools during the 1974-75 school year. Excluding those students enrolled at the Hoyt Middle School (169) in sixth grade, who were not tested with the ITBS, the population from which the sample was drawn consisted of 2,712 regularly enrolled sixth grade students.

According to calculations based on Hays[8], a sample of 339 would insure that in 95 out of 100 instances the sample mean obtained would fall within .1 standard deviation of the population mean. A sample of 15.81% of the population was drawn to increase the probability of each variable comparison having a sufficient number of sample subjects. Thus, the sample was composed of 429 subjects selected at random from the population.

VI. ANALYSIS OF DATA

The data collected for this study was analyzed by means of computer data processing through the facilities at Iowa State University. Technical assistance in analyzing the data was provided by Mr. Michael Szymczuk of Iowa State and Drs. Phillip Berrie and Joseph Millard of the Heartland Area Education Agency.

The data was first analyzed by means of a process known as stepwise

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[7]Special education students were excluded from the survey.

[8]William L. Hays, Statistics (New York: Holt, Rinehart & Winston, 1963), 206.

regression. Stepwise regression is an improved version of the foreward selection method. It examines not only a new entering variable but also reexamines, at every stage of the regression, the variables already incorporated into the model in previous stages. Thus, a variable which may have been important at one stage may be superfluous later. To check on this, the partial F criterion for each variable in the regression at any stage of caluculation is evaluated and compared with a preselected percentage point of the F-distribution. Any variable which provides a non-significant contribution is removed from the model. The process is continued until no variable will be admitted to the equation and no more are rejected.[9]

In Table 1 the stepwise regression analysis results for the sample subjects' composite scores are shown. All the variables selected by this method are significant at the 0.1 level. The table shows the rank order by magnitude of each variable which is significant, the cumulative percent of the total variance in the scores accounted for by the ranked variables, the percent of the variance accounted for by each of the six variables, and the independent variable being reported. From the table it can be seen that the factor, Intelligence Quotient (IQ) accounted for 0.680 (68%) of the variance in the scores of the sample subjects. The second ranked independent variable--Teacher's Rating: Initiative--accounted for only 0.020 (2%) of the variance. Thus, IQ would seem to be the single major factor accounting for score variance.

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[9]Norman Draper and H. Smith, Applied Regression Analysis, Series on Probability and Mathematical Statistics (New York: John Wiley and Sons, Inc., 1966).

TABLE 1
IOWA TESTS OF BASIC SKILLS
STEPWISE REGRESSION ANALYSIS
DEPENDENT VARIABLE: COMPOSITE SCORES
WITH IQ

Rank Order	Cumulative % of Total Variance	% Variance in This Variable	Independent Variable
1	0.680	0.680	Intelligence Quotient
2	0.700	0.020	Teacher's Rating: Initiative
3	0.709	0.009	Ethnic Group
4	0.717	0.008	Father's Highest Year of Education
5	0.723	0.006	Number of Siblings
6	0.726	0.003	Teacher's Rating: Reliability

There is considerable discussion regarding the measurement of IQ at the present time. Rather convincing evidence has been offered to the belief that IQ is merely another measure of achievement rather than a measure of innate ability as previously believed. If this is indeed true, IQ definitely should account for a high percentage of the variance since the two tests are actually measuring the same thing. Thus, the 68% of the variance due to IQ may be merely a measure of the degree to which the two tests (Iowa Tests of Basic Skills and Lorge-Thorndike IQ) are consistent in measuring achievement. Stepwise regression analyses were also conducted using the subtests (the other dependent variables) of the Iowa Tests of Basic Skills. Although not shown here for reasons of space economy, all the regressions revealed a similar degree of importance for IQ. Specifically, IQ accounted for the following percentages of the variance: Vocabulary - 53%; Reading - 53%; Language - 59%; rk Study - 58%; Mathematics - 51%.

It should be noted that despite the high percentage of variance accounted

for by the six independent variables in Table 1, 0.274 (27.4%) of the variance was not identified (1.000 - 0.726). This is due either to variables not identified in the study or to variables which were identified but were so minute as to be insignificant at the 0.1 level. Only independent variables significant at the 0.1 level of confidence or higher are included in the stepwise regression tables.

Because of the high percentage of variance accounted for by IQ, the decision was made to remove IQ as an independent variable and recompute the stepwise regression analyses. While it was understood that a much higher percentage of the variance would be unaccounted for when IQ was removed, this procedure would tend to magnify the remaining independent variables and might reveal some which had not been considered important in the first analyses.

Table 2 exhibits the same types of data as Table 1; however, in Table 2 the independent variable "Intelligence Quotient (IQ)" has been removed from the analyses. When this analysis was completed one highly visible independent variable appeared -- Teacher's Rating: Initiative. This single variable accounted for in excess of one-half of the cumulative variance of the seven independent variables listed in the table. Only the seven variables listed were significant at the 0.1 level.

TABLE 2
IOWA TESTS OF BASIC SKILLS
STEPWISE REGRESSION ANALYSIS
DEPENDENT VARIABLE: COMPOSITE SCORES
WITHOUT IQ

Rank Order	Cumulative % of Total Variance	% Variance in This Variable	Independent Variable i
1	0.227	0.227	Teacher's Rating: Initiative
2	0.326	0.099	Father's Highest Year of Education
3	0.350	0.024	Teacher's Rating: Leadership
4	0.372	0.022	Ethnic Group
5	0.387	0.015	Teacher's Rating: Reliability
6	0.399	0.012	Number of Siblings
7	0.407	0.008	Teacher's Rating: Cooperation

While, as expected, a much lower percentage of the total variance was accounted for in this analysis (only 40.7%) than that reported in Table 1 (72.6%), a single independent variable did emerge as considerably more important than any other.

An examination of Tables 3, 4, and 5, reveal results somewhat similar to those found in Table 2. This would be expected since Table 2 provides an analysis of the composite scores while Table 3 analyzes reading scores, Table 4 analyzes vocabulary scores, and Table 5 analyzes language scores. In all these tables the independent variable, "Teacher's Rating: Initiative," ranks considerably above the other independent variables in the percentage of variance it accounts for, while "Father's highest year of education" ranks second.

TABLE 3
IOWA TESTS OF BASIC SKILLS
STEPWISE REGRESSION ANALYSIS
DEPENDENT VARIABLE: READING
WITHOUT IQ

Rank Order	Cumulative % of Total Variance	% Variance in This Variable	Independent Variable
1	0.173	0.173	Teacher's Rating: Initiative
2	0.247	0.074	Father's Highest Year of Education
3	0.272	0.025	Teacher's Rating: Leadership
4	0.284	0.012	Ethnic Group
5	0.295	0.011	Number of Siblings

TABLE 4
IOWA TESTS OF BASIC SKILLS
STEPWISE REGRESSION ANALYSIS
DEPENDENT VARIABLE: VOCABULARY
WITHOUT IQ

Rank Order	Cumulative % of Total Variance	% Variance in This Variable	Independent Variable
1	0.193	0.193	Teachers Rating: Initiative
2	0.279	0.086	Father's Highest Year of Education
3	0.298	0.019	Teacher's Rating: Leadership
4	0.313	0.015	Ethnic Group
5	0.328	0.015	Number of Siblings
6	0.338	0.010	Teacher's Rating: Reliability
7	0.350	0.012	Teacher's Rating: Cooperation
8	0.355	0.005	Sex

TABLE 5
IOWA TESTS OF BASIC SKILLS
STEPWISE REGRESSION ANALYSIS
DEPENDENT VARIABLE: LANGUAGE
WITHOUT IQ

Rank Order	Cumulative % of Total Variance	% Variance in This Variable	Independent Variable
1	0.240	0.240	Teacher's Rating: Initiative
2	0.323	0.083	Father's Highest Year of Education
3	0.351	0.028	Teacher's Rating: Reliability
4	0.367	0.016	Eligibility for Free Hot Lunch
5	0.382	0.015	Sex
6	0.396	0.014	Teacher's Rating: Leadership
7	0.404	0.008	Student's Attendance
8	0.412	0.008	Teacher's Rating: Respect for Authority
9	0.417	0.005	Ethnic Group

The results displayed in Table 6 vary from those found in Tables 2 through 6. Most immediately obvious is the fact that "Teacher's Rating: Initiative" was not a significant independent variable at the 0.1 level. Thus, the dependent variable "Work Study" scores seem to be more closely related to a different group of independent variables than were the scores for the first three subtests.

TABLE 6
IOWA TESTS OF BASIC SKILLS
STEPWISE REGRESSION ANALYSIS
DEPENDENT VARIABLE: LANGUAGE
WITHOUT IQ

Rank Order	Cumulative % of Total Variance	% Variance in This Variable	Independent Variable
1	0.158	0.158	Teacher's Rating: Leadership
2	0.252	0.094	Father's Highest Year of Education
3	0.282	0.030	Teacher's Rating: Reliability
4	0.307	0.025	Ethnic Group
5	0.318	0.011	Number of Siblings
6	0.329	0.011	Number of Parents in the Home
7	0.334	0.005	Student's Attendance

Table 7 again returns to the more familiar pattern shown in Tables 2, 3, 4, and 5. Again "Teacher's Rating: Initiative" emerges as the most highly contributing independent variable, and "Father's highest year of education" is the second highest contributing independent variable.

It is interesting to note that four variables appear consistently significant in all the analyses contained in Tables 2 through 7:

Teacher's Rating: Initiative

Teacher's Rating: Leadership

Father's highest year of education

Teacher's Rating: Reliability (not significant for reading subtest)

TABLE 7
IOWA TESTS OF BASIC SKILLS
STEPWISE REGRESSION ANALYSIS
DEPENDENT VARIABLE: MATHEMATICS
WITHOUT IQ

Rank Order	Cumulative % of Total Variance	% Variance in This Variable	Independent Variable
1	0.189	0.189	Teacher's Rating: Initiative
2	0.250	0.061	Father's Highest Year of Education
3	0.273	0.023	Ethnic Group
4	0.294	0.021	Teacher's Rating: Leadership
5	0.305	0.011	Student's Attendance
6	0.312	0.007	Teacher's Rating: Reliability
7	0.325	0.013	Teacher's Rating: Conduct

Following completion of the stepwise regression analyses, the original data were subjected to correlational analysis utilizing the Pearson Product-Moment Correlation Coefficient. The correlation coefficient provides a means for expressing the intensity of relationships between characteristics of individuals and groups in a quantitative manner. By definition, the Pearson Product-Moment Correlation is the average of the products of the standard scores across the N pairs of scores. In the correlational table which follows, the magnitude of the coefficient is an indication of the degree of intensity of the relationship between the two variables, while the sign (+ or -) indicates the direction of the relationship. The rank correlation between two variables is +1.0 if the individuals have exactly the same rank on them; it is -1.0 if the individuals have exactly reverse ranks on the variables. Other degrees of relationship yield correlations between +1.0 and -1.0.[10]

[10]Scarvia B. Anderson, Samuel Ball, and Richard T. Murphy & Associates, Encyclopedia of Educational Evaluation (San Francisco: Jossey-Bass Publishers, 1975), 87-92.

Table 8 provides correlation coefficients for the thirteen independent variables which lend themselves to this statistical technique and the six dependent variables (the composite score and the five subtest scores).

TABLE 8
CORRELATION OF DEPENDENT VARIABLES WITH THE INDEPENDENT VARIABLES
(Pearson Product-Moment Correlation Coefficients)

	Elig./Free Hot Lunch	Father's High Yr. Educ.	# Siblings	# Schools Attended	IQ	# Days Attended	TR: Cooperation	TR: Initiative	TR: Reliability	TR: Conduct	TR: Courtesy	TR: Respect for Auth.	TR: Leadership
Composite	.29*	.38*	-.16*	-.15*	.82*	.20*	.35*	.50*	.45*	.34*	.34*	.32*	.44*
Vocabulary	.24*	.36*	-.18*	-.13*	.73*	.17*	.30*	.45*	.41*	.30*	.29*	.28*	.39*
Reading	.23*	.32*	-.14*	-.12*	.73*	.14*	.30*	.44*	.39*	.30*	.30*	.27*	.40*
Language	.29*	.37*	-.15*	-.19*	.78*	.21*	.40*	.50*	.47*	.36*	.33*	.33*	.42*
Work Study	.28*	.37*	-.15*	-.11*	.77*	.19*	.30*	.42*	.39*	.31*	.33*	.29*	.41*
Mathematics	.24*	.31*	-.11	-.10	.72*	.21*	.29*	.43*	.37*	.26*	.27*	.25*	.40*

* Significant at the .01 level of confidence.

It should be noted that because of the large sample size some relatively low numbers are significant at the .01 level. In fact, only two of the correlations presented in the table are not significant at this level: mathematics x number of siblings, and mathematics x number of schools attended.

As can be seen from the above table, "Number of siblings" and "Number of schools attended" are negatively related with each of the dependent variables due to inverse rank orders, i.e., the higher number of siblings or schools attended, the lower the scores achieved. It should be noted, however, that

these two independent variables have a smaller degree of intensity than any other variables found in the table.

The independent variable IQ is again considerably more highly related to the dependent variables than any other independent variable reported. This confirms the findings previously discussed regarding stepwise regression analysis, and the same limitations regarding the IQ variable would still apply.

Following IQ, the teacher ratings (TR) would seem to have the highest degree of significant relationships with the dependent variable test scores, the ratings for Initiative, Leadership, and Reliability leading the teacher rating variables.

The lowest degree of significant correlations were found in: (1) the number of schools attended (mobility), (2) the number of siblings (brothers and sisters), and (3) the number of days attended during the 1975-76 school year. However, it should be noted that sixteen of the eighteen relationships utilizing these three variables were significant at the .01 level. Their degree of intensity was not as high as that of the remaining independent variables.

A complete correlation matrix, showing the interrelationships among all the independent and dependent variables may be found in Appendix B. This table allows comparison of both the dependent variables and the independent variables with one another as well as containing the same information already presented in Table 8.

Several of the variables (sex, ethnic, number and category of parents in the home) did not lend themselves to the Pearson Product-Moment correlation technique due to the dichotomous nature of the data. Consequently, each of the five dependent variables were separated into deciles according to each of the independent variables. This was done for the purpose of comparing

groups of students with various achievement scores relative to these dichotomous independent variables. The data for eligibility for free hot lunch and student mobility were also separated into dichotomies for further analysis using the aforementioned procedure. The resulting divisions under each variable were as follows:

Sex: Male; female

Ethnic: Majority; minority races

Free hot lunch: Free + reduced; not eligible

Number schools attended (mobility): 1 + 2; 3+

Parents: Living with both natural parents; other

After examining the decile data, it was decided to more closely compare the ends of the distributions by combining the 1st and 2nd deciles (low) and the 9th and 10th deciles (high) for each of the previously mentioned distributions. Table 9 provides data regarding composite score comparisons by the independent variable, "sex." The row titled "Expected decile percentages" contains information regarding the total number in each group and the percentage they comprise of the total sample. Thus, 200 males (46.6%) and 229 females (53.4%) made up the total sample of 429 (100.0%). If males and females were evenly distributed throughout the deciles as should be expected, the cell percentages would remain a constant 46.6% for males and 53.4% for females. The table combines decile 9 + 10 and decile 1 + 2 in order to scrutinize the "ends" of the distribution. The expected cell percentage for the combined deciles would remain 46.6% and 53.4% respectively.

TABLE 9
COMPOSITE SCORE COMPARISONS BY SEX
1974-75

DECILES	MALE	FEMALE	TOTAL
EXPECTED DECILE PERCENTAGES	N=200 46.6%	N=229 53.4%	429 100.0%
9 + 10 (high)	N=38 44.7%	N=47 55.3%	85
1 + 2 (low)	N=62 54.4%	N=52 45.6%	114

Table 9 reveals that more females (55.3%) than would be expected are in the two highest deciles, while fewer males (44.7%) than expected are in these two deciles. The reverse of this is true in the lowest two deciles, where 54.5% were males and 45.6% were females, while the expected percentages were 46.6% and 53.4% respectively.

Table 10 exhibits data regarding composite score comparisons by majority and minority races. If the sub-populations from which the samples were drawn had equal achievement by decile we would expect 9.8% minorities and 90.2%

majority in each decile. Combining the two highest deciles reveals that only 1.0% of the sample for deciles 9 + 10 were of minority races, while 99.0% were of the majority race. On the lower end of the distribution, 21.9% were minorities in deciles 1 + 2, while only 78.1% were of the majority race. The examination thus reveals that a considerably higher percentage of minorities than expected were in the lower deciles while a considerably lower percentage of minorities than expected were in the higher deciles. The reverse of this was true for the majority race.

TABLE 10
COMPOSITE SCORE COMPARISONS BY MAJORITY/MINORITY
1974-75

DECILES	MINORITY	MAJORITY	TOTAL
EXPECTED DECILE PERCENTAGES	N=42 9.8%	N=387 90.2%	429 100.0%
9 + 10 (high)	N=1 1.0%	N=84 99.0%	85
1 + 2 (low)	N=25 21.9%	N=89 78.1%	114

Table 11 shows the same decile comparisons for those receiving free or reduced hot lunches with those not eligible for either free or reduced hot lunches (a family income measure). As can be seen from the table, a considerably lower than expected percentage of students receiving free or reduced hot lunches were in the highest achieving deciles, while a considerably higher than expected percentage of students receiving free or reduced hot lunches were in the lowest achieving deciles.

TABLE 11
COMPOSITE SCORE COMPARISONS BY ELIGIBILITY FOR FREE OR REDUCED HOT LUNCH
1974-75

DECILES	FREE & REDUCED	NOT ELIGIBLE	TOTAL
EXPECTED DECILE PERCENTAGES	N=80 18.7%	N=347 81.3%	427 100.0
9 + 10 (high)	N=2 2.4%	N=82 97.6%	84
1 + 2 (low)	N=37 32.5%	N=77 67.5%	114

Table 12 exhibits data regarding the dichotomous groups artificially divided into high mobility students (3 or more schools attended) and low mobility student (1 or 2 schools attended). An examination of the ends of the distributions by decile indicates that high mobility students achieve lower scores on the ITBS than do low mobility students.

TABLE 12
COMPOSITE SCORE COMPARISONS BY HIGH/LOW MOBILITY
1974-75

DECILES	HIGH MOBILITY	LOW MOBILITY	TOTAL
EXPECTED DECILE PERCENTAGES	N=94 22.3%	N=328 77.7%	422 100.0%
9 + 10 (high)	N=10 11.8%	N=75 88.2%	85
1 + 2 (low)	N=41 36.9%	N=70 63.1%	111

Table 13 compares achievement deciles of the sample students by the number and category of parents in the home. One group consists of those students living with both natural parents, while the other consists of those students

living with any other combination of parents or guardians.

As with the previous four decile comparisons, there would seem to be a considerable difference in achievement between the ends of the distribution for the two groups. The expected percentages were 75.9% per cell for those students living with both parents and 24.1% for those students living with some other parental combination. Those students living with some "other" combination of parents had a considerably lower percentage than expected in the higher achieving deciles and a considerably higher percentage than expected in the lower achieving deciles.

TABLE 13
COMPOSITE SCORE COMPARISONS
NUMBER & CATEGORY OF PARENTS IN THE HOME
1974-75

DECILES	OTHER	LIVING WITH BOTH PARENTS	TOTAL
EXPECTED DECILE PERCENTAGES	N=102 24.1%	N=322 75.9%	424 100.0%
9 + 10 (high)	N=10 11.9%	N=74 88.1%	84
1 + 2 (low)	N=38 33.9%	N=74 66.1%	112

The same decile comparisons made for the composite score results were also made for the five subtests of the ITBS. These results are contained in Appendix C of this paper. It might be generalized that no vast differences from the findings for the composite scores were discovered in the examination of the subtest scores.

VII. INTERPRETATION OF FINDINGS

1. Intelligence Quotient (IQ) score was the most closely related variable to the achievement score results. However, as previously discussed, the whole matter of the validity of IQ score as anything more than a measure of achievement is currently under debate. If indeed IQ is merely another measure of achievement, and the weight of evidence seems that it probably is, then the high relationship between IQ and achievement should be disregarded since both tests are measuring the same thing. Their high correlation would then become a measure of the degree to which the two tests (ITBS and Lorge-Thorndike) are measuring achievement consistently.

2. Teacher ratings were, for the most part, closely related to student achievement on the ITBS. This was especially true of the teacher ratings for (1) initiative, (2) leadership, and (3) reliability. On the surface it would seem that there might be some concern as to whether the teacher ratings were actual reflections of the traits being rated, whether they were made in the nature of "self-fulfilling prophecies," or whether they were reflections of the test scores already obtained. Since the ratings are given immediately prior to the closing of each school year while the ITBS is administered in the Fall of each year, it would seem that the ratings could not be considered as "self-fulfilling prophecies" unless the teacher(s) for succeeding years used them in this manner. Also, the investigators have no reason to believe

that the latter possibility occurred with any great degree of frequency. It would seem as likely that the ratings are true and valid attempts by the classroom teachers to rate the students on the particular traits in question. If the teacher ratings are valid they closely reflect measured achievement and may indicate certain traits that exist in approximately the same rank order as measured achievement.

3. Virtually all the variables chosen for examination in this study were found to have statistically significant correlations at the .01 level due to the large numbers of subjects sampled. The difficulty in interpreting the accumulated data lies not in determining statistical significance, but in determining educational significance. That is, what degree of intensity of a relationship between variables is required before statistical significance becomes educational significance? While there is no indisputable answer to this question, by selecting those relationships which have the highest degree of statistical significance our chances of also selecting those with educational significance would seem to be enhanced. Beyond IQ and Teacher's Rating: Initiative, the following independent variables which were not dichotomous seem to be most highly significant:

a. Teacher's Rating: Leadership.

b. Teacher's Rating: Reliability.

c. Father's highest year of school completed.

d. Various other categories of Teacher Ratings.

4. A Profile. Based upon the various analyses, a profile of the individual student most likely to be a high achiever has emerged. While the profile obviously does not hold true in all cases, students exhibiting these characteristics seem to generally exhibit high achievement as measured by the ITBS.

a. Female,

b. majority race,

c. family not eligible for free hot lunches,

d. has attended only one or two schools by the time they are enrolled in sixth grade,

e. living with both natural parents,

f. the father has completed at least some college,

g. teacher ratings are high in virtually all areas,

h. the number of brothers and sisters is fairly low, and of course,

i. the student has a higher than average IQ score.

5. Obviously, most of the more highly related variables are beyond the control of the school: IQ, sex, father's highest year of education completed, race, family income, mobility, parents, number of siblings. On the other hand, a few variables are, at least partially, under the control of the school: number of days attended can be influenced, teacher ratings or perceptions inasmuch as they are prophecies can be reconsidered. Overall, however, this study tends to confirm the findings of previous studies which indicated that the factors students bring with them to school are more influential in attaining high achievement, as measured by the ITBS, than any factors over which the school has control and which were included in this study.

LIMITATIONS OF THE STUDY

1. This study has attempted to determine those factors which exist concurrent with high achievement as measured by the Iowa Test of Basic Skills. The reader should note that no attempt was made to establish cause and effect relationships among the variables, and any attempt by the reader to do so

would be a misuse of the data and analyses.

2. No attempt was made to measure learning by any means other than the Iowa Test of Basic Skills. One would be foolish to maintain that the ITBS measures all, or even the most important, learnings for children. The ITBS is, however, an excellent instrument for comparing achievement, on a specified group of basic skills selected by the test makers, with other districts that are included in the norming groups. Furthermore, the ITBS results were the only concrete measures of achievement for all sixth graders which were available.

3. The data for this study was drawn from sixth grade students enrolled in the Des Moines Public Schools during 1974-75. Any attempt to generalize the results to other districts would be done with due consideration for the unique characteristics of the Des Moines Public Schools.

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APPENDIX A

FEDERAL HOT LUNCH

ELIGIBILITY GUIDELINES

1974-75

Parent or Guardian's Name _____ Name of Sending School _____

DES MOINES PUBLIC SCHOOLS

APPLICATION FOR FREE MEALS, FREE MILK OR REDUCED PRICE MEALS (Confidential)

PARENTS: If you wish to apply for free meals and free milk or reduced price meals for your children, complete this form and return to the school office.

Date: _____

An applicant must report the total number of all persons in the family _____.

Last Name of Parent or Guardian	First Names	Address:	Street	Telephone Number
		City _____	Zip___	

Names of all children in the home for whom application is made:

Last Name (Please Print)	First Name (Please Print)	Grade	School

School districts are no longer permitted to serve children free or reduced price meals without a report of income in dollars.

All applicants must report total family income in dollars before deductions (include wages of all working members, social security benefits, pensions (veteran's etc.) and all other income).

Fill in one: Weekly:$___ Biweekly:$___ Monthly:$___ Yearly:$___

If your gross family income exceeds the amount indicated in the attached family income scale, and you wish to apply under any of the special hardship conditions cited in the letter, describe the nature of your hardship here: (by paid amounts only) _____

_____

If the hardship is temporary, show period of time free or reduced price meals and milk are needed. _____

I hereby certify that all of the above information is true and correct to the best of my information and belief.

_____
Signature of Adult Family Member

FOR SCHOOL SOCIAL WORKER'S USE ONLY

Free Meals and Milk ___ Date to begin _____. Date to end _____.
Price Meals ___ Date to begin _____. Date to end _____.

The Des Moines Public Schools serve nutritious meals and milk every school day. Students may buy lunch for 50 cents, extra milk for 4 cents and breakfast in some schools for 20 cents.

Children from families whose income is at or below the levels shown on the attached income scales are eligible for either free meals and free milk, or for meals at the reduced prices of 20 cents for lunch and 10 cents for breakfast when it is served. If your income is greater than those shown but you have unusually high medical bills, shelter costs in excess of 30 percent of your income, special education expenses due to the mental or physical condition of a child, or disaster or casualty losses, your children may still be eligible.

To apply at any time during the year for either free meals and free milk or reduced price meals for your children, complete the attached application and return it to the school. Within 10 working days of receiving your application, the school will let you know whether or not your children are eligible. If your children attend different school buildings, send a completed application to each school if you wish meals to start immediately. One application is sufficient if your family can wait the processing period.

If you have a foster child living with you and wish to apply for meals for the child, please complete a separate application. A foster child may be considered a one member family; report the welfare payment as the income.

If you do not agree with the school's decision, you may request a conference to discuss the situation, present information, and obtain an explanation of the decision. Such a conference shall not in any way prejudice nor diminish your right to a fair hearing. Call or write the building Principal where your child attends school. He will notify the designated school social worker who will contact you.

All children are treated the same regardless of ability to pay. In the operation of child feeding programs, no child will be discriminated against because of his race, sex, color, or national origin.

FAMILY SIZE - INCOME SCALE FOR FREE MEALS, FREE MILK AND REDUCED PRICE MEALS

This is the income scale used by Des Moines Public Schools to determine eligibility in the 1974-75 school year.

Family Size	Income Scale for Free Meals and Free Milk	Income Scale for Reduced Price Meals
1	$ 2,910	$ 4,090
2	$ 3,830	$ 5,350
3	$ 4,740	$ 6,630
4	$ 5,640	$ 7,910
5	$ 6,490	$ 9,070
6	$ 7,330	$10,240
7	$ 8,[illegible]	$11,297
8	$ 8,310	$12,310
9	$ 9,510	$13,330
10	$10,150	$14,260
11	$10,[illegible]	$15,290
12	$11,350	$16,140
Each additional Family Member	$ 670	$ 940

APPENDIX B

CORRELATION MATRIX

TABLE 14

CORRELATION MATRIX

(Pearson Product Moment Correlation Coefficients)

	Composite	Vocabulary	Reading	Language	Work Study	Mathematics	El. F.H.L.	Father's Ed.	# Siblings	# Schools Attend.	I.Q.	# Days Attend.	Tr: Cooperation	Tr: Initiative	Tr: Reliability	Tr: Conduct	Tr: Courtesy	Tr: Respect for Authority	Tr: Leadership
Composite																			
Vocabulary	.90*																		
Reading	.91*	.80*																	
Language	.90*	.78*	.78*																
Work Study	.91*	.75*	.80*	.78*															
Mathematics	.86*	.69*	.71*	.73*	.80*														
El. F.H.L.	.29*	.24*	.23*	.29*	.29*	.24*													
Father's Ed.	.38*	.36*	.32*	.37*	.37*	.31*	.26*												
#Siblings	-.16*	-.18*	-.14*	-.15*	-.15*	-.11	-.20*	-.18*											
# Schools Attend.	-.15*	-.13*	-.12*	-.19*	-.11*	-.10	-.12*	-.15*	-.06										
I.Q.	.82*	.73*	.73*	.78*	.77*	.72*	.23*	.36*	-.10	-.12									
# Days Attend.	.20*	.17*	.14*	.21*	.19*	.21*	.15*	.15	.00	-.09	.17*								
Tr: Cooperation	.35*	.30*	.30*	.40*	.33*	.29*	.03	.19*	.00	-.12	.32*	.11							
Tr: Initiative	.50*	.45*	.44*	.50*	.43*	.43*	.08	.22*	.01	-.11	.43*	.19*	.62*						
Tr: Reliability	.45*	.41*	.39*	.47*	.39*	.37*	.07	.17*	-.01	-.13*	.40*	.09	76*	.69*					
Tr: Conduct	.34*	.30*	.30*	.36*	.31*	.26*	.04	.15*	.01	-.10	.30*	.03	.80*	.58*	.77*				
Tr: Courtesy	.34*	.29*	.30*	.33*	.31*	.27*	.02	.13*	.04	-.05	.28*	.07	.80*	.56*	.73*	.83*			
Tr: Respect for Authority	.32*	.28*	.27*	.33*	.29*	.25*	.09	.21*	.02	-.07	.28*	.09	.78*	.56*	.73*	.82*	.87*		
Tr: Leadership	.44*	.39*	.40*	.42*	.41*	.40*	.09	.24*	.01	-.09	.38*	.14*	.45*	.63*	.50*	.40*	.39*	.40*	

* Significant at the .01 level

APPENDIX C

SUBTEST SCORE COMPARISONS BY DECILES

Vocabulary
Reading
Language
Work Study
Mathematics

TABLE 15
VOCABULARY SCORE COMPARISONS
BY SEX
1974-75

DECILES	Male	Female	TOTAL
EXPECTED DECILE PERCENTAGES	N=200 46.6%	N=229 53.4%	429 100.0%
9 + 10	N=42 49.4%	N=43 50.6%	85 100.0%
1 + 2	N=51 49.5%	N=52 50.5%	103 100.0%

TABLE 16
VOCABULARY SCORE COMPARISONS
BY MAJORITY/MINORITY
1974-75

DECILES	Minority	Majority	TOTAL
EXPECTED DECILE PERCENTAGES	N=42 9.8%	N=387 90.2%	429 100.0%
9 + 10	N=1 1.2%	N=84 98.8%	85 100.0%
1 + 2	N=25 24.3%	N=78 75.7%	103 100.0%

TABLE 17
VOCABULARY SCORE COMPARISONS
BY HIGH/LOW MOBILITY
1974-'75

DECILES	High Mobility	Low Mobility	TOTAL
EXPECTED DECILE PERCENTAGES	N=94 22.3%	N=328 77.7%	422 100.0%
9 + 10	N=11 12.9%	N=74 87.1%	85 100.0%
1 + 2	N=38 37.3%	N=64 62.7%	102 100.0%

TABLE 18
VOCABULARY SCORE COMPARISONS
BY ELIGIBILITY FOR FREE OR REDUCED HOT LUNCH
1974-75

DECILES	Free + Reduced	Not Eligible	TOTAL
EXPECTED DECILE PERCENTAGES	N=80 18.7%	N=347 81.3%	427 100.0%
9 + 10	N=7 8.4%	N=76 91.6%	83 100.0%
1 + 2	N=32 31.1%	N=71 68.9%	103 100.0%

TABLE 19
VOCABULARY SCORE COMPARISONS
NUMBER & CATEGORY OF PARENTS IN THE HOME
1974-75

DECILES	Other	Living with both parents	TOTAL
EXPECTED DECILE PERCENTAGES	N=102 24.1%	N=322 75.9%	424 100.0%
9 + 10	N=13 15.3%	N=72 84.7%	85 100.0%
1 + 2	N=36 35.3%	N=66 64.7%	102 100.0%

TABLE 20
READING SCORE COMPARISONS
BY SEX
1974-75

DECILES	Male	Female	TOTAL
EXPECTED DECILE PERCENTAGES	N=200 46.6%	N=229 53.4%	429 100.0%
9 + 10	N=36 47.4%	N=4- 52.6%	76 100.0%
1 + 2	N=44 50.0%	N=44 50.0%	88 100.0%

TABLE 21
READING SCORE COMPARISONS
BY MAJORITY/MINORITY
1974-75

DECILES	Minority	Majority	TOTAL
EXPECTED DECILE PERCENTAGES	N=42 9.8%	N=387 90.2%	429 100.0%
9 + 10	N=1 1.3%	N=75 98.7%	76 100.0%
1 + 2	N=12 13.6%	N=76 86.4%	88 100.0%

TABLE 22
READING SCORE COMPARISONS
BY HIGH/LOW MOBILITY
1974-75

DECILES	High Mobility	Low Mobility	TOTAL
EXPECTED DECILE PERCENTAGES	N=94 22.3%	N=328 77.7%	422 100.0%
9 + 10	N=13 17.1%	N=63 82.9%	76 100.0%
1 + 2	N=29 33.3%	N=58 66.7%	87 100.0%

TABLE 23
READING SCORE COMPARISONS
BY ELIGIBILITY FOR FREE OR REDUCED HOT LUNCH
1974-75

DECILES	Free + Reduced	Not Eligible	TOTAL
EXPECTED DECILE PERCENTAGES	N=80 18.7%	N=347 81.3%	427 100.0%
9 + 10	N=4 5.3%	N=71 94.7%	75 100.0%
1 + 2	N=25 28.4%	N=63 71.6%	88 100.0%

TABLE 24
READING SCORE COMPARISONS
NUMBER & CATEGORY OF PARENTS IN THE HOME
1974-75

DECILES	Other	Living with both Parents	TOTAL
EXPECTED DECILE PERCENTAGES	N=102 24.1%	N=322 75.9%	424 100.0%
9 + 10	N=10 13.3%	N=65 86.7%	75 100.0%
1 + 2	N=24 27.6%	N=63 72.4%	87 100.0%

TABLE 25
LANGUAGE SCORE COMPARISONS
BY SEX
1974-75

DECILES	Male	Female	TOTAL
EXPECTED DECILE PERCENTAGES	N=200 46.6%	N=229 53.4%	429 100.0%
9 + 10 (High)	N=26 33.8%	N=51 66.2%	77 100.0%
1 + 2 (Low)	N=59 64.8%	N=32 35.2%	91 100.0%

TABLE 26
LANGUAGE SCORE COMPARISONS
BY MAJORITY/MINORITY
1974-75

DECILES	Minority	Majority	TOTAL
EXPECTED DECILE PERCENTAGES	N=42 9.8%	N=387 90.2%	429 100.0%
9 + 10 (High)	N=2 2.6%	N=75 97.4%	77 100.0%
1 + 2 (Low)	N=18 19.8%	N=73 80.2%	91 100.0%

TABLE 27
LANGUAGE SCORE COMPARISONS
BY HIGH/LOW MOBILITY
1974-75

DECILES	High Mobility	Low Mobility	TOTAL
EXPECTED DECILE PERCENTAGES	N=94 22.3%	N=328 77.7%	422 100.0%
9 + 10 (High)	N=9 11.7%	N=68 88.3%	77 100.0%
1 + 2 (Low)	N=33 37.1%	N=56 62.9%	89 100.0%

TABLE 28
LANGUAGE SCORE COMPARISONS
BY ELIGIBILITY FOR FREE OR REDUCED HOT LUNCH
1974-75

DECILES	Free + Reduced	Not Eligible	TOTAL
EXPECTED DECILE PERCENTAGES	N=80 18.7%	N=347 81.3%	427 100.0%
9 + 10 (High)	N=2 2.6%	N=75 97.4%	77 100.0%
1 + 2 (Low)	N=33 36.3%	N=58 63.7%	91 100.0%

TABLE 29
LANGUAGE SCORE COMPARISONS
NUMBER & CATEGORY OF PARENTS IN THE HOME
1974-75

DECILES	Other	Living with both parents	TOTAL
EXPECTED DECILE PERCENTAGES	N=102 24.1%	N=322 75.9%	424 100.0%
9 + 10 (High)	N=8 9.8%	N=74 90.2%	82 100.0%
1 + 2 (Low)	N=44 44.9%	N=54 55.1%	98 100.0%

TABLE 30
WORK STUDY SCORE COMPARISONS
BY SEX
1974-75

DECILES	Male	Female	TOTAL
EXPECTED DECILE PERCENTAGES	N=200 46.6%	N=229 53.4%	429 100.0%
9 + 10	N=42 51.2%	N=40 48.8%	82 100.0%
1 + 2	N=52 52.0%	N=48 48.0%	100 100.0%

TABLE 31
WORK STUDY SCORE COMPARISONS
BY MAJORITY/MINORITY
1974-75

DECILES	Minority	Majority	TOTAL
EXPECTED DECILE PERCENTAGES	N=42 9.8%	N=387 90.2%	429 100.0%
9 + 10	N=2 2.4%	N=80 97.6%	82 100.0%
1 + 2	N=27 27.0%	N=73 73.0%	100 100.0%

TABLE 32
WORK STUDY SCORE COMPARISONS
BY HIGH/LOW MOBILITY
1974-75

DECILES	High Mobility	Low Mobility	TOTAL
EXPECTED DECILE PERCENTAGES	N=94 22.3%	N=328 77.7%	422 100.0%
9 + 10	N=10 12.2%	N=72 87.8%	82 100.0%
1 + 2	N=36 37.5%	N=60 62.5%	96 100.0%

TABLE 33
WORK STUDY SCORE COMPARISONS
BY ELIGIBILITY FOR FREE OR REDUCED HOT LUNCH
1974-75

DECILES	Free + Reduced	Not Eligible	TOTAL
EXPECTED DECILE PERCENTAGES	N=80 18.7%	N=347 81.3%	427 100.0%
9 + 10	N=2 2.5%	N=79 97.5%	81 100.0%
1 + 2	N=35 35.0%	N=65 65.0%	100 100.0%

TABLE 34
WORK STUDY SCORE COMPARISONS
NUMBER & CATEGORY OF PARENTS IN THE HOME
1974-75

DECILES	Other	Living with both parents	TOTAL
EXPECTED DECILE PERCENTAGES	N=102 24.1%	N=322 75.9%	424 100.0%
9 + 10	N=8 9.8%	N=74 90.2%	82 100.0%
1 + 2	N=44 44.9%	N=54 55.1%	98 100.0%

TABLE 35
MATHEMATICS SCORE COMPARISONS
BY SEX
1974-75

DECILES	Male	Female	TOTAL
EXPECTED DECILE PERCENTAGES	N=200 46.6%	N=229 53.4%	429 100.0%
9 + 10	N=45 48.4%	N=48 51.6%	93 100.0%
1 + 2	N=55 50.9%	N=53 49.1%	108 100.0%

TABLE 36
MATHEMATICS SCORE COMPARISONS
BY MAJORITY/MINORITY
1974-75

DECILES	Minority	Majority	TOTAL
EXPECTED DECILE PERCENTAGES	N=42 9.8%	N=387 90.2%	429 100.0%
9 + 10	N-1 1.1%	N=92 98.9%	93 100.0%
1 + 2	N=21 19.5%	N=87 80.5%	108 100.0%

TABLE 37
MATHEMATICS SCORE COMPARISONS
BY HIGH/LOW MOBILITY
1974-75

DECILES	High Mobility	Low Mobility	TOTAL
EXPECTED DECILE PERCENTAGES	N=94 22.3%	N=328 77.7%	422 100.0%
9 + 10	N=14 15.0%	N=79 85.0%	93 100.0%
1 + 2	N=35 33.3%	N=70 66.7%	105 100.0%

TABLE 38
MATHEMATICS SCORE COMPARISONS
BY ELIGIBILITY FOR FREE OR REDUCED HOT LUNCH
1974-75

DECILES	Free + Reduced	Not Eligible	TOTAL
EXPECTED DECILE PERCENTAGES	N=80 18.7%	N=347 81.3%	427 100.0%
9 + 10	N=2 2.2%	N=90 97.8%	92 100.0%
1 + 2	N=31 28.7%	N=77 71.3%	108 100.0%

TABLE 39
MATHEMATICS SCORE COMPARISONS
NUMBER & CATEGORY OF PARENTS IN THE HOME
1974-75

DECILES	Other	Living with both parents	TOTAL
EXPECTED DECILE PERCENTAGES	N=102 24.1%	N=322 75.9%	424 100.0%
9 + 10	N=11 12.0%	N=81 88.0%	92 100.0%
1 + 2	N=41 38.7%	N=65 61.3%	106 100.0%