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COMPARISON OF STUDENT ACHIEVEMENT LEVEL
IN READING, MATHEMATICS, AND LANGUAGE
WITH EDUCATION LEVELS OF PARENTS

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An Abstract
Presented to
the Graduate Council of
Austin Peay State University

In Partial Fulfillment
of the Requirements for the Degree
Education Specialist

by
Ida Webster Westerman

August, 1984

ABSTRACT

This study compared parent education levels with students' Reading, Language, Mathematics and Basic Battery scores on the Metropolitan Achievement Test (MAT), using a product moment correlation. The sample included 180 first-, third-, and sixth-grade students of one Dickson County elementary school. Education levels of fathers and mothers, obtained through parent-completed questionnaires, were compared using a chi-square analysis and found to be significantly related. A significant relationship at the .005 level for all first-grade MAT scores indicated parents' education levels may be useful in predicting first-grade achievement. Positive significant correlations for mathematics at third-grade level supported the continued predictive value of parents' education levels for third-grade achievement in mathematics. No significant correlations were found at sixth-grade level.

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In Partial Fulfillment of
the Requirements for the Degree
Education Specialist

by
Ida Webster Westerman

August, 1984

To the Graduate Council:

I am submitting herewith a Field Study written by Ida Webster Westerman entitled "Comparison of Student Achievement Level in Reading, Mathematics and Language with Education Level of Parents." I recommend that it be accepted in partial fulfillment of the requirements for the degree of Education Specialist, with a major in Psychology.

Elizabeth H. Stokes
Major Professor

We have read this field study,
and recommend its acceptance:

Donald B. Lambert
Minor Professor

Wm. Rudolph
Third Committee Member

Accepted for the
Graduate Council:

William H. Ellis
Dean of the Graduate School

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Chapter 1

INTRODUCTION

The heredity-environment or nature-nurture controversy relative to academic achievement is probably as old as public education. Extensive research has been conducted in attempts to determine which factor has more influence on a child's ability and/or achievement. In addition, numerous investigators have endeavored to identify the specific aspects of the environment influencing achievement, the extent of impact, and the age at which the impact is most significant.

Several major generalizations regarding the relationship between achievement test scores and community characteristics were formulated and reported (Special Report, Number 25, 1981) by Psychological Corporation staff, based on an extensive research review. A highly significant relationship was indicated between student achievement and socio-economic characteristics. Measures of parental education attainment, such as income, housing value, presence of written matter in the home, and occupational status consistently showed a significant relationship with student achievement. Teacher salaries, class size, and quality of school facilities were found to be less powerful predictors of student achievement than non-school factors.

Family income and educational and occupational levels have

long been recognized as determining factors of student motivation and achievement. Much of the relevant research reviewed but not cited by the writer was published during the 1960's. Bowles (1972) found parents' occupational and educational status appeared to explain between one-fourth and one-third of variance in years of schooling attained by students. Based on such findings, he identified social class background as a more important determinant of educational attainment than earlier studies had shown. In contrast, the relation between socio-economic factors and academic achievement was viewed by White (1982) as weaker than assumed in such early research. White's study, however, found income as the highest single predictor of student achievement and, further, a higher correlation when two or more socio-economic factors including parents' income, education, and occupation were used. A higher correlation between home environment and achievement measures than with intelligence measures was found by Iverson and Walberg (1982).

In an extensive discussion of educational inequality, Jencks (1972) looked at non-economic, as well as economic, family background factors. As a result of his study, he attributed almost one-half the variation in educational attainment to family background. Of the family background variables studied, non-economic factors accounted for a significant portion of the effect, with occupation accounting for 35-45% of the variance, income accounting for 15%, and 40-50% unexplained. The two-way relationship was attributed by Jencks

to parental pressure for academic achievement and a desire for higher occupational status on the part of children from mid-socio-economic status parents. Low and Clement (1982) found the contribution of socio-economic status to student achievement scores far outweighed that of race, while Stauffer's investigation (1980) determined race and socio-economic status valid for predicting scores of first graders on the Stanford Early School Achievement Test.

Haertel and Wiley (1979) found the influence of maternal education level greater than that of poverty on academic achievement of students in first through sixth grades. The data base used in the study was representative of all public school students in the United States. Group achievement test data were used as a measure of student achievement. As part of the Maryland Accountability Program (1978), an attempt was made to identify elementary schools with high and low achievement using basic skills test scores. Among the positive factors associated with the high-achieving students was higher socio-economic status.

In the opinion of the writer and others, both income and occupation are related to, and generally dependent on, an individual's level of education. According to Laosa (1982), parental behavior was determined to be important to the child's development of specific cognitive skills and learning strategies. Further, parental schooling was found to determine how the individuals behave as parents. The three-way relationship

has promoted little attention or concern in research, argues Laosa, although questions regarding the consequences of parental schooling on children have long been the basis of heated controversy.

Bloom's research (1964) resulted in a correlation of .50 between eighth-grade Chicago Reading Test scores and occupational/educational levels of fathers. A zero correlation was found earlier for the pupils between reading scores at grade two and the occupational/educational levels of fathers. The significant role of the family, including fathers' and mothers' education levels, along with other home variables, was supported by the data obtained in a follow-up study of rural families sponsored by the Department of Agriculture (Gansemer and Bealer, 1977). The study looked at achievement behavior in adolescent males as well as occupational attainment. Sewell, Hauser, and Featherman (1976) view socio-economic origin as important to a student's educational attainment, both as a status variable and a prime achievement facilitator. Whether the socio-economic status measure used was parental income, educational level of the mother or father, or father's occupation, they found significant differences in the achievement levels of the three socio-economic status groups. Results of their analysis indicated the effects of socio-economic status operated independent of ability and sex of students.

For apparent reasons, the parental education data can be more easily and accurately obtained by school personnel than

information concerning income levels and other factors. Thus, the investigator has chosen to collect and compare parental education levels and current achievement test scores of a group of first-, third-, and sixth-grade students. The writer recognizes the need to investigate the grade level of the child at which the parent education level is more predictive of the child's achievement. As previously noted, Bloom's study (1965) found the father's education level more predictive at eighth grade than at second grade. Iverson and Walberg (1982) also reported a slightly higher correlation between socio-economic status and achievement for older students than for younger. The Coleman report on equality of educational opportunity spurred wide controversy and discussion, some of which was reported by Mosteller and Moynihan (1972). In a re-analysis of the Coleman report, Mosteller and Moynihan found children whose parents had a college education scored higher on achievement tests than children of parents with less than eight years of schooling. In the same collection of papers, Smith (1972) found an error in Coleman's data which had produced an underestimate of the impact of family factors. Further, he found the relation between background variables, including parents' education levels, tended to increase through the years. The relationship, however, according to the previously cited Special Report by Psychological Corporation (1981), remained fairly stable with respect to achievement test performance at different grade levels.

A second area of interest and investigation involves the area or areas of basic skills most affected by parent education level. A 1963 study by Dave (cited in Bloom, 1964) examined the effects of home environment on achievement. Dave found home environment had the greatest influence on language development (reading and word knowledge) and the least on skills taught in school (spelling and arithmetic). Lower socio-economic status (SES) children in the study by Low and Clement (1982) scored significantly below mid- and upper-SES children in reading on the California Test of Basic Skills (CTBS), while upper-SES children scored significantly higher in mathematics. Highly conflicting results were reported in previous studies, according to Calloway, Jerrolds, and Gwaltney (1974), who further investigated the relationship between reading and language achievement and socio-economic factors. The group found no significant difference between reading achievement of low-, mid-, and high-socio-economic groups, based on father's occupational levels. However, children of fathers who were clerical and sales workers, technicians, and owners of small businesses scored significantly higher in language than children of skilled manual laborers.

The final basis for concern and comparison is the maternal versus paternal education level with regard to significance of impact on the child's achievement. Some of the research reviewed and summarized by Psychological Corporation staff (1981) found the mother's education level a more crucial variable than the father's relative to student achievement

level. However, no further investigative research was attempted by the group. A study conducted by Dunn (1981) involved students whose mothers had a mean of 13.71 years of education and fathers a mean of 14.71 years. She found the mothers who assumed responsibility for teaching their youngsters facilitated their growth in general academic skills, while the youngsters whose fathers assumed such responsibility scored higher on problem-solving items. Boys' aspirations and self-ratings of achievement were highly related to fathers' occupations in Schrom's study (1981). However, he found only ethnic background, of family variables, predictive of girls' aspirations and achievement ratings.

Specifically, it is hypothesized:

1. If there is no significant relationship between the education levels of the parents, the mother's education level will correlate more highly with the child's achievement than that of the father.

2. If there is a significant relationship between the education levels of the parents, there will be a correlation between parents' education and student achievement levels.

3. The parents' education level will correlate more highly with the child's achievement in reading comprehension and language than in mathematics.

4. The correlation between parent education and student achievement levels will remain stable with regard to the grade at which achievement level is measured.

Chapter 2

METHOD

For the purpose of this study, data were collected on 75% of the 241 students enrolled in the first, third, and sixth grades at one elementary school located in Dickson County. The selected school is believed to be generally representative of Dickson County School System's elementary population with regard to socio-economic status. The school facility is one of the newer elementary facilities and is staffed with teachers who are considered representative of Dickson County teachers with respect to training, age, sex, and instructional methods.

Data for the study were obtained by parental completion of questionnaires regarding the highest educational level of both natural parents, if known. The questionnaires were disseminated by the classroom teacher who collected the completed forms for the examiner. Student scores on the spring administration of the Reading (a test of reading comprehension), Mathematics, and Language subtests of the Metropolitan Achievement Test (MAT) were obtained from the class printouts provided through Psychological Corporation scoring service. The data were tabulated by the examiner and statistical comparisons were made using a product-moment correlation between parental education levels and student scores on the basic subtests of the MAT. A chi-square analysis was made

to determine the relationship between the education levels of mothers and fathers.

Chapter 3

RESULTS

A chi-square analysis indicated the education levels of fathers and mothers were significantly related. Therefore, no attempt was made to treat them separately.

Parent education levels were compared with student Reading, Language, Mathematics, and Basic Battery Metropolitan Achievement Test scores, using the Pearson product-moment correlational technique. Mean scores, standard deviations, grade equivalents, percentiles, and stanines are reported on Table 1 by grade and subtest. Table 2 indicates the correlations for all grades and scores.

At the first-grade level, all the correlations were significant at the .005 level. Correlations were higher for Reading and Language than for Mathematics. At third-grade level, the correlations for language had dropped a great deal, while the correlation for Mathematics had increased. None of the correlations were significant at the sixth-grade level.

Chapter 4

DISCUSSION

As shown in Table 1, the Metropolitan Achievement Test scores for the total sample of 180 students were in the fifth stanine and between the 49th and 59th percentiles, with the exception of the sixth-grade Language score at the sixth stanine. Such consistency, based on comparison with national norms, supports the author's description of the sample as representative of the elementary public school population.

In the present study, unlike that of Dunn (1981) and those reviewed by the staff of Psychological Corporation (1981), the education levels of the fathers and mothers were found to be significantly related. Consequently, no attempt was made to treat them separately.

The results of the correlations between parent education level as a measure of socio-economic status and academic achievement for the sample used in the present study agree with those reported in most of the literature. Parent education level accounted for five percent of the variance in the Reading, Mathematics, and Basic Battery scores and six percent of the variance in Language. White's (1982) findings suggest inclusion of a second socio-economic factor would add to the predictive value of parent education level.

When scores were compared by grades, high positive correlations were found beyond the .01 level in Mathematics for both

first and third grades and in Language and Reading for first grade only. Parent educational level was related significantly beyond the .05 level in Reading for third grade. Overall, the data suggest level of parent education has more consistent predictive value for mathematics and less for language achievement. Such findings are contrary to Dave's report (cited in Bloom, 1964) that socio-economic factors are more predictive of reading and language achievement and less of mathematics success. All three academic areas were highly related to SES factors in the study of Low and Clement (1982). Such contradictory findings imply the need for further study regarding subject areas most influenced by parent education level as a specific SES factor.

While the extensive data of the Coleman Report (Mosteller and Moynihan, 1972) indicated the relationship increased through the years, results of the present study pointed to a decrease in the relationship. Bloom's (1964) work, limited to reading, was supported by the more recent research of Iverson and Walberg (1982) which also found correlations higher for older students. Other research, such as that reviewed by the staff of Psychological Corporation (1981) indicated the relationship remained stable with age. In the present study, however, a significant relationship at the .005 level was found in first grade including all academic areas, similar to that found by Stauffer (1980). By third grade, the correlations varied with regard to subject areas, increasing in mathematics and dropping in reading although

still exceeding that required for significance at the .05 level. It is generally believed that development of reading and language skills is more dependent on socio-economic factors, while mathematics skills are more influenced by academic instruction. Comparison of MAT subtest scores reveals that, of the four scores reported, third graders scored lowest in reading. Consequently, the higher correlation between parent education levels and third graders' reading scores may reflect the influence of peer, school, and teacher variables on mathematics and language arts (which includes spelling and English). Such relationships are consistent with those of Dave summarized by Bloom (1964). The slightly lower third-grade reading scores, in comparison with mathematics and language scores and with first and sixth graders' scores, may also be a function of time spent in television viewing as opposed to reading.

No significant relationships were found at sixth-grade level. Reading skills would be expected to improve between third and sixth grade since demands and opportunities for independent reading of subject area material tend to increase sharply after third grade. Such factors would be more dependent on teacher expectations and student-teacher relationships than on parental influence.

Due to the conflicting results within reports of previous research and within the present study, a need for further investigation emerges, addressing the stability of the relationship over time. As previously noted, some of the research

reviewed reports stability of the relationship between socio-economic factors and student achievement. However, the number of intact homes (the child living with both biological parents) has continued to decrease in recent years. Such a sociological change could partially explain the low correlation by sixth grade, when peers and teachers may become more important as stabilizing and motivating influences on achievement. The advent of proficiency tests, precipitating concern of teachers and students about achievement of mastery, along with recent emphasis on basic skills on the part of educators, legislators, and citizens, may also tend to replace socio-economic factor as a motivational force by sixth grade level. A critical factor to be considered when comparing older and current research is recent technological advances, providing television, computers, and electronic games which tend to supplant reading in use of leisure time. A related change, which would influence such research comparison, is the decrease in interest and time invested in reading, homework, and related activities, a change often supported by parents without respect to educational backgrounds. Another factor deserving of concern is the influence of the person, agency, or institution responsible for the care of the child as opposed to the influence of working parents. Such variables should be considered in future research.

Quite evidently, some of the outcomes of the present study differed from those anticipated by the author. However, the results established parent education level as a predictor of

academic success. The two were found more highly related at first-grade level.

The relationship between the parent education level and sex of the student was not addressed in the present study. Concern regarding such a relationship, along with the lack of agreement with previous studies in some aspects, could serve to generate further investigative research.

Chapter 5

SUMMARY

The purpose of this study was to determine the relationship between parents' education levels and Metropolitan Achievement Test (MAT) scores of 180 first-, third-, and sixth-grade students. The writer expected the education level of the mother to correlate more highly with the child's achievement than that of the father. However, the mother's and father's education levels were found to be significantly related, using a chi-square analysis, and no attempt was made to treat them separately.

A positive correlation between education levels of the parents and student achievement levels was anticipated. Overall, the hypothesis was supported by analysis of the data using a product-moment correlation.

Based on previous research, a higher correlation was expected between parent education level and student achievement in reading and language than in mathematics. Although correlations were significantly high for all subject areas at first-grade level, the overall results indicate more predictive value for parent education level in mathematics than in reading or language.

Correlations between parent education and student achievement levels were expected to remain stable over time. Results of the study did not support such an expectation. Significantly

high relationships were found in first grade for all three academic areas measured and in third grade for mathematics, with slightly lower positive correlations for reading in third grade. No significant relationships were found at sixth-grade level. Such findings suggest deterioration of the relationship, rather than stability, over time.

In the writer's opinion, the relationship studied is deserving of further research due to recent changes in families, relationships, and technology. Variables which should be addressed in future research include family size and make-up, teacher expectations, peer influence, impact of proficiency testing and increased emphasis on basic skills, use of leisure time (television, electronic games and computer use as opposed to reading and related activities), and time spent with parents in comparison with time spent with other caregivers.

REFERENCES

- Bloom, Benjamin S. (1964). Stability and change in human characteristics. New York: John Wiley & Sons.
- Bowles, Samuel (1972). Schooling and inequality from generation to generation. Journal of Political Economy, 80(3), S219-S251.
- Callaway, Byron, Jerrolds, Bob W., and Gwaltney, Wayne (1974). The relationship between reading and language achievement and certain sociological and adjustment factors. Reading Improvement, 11(1), 91-126.
- Dunn, Nancy E. (1981). Children's achievement at school-entry age as a function of mother's and father's teaching sets. Elementary School Journal, 81(4), 254-253.
- Gansemmer, Lawrence P. and Bealer, Robert C. (1977). Family background and occupational attainment: Replication and extension through a 24-year follow up. Pennsylvania State University. Agricultural Economics and Rural Sociology, 128.
- Haertel, Edward H., and Wiley, David E. (1979). Out of school determinants of elementary school achievement. Chicago, Ill. CEMREL, Inc., (ERIC Document Reproduction Service No. ED 170 0677).
- Iverson, Barbara K. and Walberg, Herbert J. (1982). Home environment and school learning: A quantitative synthesis.

Journal of Experimental Education, 50(3), 144-151.

Jencks, Christopher (1972). Inequality. New York: Basic Books, Inc.

Laosa, Luis M. (1982). School occupation, culture and family: The impact of parental schooling on the parent-child relationship. Journal of Educational Psychology, 74(6), 791-827.

Low, Benson P. and Clement, Paul W. (1982). Relationship of race and socio-economic status to classroom behavior, academic achievement and referral for special education. Journal of School Psychology, 20(2), 103-112.

Mosteller, Frederick and Moynihan, Daniel P. (1972). On equality of educational opportunity. New York: Random House.

Process evaluation: A comprehensive study of outliers. (1978). Baltimore: Maryland University, Center of Educational Research and Development.

Schrom, Linda K. (1981). Factors influencing the vocational aspirations of Victorian year 9 students. Victorian Education Department, Australia.

The SES predicted achievement report: Its purpose, development and use. (1981). Special Report No. 25, Psychological Corporation, Atlanta, Harcourt Brace Jovanovich.

Sewell, William H. and Hauser, Robert (1976). Causes and consequences of higher education: Models of the status attainment process. In William H. Sewell, Robert M. Hauser

and David L. Featherman (Eds.), Schooling and Achievement of American Society, New York, Academic Press.

Smith, Marshall S. (1972). Equality of educational opportunity: The basic findings reconsidered. In F. Mosteller and D. P. Moynihan (Eds.), On equality of educational opportunity (pp. 230-342). New York: Random House.

Stauffer, A. J. (1980). An investigation into the validity of race and socio-economic status as factors for equalizing student knowledge along with an identification of deficiencies in knowledge. Educational and Psychological Measurement, 40, 525-529.

White, Karl R. (1982). The relation between socio-economic status and academic achievement. Psychological Bulletin, 91(3), 461-481.

TABLES

Table 1

Means, Standard Deviations, Grade Equivalents
Percentiles, and Stanines on Metropolitan Achievement Tests

Grade 1					
Subtest	M	SD	G.E.	Percentile	Stanine
Reading	516	79	1.7	55	5
Mathematics	436	79	2.0	59	5
Language	426	101	1.8	58	5
Basic Battery	443	74	1.7	56	5
Grade 3					
Subtest	M	SD	G.E.	Percentile	Stanine
Reading	659	39	3.3	49	5
Mathematics	583	53	4.1	58	5
Language	625	78	4.6	65	6
Basic Battery	613	50	4.0	57	5
Grade 6					
Subtest	M	SD	G.E.	Percentile	Stanine
Reading	744	70	7.2	54	5
Mathematics	690	64	6.4	48	5
Language	720	104	7.1	54	5
Basic Battery	709	69	6.9	52	5

Table 2
Correlations by Grades Between Parent
Education Levels and Student MAT Scores

Reading					
Grade	R	F-ratio	df(n)	df(d)	P
1	.535	6.008	4	60	.001
3	.463	3.471	4	51	.014
6	.242	0.836	4	54	.510
Mathematics					
Grade	R	F-ratio	df(n)	df(d)	P
1	.468	4.216	4	60	.005
3	.524	4.818	4	51	.003
6	.322	1.564	4	54	.196
Language					
Grade	R	F-ratio	df(n)	df(d)	P
1	.550	6.496	4	60	.000
3	.348	1.762	4	51	.150
6	.331	1.665	4	54	.171
Basic Battery					
Grade	R	F-ratio	df(n)	df(d)	P
1	.573	7.314	4	60	.000
3	.476	3.742	4	51	.010
6	.311	1.446	4	54	.231