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A Study of the Relationship between Children's Verbal Ability and Social Class

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A STUDY OF THE RELATIONSHIP BETWEEN CHILDREN'S VERBAL ABILITY AND SOCIAL CLASS

by

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Vita

Ronald P. McDermott was born in Drexel Hill, Pennsylvania, on September 25, 1932. He graduated from Holy Spirit High School, Atlantic City, New Jersey in 1950 and entered St. Mary's Seminary in that same year. He received the Bachelor of Arts in Philosophy in 1954 and the Licentiate in Sacred Theology, cum laude, and was ordained in May, 1958.

He began graduate studies in psychology at Loyola University in Chicago in September, 1964 and served a clerkship in Clinical Psychology at Loyola University Guidance Center.

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Introduction

The search for factors that are significantly related to verbal ability is an important one, especially in our urban society with its strong emphasis on education. In this study one such factor was studied; that was the occupational level or social class of the father as a correlate of the child's verbal ability. Past studies, such as that of Terman (1937) and those review by Eells (1948) have indicated that the occupational level of the father is significantly related to the child's IQ. The study by McNemar (1942) had shown that the verbal ability is significantly related to IQ. The present study dealt with the relationship between verbal ability of the child and the occupational level of the father.

Past studies such as those of Bayley (1940) and Janke and Havighurst (1945) have shown that the relative differences between occupational levels becomes greater as the children grow older. These relative differences were examined as part of this study.

Review of Related Literature

From the earliest days of IQ testing it has been evident that there is a relationship between the socio-economic level of the father and the IQ of the child. Bridges (1917) wrote: "Our results corroborate the conclusions of Binet in France, Hoffman in Germany and Yerkes et al in the United States that there is a considerable dependence of intelligence upon sociological condition. We have further shown that when children are classified according to the occupation of their fathers, a striking correlation is shown between the intellectual quotient and occupational group (p. 1)." Bridges stated that if the mental age rather than the chronological age were used to determine the time for beginning school, the children of the professional group would begin school two years earlier than the children of the unskilled labor group since the children of the former group mature much earlier than the children of the latter group.

Terman (1937) studied the relationship between IQ of almost 3,000 children and the occupational level of their fathers. Terman found that the children of the lowest occupational group averaged 20 points lower than the children of the highest occupational group.

Neff (1938) reviewed thirty studies, some of which compared mean

IQs. These studies confirmed the findings of Terman described above. Other studies reviewed by Neff used the correlational method in attacking the problems of socio-economic status; it was found that the magnitude of the correlations varied considerably from study to study, although all were positive. The lowest was +21 and the highest was +53. Neff stated that although these coefficients were not high, they did appear to indicate some degree of relationship between the IQ of the child and the socio-economic status of the father. Neff concluded that regardless of the sample tested, the geographical region visited, the test used, or the type of social classification employed, it was confirmed in all of the thirty studies that intellectual proficiency, as determined by score on standard intelligence tests, varies with social level.

Eells (1948) made a thorough review of the research studies dealing with the child's IQ and the occupational status of the family. Some of the studies compared the means or medians of the children of the various occupational groups while other studies used correlational techniques. Of those studies which reported the analyses in terms of group means or medians, the median of the mean and median scores reported for professional children was 114; the median of the unskilled labor group was 96. The median of the differences between the two groups was 18 IQ points. Without a single exception, the children of professional parents were found to score

higher than the children of unskilled laborers, and in most of the studies the difference was substantial.

When Eells reviewed those studies which used correlational techniques, he found that the correlations between parental occupation and intelligence-test scores varied from the low .20's to .60.

The research studies dealing with the relationship between occupational level and the child's intelligence.

The studies mentioned in the above paragraphs examined the relationship between the occupational level of the father and the intelligence of the child. It is also important to examine the relationship between the child's intelligence and his verbal ability. Terman (1937) called the vocabulary test of the Stanford-Binet the most valuable single test in the scale. He felt that the vocabulary scale was a "... rapid survey method of estimating the subject's ability." It is obvious that Terman felt that the child's verbal ability, as indicated by his vocabulary score, gave an idea of the child's intelligence. Terman found that the correlations between vocabulary score and mental age for single age groups ranged from .65 to .91 with an average of .81.

McNemar (1942) found that the vocabulary scale of the Stanford-Binet tended to yield the highest biserial correlations with the total score and scored in terms of the number of words passed it yielded product moment

correlations with composite MA's of .71, .83, .86, and .83 for ages 8, 11, 14, and 18. McNemar stated that these correlations were in part spurious because the vocabulary test was included in the determination of the MA scores but that this effect was slight since the vocabulary test constituted less than 5% of the total number of test items. The high correlations between vocabulary scores and composite MA led McNemar to believe that the vocabulary scale was a good estimate of intelligence.

It has been noted that there is a positive correlation between the occupational level of the father and the intelligence of the child. It has also been noted that there is a high positive correlation between the vocabulary score of the Stanford-Binet and the intelligence of the child. The relationship between the father's occupation and the child's verbal ability in general and vocabulary score in particular will be examined next.

As early as 1847 one author spoke of the relationship between the verbal ability of the child and the father's socio-economic status. Degerando (Carmichael, 1946) reported that "...the child of the rich understands more words and less actions, and the child of the poor less words and more actions (p. 556)." In 1900, Chamberlain (Carmichael, 1946) made a review of the literature and he reported that "... there is considerable evidence in the literature to indicate that there exists a

marked relationship between the socio-economic status of the family and the child's linguistic development (p. 556)."

Eells (1951) reviewed nine studies dealing with status differences. These studies dealt with a wide variety of intellectual functions and abilities. His review indicated that "...test items which are essentially linguistic or scholastic in nature show comparatively large differences in favor of children from high socio-economic backgrounds. While test items which are primarily perceptual or 'practical' in nature show either smaller differences or differences in favor of children from the lower socio-economic backgrounds (p. 16)."

The studies of Saltzman (1940), Havighurst (1947), Ravenette (1962), and Jahoda (1964) are described in the following paragraphs. All four studies are in agreement with the findings of Eells.

Saltzman (1940) arrived at a conclusion similar to Eells after comparing the Stanford-Binet scores of children from a Manhattan slum neighborhood and children from a fine residential neighborhood of Manhattan. Saltzman found that the group from the better neighborhood showed a marked superiority in the verbal tests. Their greatest superiority was on the tests involving vocabulary and verbal comprehension.

Havighurst (1947) used the Thurstone Tests of Primary Mental Abilities with thirteen year olds in a midwestern community to investigate

how differences in primary mental abilities are related to social status. He found that the Verbal tests, along with Number and Word Fluency tests, showed a more significant relationship with social status than did the other tests.

Ravenette (1962) compared the WISC scores of twelve year old English children from a working class population to those of twelve year olds from a predominantly middle-class population. Ravenette found a significant difference between the Vocabulary sub test scores of the two groups with the scores of the working class boys significantly lower.

Jahoda (1964) compared the vocabularies of working class boys and middle class boys in Strathclyde, England. A single measure was derived for each pair of boys by expressing the Self-judging vocabulary score of each working class boy as a proportion of that of his middle class partner. The results indicated that the working class children's vocabulary at age 10 was on the average two-thirds of that of their middle class peers, declining to just over one-half by the age of 14. These results indicated that there is a significant difference in verbal ability between the two groups and that the difference becomes greater as the children grow older.

None of the four studies just mentioned deal explicitly with the occupational level of the father. Those studies used socio-economic classifications rather than occupational classifications. A study by

Seashore, Wesman and Doppelt (1950) did investigate the relationship between Verbal IQ and the occupational level of the fathers. The subjects were the group of 2,200 children who were the subjects in the WISC standardization group. Seashore et al divided the occupations of the fathers into eight levels. The mean Verbal IQ for the highest occupational level was 110.9 and the mean for the lowest occupational level was 94.6.

Three conclusions can be drawn from this review of the literature:

1. A positive relationship exists between the occupational level of the father and the IQ of the child.

2. A positive relationship exists between the child's IQ and the vocabulary score of the child.

3. A positive relationship exists between the verbal ability of the child and the father's occupational level.

Method

Subjects:

The subjects were 256 boys and 63 girls who were six, eight, ten and twelve years of age at the time the tests were taken. All subjects were white children whose families were intact and whose parents were American born. None of the children was retarded.

Measures:

Subject's data were gathered from the files of the Loyola University Guidance Center.

Data included the vocabulary score on the Stanford-Binet Intelligence Test which had been administered to each child at the Center sometime during the past ten years. Information concerning the father's occupation was gathered from the files and was classified according to the Coleman Index of Occupational Levels (Coleman, 1959). A Pearson coefficient of .98 between independently assigned Coleman scores indicated that the assigned occupational levels were reliable.

The vocabulary responses of each subject were rescored by a psychology graduate student who had been trained to use the Stanford-Binet and who had three semesters of supervision in the use of the Stanford-Binet. A Pearson coefficient of .99 for a sample of independently rescored protocols

indicated that the scoring was reliable.

Statistical analysis:

The statistical procedure included two analyses of variance. One was an analysis of the data for the boys and the second was an analysis of the data for the boys and girls. In both cases the analysis of variance was a 4 x 2 analysis with four age levels and two groups of combined occupational classes (McNemar, 1962 and Guilford, 1956). The statistical analysis also included product moment correlations of vocabulary scores and occupational levels for:

1. All subjects combined
2. Boys, all ages combined
3. Boys at each age level
4. Boys of each age and occupation level

There were t tests between the means for boys divided into two occupational groups at each age level. There were t tests of the means of the girls' data also.

Results

A Chi square test of the vocabulary scores of boys and girls indicated a significant difference, in favor of girls. The means and standard deviations of total vocabulary items passed are given in Tables 1 and 2. Descriptive data for each of the Coleman occupational levels are given in Table 3. There were no subjects in the highest occupational level of the Coleman Index (7) and only two subjects in the lowest level of the Coleman Index (1). The means ranged from 11.5 at level 2 to 14.6 at occupational level 6. When the Index levels were pooled to provide two general classifications, there were 132 subjects in the low occupational group and 124 subjects in the high occupational level group.

Results of the 4 x 2 analysis of variance for the total group and for boys only are shown on Tables 4 and 5. The results were similar in both cases. Main effects for age and occupational level were significant but the interaction between occupation and age level was not significant.

The Pearson coefficient of correlation between Coleman occupational levels and vocabulary scores of boys' data supported the results of the analysis of variance. The correlation was .19, significant at the .01 level of probability. The Pearson coefficient of the combined data of the boys and girls was also significant ($r = .14$, $p = .05$).

Table 1

Boys: Means and Standard Deviations

High Occupational Level				Low Occupational Level	
Age*	M	SD		M	SD
6	8.5	2.64		6.3	1.93
8	11.1	3.06		10.2	2.62
10	15.1	3.71		14.1	2.45
12	17.8	4.92		16.4	2.66

* 64 boys at each level. Total number = 256

Table 2

Girls: Means and Standard Deviations

High Occupational Level					Low Occupational Level		
Age	M	SD	N		M	SD	N
6	7.2	1.23	9		10.2	1.33	5
8	12.1	3.70	10		11.4	2.34	8
10	13.3	3.84	7		13.2	3.26	9
12	17.8	2.44	8		16.3	2.66	7

Total Number = 63

Table 3

Descriptive Data

For Each of the Occupational Levels

	Occupational Level	Number of Boys & Girls	Percent of Total	M of Vocabulary Score
High Group N= 124	7	0	.00	00.0
	6	25	.10	14.6
	5	69	.27	13.6
	4	30	.12	11.8
Low Group N = 132	3	99	.39	11.6
	2	31	.12	11.5
	1	2	.01	15.0
		256	100.00	12.6

Table 4

Analysis of Variance

Data for Boys and Girls ($\underline{N}$ = 296)

Source of Variation	df	MS	F	p
Occupation Level	1	95.00	11.51	$<.01$
Age	3	1293.00	156.73	$<.01$
O. L. x Age	3	5.6	.69	NS

Table 5

Analysis of Variance

Data for Boys - (N = 256)

Source of Variation	df	MS	F	p
Occupation Level	1	144.00	17.50	$<.01$
Age	3	1212.16	147.29	$<.01$
O. L. x Age	3	5.25	.6257	NS

The correlations between the six occupational levels and vocabulary scores for boys are shown in Table 6. These results indicated that at ages six and ten the relationship between vocabulary scores and the six occupational levels was significant but only moderate in magnitude. Table 7 lists the correlations between the high occupational levels (Levels 4, 5, and 6) and vocabulary scores for boys. Only one of the four correlations was significant and that was in the ten-year-old group. Table 7 also shows the correlations between the low occupational levels (1, 2, and 3) and the vocabulary scores of boys. None of these correlations was significant.

Table 8 presents a series of *t* tests of the difference between the means of the high occupational level boys and the low occupational level boys. At ages six and ten the *t* tests were significant at the .01 level and at age 12 the test was significant at the .05 level. Table 9 presents *t* tests of the difference between the means of the high occupational level girls and the low occupational level girls. The only age at which the test was significant was at age six at the .01 level.

Table 6

Boys' Data

Correlations

of

Vocabulary Scores and Occupational Levels

Age	r	p
6	.46	.01
8	.07	NS
10	.32	.01
12	.21	NS

Table 7

Boys' Data

Correlations of Vocabulary Scores and Combined Occupation Levels

Age	High O. L.	Low O. L.
6	.32	.04
8	.23	.07
10	.35*	.02
12	.11	.17

* $p < .05$

Table 8

t Tests of the Difference Between the Means of

High O. L. and Low O. L. Boys

Age	N	t	p
6	69	3.72	$<.01$
8	100	1.50	NS
10	107	3.25	$<.01$
12	82	2.37	$<.05$

Table 9

t Tests of the Difference between the Means of High O. L. and Low O. L. Girls

Age	*N*	*t*	*p*
6	14	3.94	$< .01$
8	18	.44	NS
10	16	.05	NS
12	15	.34	NS

Discussion

The present findings indicated a significant difference between the Stanford-Binet vocabulary scores of boys and of girls. The studies of Havighurst and Breese (1947), Janke and Havighurst (1945), McCarthy (1946), and Pinter (1931) did not find a significant difference between girls and boys in vocabulary. These studies involved normal populations while the present study used a clinic population. Center population statistics indicate that parents are far more prone to seek professional help for a son than for a daughter. The personnel at the Center felt that a girl's problems would have to be relatively more extreme than a boy's problems before the parents would seek help. If this opinion is a valid one, this difference and the small number of girls subjects, might help to explain why, in this population, there was a significant difference between boys and girls and not in the other studies cited.

The analyses of variance confirmed the hypothesis that there is a significant effect of father's occupational level on vocabulary scores for boys and for girls and boys combined. In both analyses, the effect was significant at the .01 level of probability. The Pearson coefficients of correlation also supported the hypothesis that occupational level and vocabulary scores are related for boys. These findings were in agreement

with the many studies cited in the review of the literature.

In both analyses of variance, the interaction between age of child and occupational level of father was not significant. Of the eight studies in the literature which dealt with the interaction between age and occupational level, seven found that there was a significant interaction. The apparent difference in the findings of these studies and the findings of the present study might be explained by the fact that most of the studies in the literature were dealing with populations that were much different from the population in this study. In many of the studies, the populations were rural versus urban, or professional class versus working class subjects. In such populations, it is possible to see that the relative differences if environmentally fostered would become more extreme with age. In this study all levels of the population were included and all subjects were from one metropolitan area and one of two centrally administered school systems. These factors may have had a leveling effect which would cause the relative difference between groups to become less extreme as the children advanced in age and participated in highly similar educational experiences.

Although the analyses of variance in this study indicated that the interaction between age and occupational level is not significant, there does seem to be a trend in these data in regard to age and occupational

level interaction. In four of the five series of tests listed in Tables 6, 7, 8, and 9, the relationship between age and occupational level is greater at age six than it is at age twelve. However this trend is just the opposite of the trend that was present in most of the eight studies in the literature. These studies found that the relationship between age and occupational level increases with age while in this study the relationship was greater at age six than it was at age twelve. These results could very well have been due to the leveling effects of similar education mentioned above.

Summary

This study investigated the relationship between occupational level and vocabulary scores of 256 boys and 63 girls who had taken the Stanford-Binet Intelligence Test between the years of 1957 and 1967. The subjects were six, eight, ten and twelve at the time the tests were taken. All subjects were white children whose families were intact and whose parents were American born. None of the children were retarded.

A reliability coefficient indicated that the rescoring of the vocabulary scores was reliable. The fathers' occupational levels were classified according to the Coleman Index of Occupational levels and a reliability coefficient indicated that the assigned occupational levels were reliable.

An analysis of variance of the combined data of boys and girls and an analysis of variance of boys' data indicated that there was a significant difference in the vocabulary scores of the children of different occupational levels. The results of the two analyses of variance also indicated that there was a significant difference in vocabulary at the ages of 6, 8, 10, and 12, as of course would be expected. The Pearson Product Moment Correlation of vocabulary and occupational level for boys was significant at the .01 level. When the data of boys and girls were combined, the Product Moment Correlation was significant at only the .05 level.

Further analysis of the data indicated that the relationship between vocabulary and occupational level was higher absolutely at age six than at age twelve although this interaction was not significant.

Past research had indicated that the relationship between vocabulary and occupational level is significant. This study also confirmed this finding. Past research had indicated that there is a significant interaction between age and occupational level but in this study, the interaction was not significant. It is possible that factors such as the urban environment, education in city schools, television, etc. might have had a leveling effect on the vocabulary scores of the subjects of this study and that this leveling effect kept the relative difference between occupational levels from becoming more extreme with age as was the case in many of the studies in the past.

Abstract

This study investigated the relationship between occupational level and vocabulary scores of 256 boys and 63 girls who had taken the Stanford-Binet Intelligence Test. All subjects were white, urban children whose families were intact and whose parents were American born.

There was a significant difference in vocabulary at the ages of 6, 8, 10, and 12. The correlation between vocabulary and occupational level was significant at the .01 level for the boys and was significant at the .05 level for the combined sample of boys and girls.

Most of the studies in the literature found that the relative difference between occupational levels increased with age. This finding was not confirmed in this study. It is possible that the urban environment, education in city schools, and television might have had a leveling effect which lessened the interaction between age and occupational level.

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Approval Sheet

The thesis submitted by Ronald P. McDermott has been read and approved by the director of the thesis. Furthermore, the final copies have been examined by the director and the signature which appears below verifies the fact that any necessary changes have been incorporated, and that the thesis is now given final approval with reference to content and form.

The thesis is therefore accepted in partial fulfillment of the requirements for the degree of Master of Arts.

10 November 1969
Date

Patricia M Berger, Ph.D.
Signature of Advisor