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ABSTRACT

A family history inventory administered to mothers of 1,206 subjects yielded 12 stable factors which were used as predictors of educational functioning at ages five to seven in a double cross-validation design. In the majority of instances, it was found that family history variates were better predictors of educational functioning than was socioeconomic status. Some variates such as school related activities at age five and reading background of the mother were strongly associated with educational measures at all ages, while other factors such as parental agreement on child-rearing practices and child's TV viewing activities showed little relationship with any educational outcomes. (Author)

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USE OF FAMILY HISTORY DATA TO PREDICT EDUCATIONAL FUNCTIONING FROM AGES FIVE THROUGH SEVEN

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Abstract

The purpose of this investigation was to relate specific aspects of the pre-school home environment to variability in educational functioning. A factor analysis of a 120-item home environment inventory administered to mothers of 1206 five year old Educational Follow-Up subjects yielded 12 stable factors. These factors were used as predictors of educational functioning at ages five through seven in a longitudinal double cross-validation design.

Predictions based on home environment factors were contrasted with predictions of the same outcome variables based on a global rating of socioeconomic status (SES) to ascertain whether general SES or specific family history data was a stronger predictor of educational functioning. The effect of SES was partialled out of the correlations of the major family history factors with the outcome variables to see how SES dependent family history data were. The results could be summarized as follows:

1. Before cross-validation, in the majority of instances (71 percent for boys and 100 percent for girls), educational functioning was significantly more accurately predicted from family history factors than from SES.
2. After cross-validation, (29 percent of the time for boys and 86 percent of the time for girls), educational functioning was significantly more accurately predicted from family history factors than from SES.
3. The family history factors most highly associated with the Metropolitan Achievement Tests and Illinois Test of Psycholinguistic Abilities were school-related activities at age five and reading background of the child.
4. The family history factors most highly associated with the Wide Range Achievement Test subtests reading, spelling and arithmetic were school-related activities at age five and reading backgrounds of the mother, siblings, child and father.
5. The family history factors showing little association with educational functioning were parental agreement about child-rearing practices, breakfast regimen, child's TV viewing habits and age of earliest home responsibilities.
6. With the influence of SES partialled out of the major family history factors, a strong relationship with the outcome variables remained for the factors involving school-related activites of the five year old and reading background of the young child.

USE OF FAMILY HISTORY DATA TO PREDICT EDUCATIONAL FUNCTIONING FROM AGES FIVE THROUGH SEVEN[1]

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A child's home environment has been postulated by psychologists and educators to have a strong effect on educational functioning with a good deal of the variability in educational achievement between children being ascribed to differential home backgrounds. The report on Equality of Educational Opportunity (Coleman, 1966) concluded that the effects of school staff and facilities on achievement are not as large as the effects of family background. The implication of this finding is that equality in achievement cannot be attained through improvement of schools alone, but rather what seems indicated is an improvement of the child's total environment, school and home.

The relationship between home environment and educational achievement has been explored largely by correlating general sociological constructs with educational achievement measures. Although

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there are moderate correlations between sociological constructs and educational achievement, the fact that these relationships exist in no way explains how the relationships operate. It is not possible to go from these correlations to recommendations to parents or preschool teachers about specific environmental characteristics that facilitate development.

What is necessary for such recommendations is a breaking down of the specific characteristics of the home environment which, though intercorrelated with socioeconomic status, are more directly associated with the educational outcome variables measured in the child. Then, predictions and remedial action could be undertaken on the basis of particular deficits in the home environment rather than on the basis of low social class standing. Further, specific characteristics within the home environment should ideally be related to educational outcome variables measured repeatedly over time to ascertain the magnitude and consistency of early home effects as the school environment begins to have its influence. In this study, specific home environment characteristics are identified and related to selected educational outcomes over a three-year time span.

The purpose of this investigation was to explore the relationship between information pertaining to pre-school family and home environment with educational achievement at ages five, six and seven on the same group of youngsters. Specific characteristics within the home environment were related to variability in educational functioning with and without the influence of general level of

socioeconomic status to ascertain which aspects of the home are important for educational achievement across social class and to contrast the utility of predicting educational achievement from home factors and from general socioeconomic status.

The Reading Environment Inventory (REI)(French, 1965) was completed when a trained examiner interviewed the mother in her home the summer of the year the child turned five years old. Data selected from the inventory for further examination included information about the presence of reading materials in the home, the reading backgrounds of all family members, the five year old's liking school-related activities such as coloring, cutting and pasting, the child's TV viewing activities, and parental agreement about child-rearing practices. The educational outcomes included the Metropolitan Readiness Tests (MRT) and the Illinois Test of Psycholinguistic Abilities (ITPA) at ages five and six, and the Wide Range Achievement Test (WRAT) subtests: reading, spelling and arithmetic at age seven.

Hypotheses

1. It was hypothesized that the factor structure of the REI based on subjects born in 1960 and 1961 would be similar to the factor structure yielded by analysis of the scores of subjects born in 1962 and 1963.

2. It was hypothesized that there would be a sex difference in the effects of home environment on educational outcomes.

3. It was hypothesized that among the family history factors, a reordering over time was expected such that variables pertaining

directly to the child, rather than to his parents, would become most strongly related to the later criterion variables.

5. It was hypothesized that upon double cross-validation, the shrinkage of the multiple correlation coefficients would be small.

6. It was hypothesized that family history data would show a strong relationship with intellectual and educational outcome variables after the influence of socioeconomic status was partialled out.

PROCEDURE

Subjects

The population out of which the present study's sample was chosen consists of 1559 participants in the Minnesota Educational Follow-Up Study, a prospective longitudinal investigation of educational outcomes associated with conditions of the family, pregnancy, delivery, infancy and childhood (Balow, et al, 1969). Studies have shown that although the subjects were not initially chosen in a random fashion (all pregnant women at the University of Minnesota Hospital from 1960 to 1964 were encouraged to participate), the Minnesota subjects are essentially normal on measured of socioeconomic status, medical characteristics, neonatal neurological abnormalities, proportion of birth anomalies, intelligence, preschool language development, school readiness and school achievement measures (Ireton, Thwing & Gravem, 1970; Rubin & Balow, 1968).

Four of the five birth year groups of Educational Follow-Up subjects were administered the University of Oregon Medical School

Reading Environment Inventory (REI) (French, 1965). From these 1215 subjects, 1206 subjects were selected for inclusion in our sample based on selection criteria of a completed family interview and participation in the project until age seven. Of the 1206 subjects meeting the selection criteria, 49.7 percent or 599 were boys and 50.3 percent or 607 were girls. They were all born between January 1, 1960, and December 31, 1963. This group appears to be an essentially normal group that does not deviate from the samples used to norm the instruments used in this investigation. Table 1 presents the means, standard deviations and size of our sample and the published norms of the educational tests used in this investigation.

Method

The summer of the year in which the study child turned five years old, a trained examiner administered the REI to mothers in their homes. The interview is a 120-item, highly structured interview in which the examiner reads the question verbatim, the mother verbally responds and the responses are immediately coded into predesignated response categories. The interview takes about an hour to administer.

During the same visit, the study child was administered the Metropolitan Readiness Tests (MRT) and the Illinois Test of Psycholinguistic Abilities (ITPA). These tests were readministered a year later when the child was reaching six years of age. At age seven, the study child was administered the Wide Range Achievement

	Our Sample		Test Norms	
	Mean	SD	Mean	SD
Pre-K MRT	28.0	14.0	Not	Available
Pre-K ITPA	58.7	11.5	60.0	Not Available
Pre-1 MRT	53.0	17.0	45-63	Not Available
Pre-1 ITPA	72.8	11.8	72.0	Not Available
WRAT Reading	34.0	12.0	34.0	Not Available
WRAT Spelling	24.0	5.1	24.0	Not Available
WRAT Arithmetic	20.4	3.5	20.0	Not Available
SES	52.0	18.2	50.0	Not Available

Table 1. Means and standard deviations of our sample and the published test norms on the criterion variables.

Test (WRAT) subtests: reading, spelling and arithmetic at University Hospital by a trained psychologist.

Procedure for data analysis

At the outset, the sample was divided into half by birth year (Rubin, 1972). By birth year group, the items on the REI retained for further investigation were factor analyzed, using principal axis factor analysis with Kaiser normalization and Varimax rotation to simple structure. With the resulting factor-item matrix, factors with eigenvalues greater than 1.0 were retained for further analysis. Factor score variates for each subject on each factor were computed by the summation of scores for items on each factor.

The factor score variates were used to predict five and six year MRT and ITPA and seven year WRAT subtests with stepwise multiple regression. Inspection of the multiple correlations obtained from these predictions arranged in a time sequence from ages five to seven revealed the importance of the home environment for different ages of the child.

Within each sex the prediction formulas obtained from the stepwise multiple regressions of the family history factors predicting the outcome variables based on the first birth year group were then cross-validated against the second birth year group and vice versa. This double cross-validation design revealed the predictive efficiency of using the information about the home environment to predict educational outcomes on a group different from the one that was used to develop the prediction equation.

RESULTS

Factor Structure of the REI

Comparison of the factor structures obtained on the two birth year groups rendered 12 stable factors with eigenvalues greater than 1.0. Six factors dealt with information about the study child, four with the parents, one with siblings, and one dealt with reading materials in the home. Table 2 presents the items by factor, common and total eigenvalues and variance accounted for. These factors were used in stepwise multiple regression as predictors of educational functioning.

Sex Differences

There were sex differences significant at the .001 level for two factors favoring girls enjoying reading and being read to more than boys, while boys spent more time watching television than girls. Table 3 presents the means, standard deviations, numbers, t-tests and probability levels comparing boys and girls on the family history factors. In view of these differences, the remainder of the analysis is reported by sex.

Table 2: Factor Structure of Family History Inventory (N=1206)

	Factor Loading	Total Variance	Total Eigenvalue	Common Variance	Common Eigenvalue
Factor 1. HUSBAND-WIFE AGREEMENT					
Husband present in household	1.23	9.0%	5.48	18.8%	4.98
Disagreement about child-rearing practices	.90				
Intensity of disagreement	.90				
Factor 2. CHILD'S READING BACKGROUND					
Did child like to be read to at 2 1/2	.66	5.0%	3.05	12.2%	3.24
Looks at books by himself at 5	.58				
Frequency child looks at books	.56				
Child's preference for being read to	.54				
Preference in looking at books	-.48				
How often read to at 2 1/2 yrs.	.45				
Factor 3. CHILD'S TV TIME					
Times of day watches TV	.91	3.8%	2.32	6.9%	1.82
Hours spent watching TV	.77				
Factor 4. SCHOOL-RELATED ACTIVITIES OF 5 YEAR OLD					
Prints name at 5 yrs.	.67	3.7%	2.24	6.5%	1.73
Counts to 20	.65				
Recites ABC's	.56				
Identifies colors	.50				
Ties shoes	.41				
Preference	-.31				
Factor 5. AGE OF EARLIEST JOBS IN HOME					
Age of earliest ego oriented	.76	3.1%	1.91	5.4%	1.43
Age of earliest family jobs	.63				

		Factor Loading	Total Variance	Total Eigenvalue	Common Variance	Common Eigenvalue
Factor 6.	MOTHER'S ATTITUDES TOWARD SEX DIFFERENCES					
	Sex who studies	.58	3.1%	1.91	5.4%	1.42
	Sex who reads	.53				
	Sex for math	.36				
	Sex who writes	.28				
Factor 7.	BREAKFAST REGIMINE					
	Special time for breakfast	.71	2.9%	1.76	4.6%	1.23
	With whom child eats breakfast	.61				
Factor 8.	SIBLINGS' READING PROBLEMS					
	Reading problems of siblings	.72	2.7%	1.68	4.6%	1.23
Factor 9.	CHILD DRESSES HIMSELF					
	Dresses himself	.61	2.6%	1.60	3.8%	1.15
	Puts on coat	.51				
Factor 10.	FATHER'S READING BACKGROUND					
	Husband's enjoyment of reading	.72	2.2%	1.37	3.1%	.82
	News magazines in home	.36				
Factor 11.	MOTHER'S READING BACKGROUND					
	Mother's reading score	.64	2.2%	1.34	2.9%	.78
	Mother's enjoyment of reading	.53				
	Mother's reading problems	-.42				
	Literary magazines in home	.33				
	Newspapers in home	.23				
Factor 12.	READING MATERIALS IN THE HOME					
	Presence in the home of a dictionary	.71	2%	1.11	2%	.48
	Presence in the home of adult books	.45				
	Presence in the home of children's books	.34				
	Presence in the home of Bible	.33				
	Presence in the home of an encyclopedia	.29				
	Presence in the home of school books	.27				
	Presence of magazines in the home	.26				

	BOYS			GIRLS				
	MEAN	S.D.	N	MEAN	S.D.	N	t	p
Factor 1 - Husband-wife agreement	1.79	1.47	576	1.86	1.52	583	.80	NS
Factor 2 - Child's reading background	5.65	3.3	576	6.50	6.50	583	4.38	.001
Factor 3 - TV Viewing habits	7.30	2.30	576	6.80	2.45	583	3.58	.001
Factor 4 - 5 year old's activities	8.25	3.07	576	8.32	2.87	583	.40	NS
Factor 5 - Age of earliest jobs	4.26	3.03	576	4.42	3.10	583	.89	NS
Factor 6 - Mother's sex attitudes	5.33	2.04	576	5.48	2.03	583	1.26	NS
Factor 7 - Breakfast regimen	2.00	1.14	576	1.98	1.16	583	.30	NS
Factor 8 - Siblings' reading problems	.30	.46	576	.32	.47	583	.76	NS
Factor 9 - 5 year old dresses self	3.69	.63	576	3.81	.50	583	3.63	.001
Factor 10 - Mother's reading background	15.42	5.15	576	14.59	5.19	583	2.73	.01
Factor 11 - Father's reading background	1.55	1.12	576	1.50	1.11	583	.77	NS
Factor 12 - Home reading materials	4.98	2.17	576	5.01	2.07	583	.24	NS

Table 3. Means, standard deviations, numbers, t-tests and probabability levels comparing boys and girls on the family history factors.

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Educational Outcome Variables, Family History Data and Socioeconomic Status

It was found that in the majority of instances, family history factors were stronger than socioeconomic status (SES) in predicting the outcome variables. Tables 4 and 5 present the developmental

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[1]To ascertain the statistical significance of the difference between the multiple correlation of family history factors and an outcome variable versus the simple correlation of SES with the outcome variable, the following formula by Hotelling (Walker & Lev, 1953, p. 257) was employed:

$$t = (r_{xz} - r_{yz}) \sqrt{\frac{(N - 3)(1 + r_{xy})}{2(1 - r^2_{xy} - r^2_{xz} - r^2_{yz} + 2r_{xy} \cdot r_{xz} \cdot r_{yz})}}$$

where x = family history data from 12 factors
y = socioeconomic status
z = outcome variable

Basically, this formula ascertains the probability of the two correlations (family history with one outcome variable versus socioeconomic status with the same outcome) being significantly different, taking into account the inter-correlations of all three variables (family history and SES, although both are considered to be independent variables, do correlate with each other).

This formula was designed for zero-order Pearson product moment correlations which can range between -1.00 to +1.00. While the SES-outcome variable correlations are simple correlations, the family history-outcome variable correlations are multiple correlations which range from .00 to +1.00. A statistical procedure for this multivariate situation has not yet been developed. However, based upon personal communication on January 21, 1974, with Drs. Donald MacEachern and Raymond Collier, University of Minnesota statisticians, and Dr. Ralph Bradley, University of Florida statistician, it was decided that it would be acceptable to employ Hotelling's t-test even though the assumption of the distribution of the correlations was violated. Because of the assumption violation, the test will be highly conservative.

	BOYS				GIRLS			
	FH-OV	SES-OV	t	p	FH-OV	SES-OV	t	p
Pre K MRT	.46	.40	1.76	.05	.60	.34	7.24	.001
Pre K ITPA	.51	.43	2.04	.025	.55	.45	2.72	.005
Pre 1 MRT	.54	.50	1.16	NS	.63	.45	5.48	.001
Pre 1 ITPA	.51	.38	3.53	.001	.54	.39	4.05	.001
WRAT reading	.47	.30	4.83	.001	.55	.40	4.05	.001
WRAT spelling	.44	.36	2.06	.025	.52	.40	3.32	.001
WRAT arithmetic	.41	.37	1.03	NS	.52	.29	6.87	.001

Table 4. With noncross-validated correlations, t-tests of significance of the difference between family history factors - outcome variable (FH-OV) correlations versus socioeconomic status-outcome variable (SES-OV) correlations.

	BOYS				GIRLS			
	FH-OV	SES-OV	t	p	FH-OV	SES-OV	t	p
Pre K MRT	.43	.40	.74	NS	.51	.34	4.83	.001
Pre K ITPA	.45	.43	.55	NS	.40	.45	0	NS
Pre 1 MRT	.48	.50	0	NS	.59	.45	1.76	.091
Pre 1 ITPA	.46	.38	1.76	.05	.48	.39	2.41	.01
WRAT reading	.44	.30	3.57	.001	.50	.40	2.75	.005
WRAT spelling	.36	.36	0	NS	.47	.40	1.88	.05
WRAT arithmetic	.35	.37	0	NS	.42	.29	3.56	.001

Table 5. With cross-validated correlations, t-tests of significance of the difference between family history factors - outcome variable (FH-OV) correlations versus socioeconomic status-outcome variable (SES-OV) correlations.

and cross-validated multiple regressions with tests of significance between predictions by family history versus predictions by SES. Before cross-validation, 71 percent of the time for boys and 100 percent of the time for girls, educational functioning was more accurately predicted from family history factors than from SES. After cross-validation, 29 percent of the time for boys and 86 percent of the time for girls, educational achievement was more accurately predicted from family history factors than from SES.

Socioeconomic Status Dependence of Family History Factors

After the influence of SES was partialled out of the zero-order correlations of the five major family history factors with the outcome variables, it was found that three of the factors were highly dependent on SES (See Table 6). These three SES-dependent factors were mother's reading background, father's reading background and presence in the home of reading materials. The factors that maintained correlations with outcome variables at about the same strength with SES partialled out were five year old's school-related activities and young child's reading background.

Cross-Validation

After the beta weights for the 1960-1961 boys' scores were applied to the data of the 1962-1963 boys and vice versa with the same procedure being employed for girls, it was found that the multiple correlations were remarkably stable upon cross-validation. Shrinkage ranged from one to four percent of the total variance accounted for. All multiple correlations before and after cross-validation were significant at the .001 level (See Table 7).

	Pre K MRT	Pre K ITPA	Pre 1 MRT	Pre 1 ITPA	WRAT Reading	WRAT Spelling	WRAT Arithmetic
Five year old's school-related activities							
With SES	$.44^{***}_{***}$	$.40^{***}_{***}$	$.33^{***}_{***}$	$.32^{***}_{***}$	$.38^{***}_{***}$	$.35^{***}_{***}$	$.35^{***}_{***}$
Without SES	.39	.35	.25	.24	.33	.30	.30
Child's reading background							
With SES	$.24^{***}_{***}$	$.27^{***}_{***}$	$.25^{***}_{***}$	$.25^{***}_{***}$	$.18^{***}_{***}$	$.17^{***}_{***}$	$.14^{***}_{***}$
Without SES	.19	.21	.20	.20	.13	.13	.09
Mother's reading background							
With SES	$.30^{***}_{*}$	$.33^{***}_{*}$	$.37^{***}$	$.30^{***}$	$.30^{***}_{***}$	$.27^{***}_{**}$	$.24^{***}$
Without SES	.08	.08	.04	.05	.11	.09	.03
Father's reading background							
With SES	$.20^{***}_{***}$	$.23^{***}_{***}$	$.26^{***}_{**}$	$.20^{***}_{***}$	$.18^{***}_{*}$	$.16^{***}_{*}$	$.16^{***}_{*}$
Without SES	.11	.13	.10	.11	.08	.07	.08
Presence in the home of reading materials							
With SES	$.16^{***}_{***}$	$.16^{***}_{**}$	$.12^{***}_{*}$	$.11^{***}$	$.08^{*}$	$.06^{*}$	$.08^{*}$
Without SES	.11	.10	.06	.05	.03	.01	.02

Table 6: Correlations of the major factors with the outcome variables with and without the influence of SES for all subjects.

Statistically significant at $p < .001^{***}$

$p < .01^{**}$

$p < .05^{*}$

	BOYS			GIRLS		
	Original R	Cross-Validated R	SES	Original R	Cross-Validated R	SES
Pre K MRT	.46	.43	.40	.60	.51	.34
Pre K ITPA	.51	.45	.43	.55	.40	.45
Pre 1 MRT	.54	.48	.50	.63	.59	.45
Pre 1 ITPA	.51	.46	.38	.54	.48	.39
WRAT reading	.47	.44	.30	.55	.50	.40
WRAT spelling	.44	.36	.36	.52	.47	.40
WRAT arithmetic	.41	.35	.37	.52	.42	.29
SES	.55	.51		.55	.50	

Table 7. Developmental and cross-validated multiple correlation coefficients from stepwise multiple regression of family history predictor variates on outcome variables and socioeconomic status with outcome variables.

Changes in the Influence of the Child's Past and that of the Parents as the Child Grows Older

The expectation that factors pertaining directly to the child, rather than to his parents, would become more strongly related to school-related criterion variables as the child grew older was not confirmed. Support of this expectation would have been gained if the correlations of factors 2, 3, 4, 5 and 9 with the educational outcomes had increased with increasing age of the child, while factors 1, 6, 10 and 11 had decreased. Inspection of Tables 8 and 9 does not reveal any patterns that would clearly support this contention. Rather, what seems to be indicated is that the major factors seem to be important for every outcome variable.

EDUCATIONAL FUNCTIONING

The factors most highly associated with the pre-kindergarten and pre-first grade measures of the MRT and ITPA were the five year old's school-related activities followed by mother's reading background and child's reading background, the latter two having the same strength correlations. Father's reading background and reading materials in the home followed at somewhat less strength. The factors showing no relationship with the five and six year outcomes were parental agreement, breakfast regimen, TV viewing habits and age of earliest home responsibilities. The child's reading background declined slightly

	Pre K MRT	Pre K ITPA	Pre 1 MRT	Pre 1 ITPA	WRAT Spelling	WRAT Reading	WRAT Arith-metic	SES
Factor 1 - Parental agreement	.05	.08	.08	.08	.01	.03	.05	.08
Factor 2 - Child's reading background	.16	.25	.24	.27	.17	.14	.14	.18
Factor 3 - TV viewing habits	-.02	-.01	-.03	.05	-.04	-.01	.03	-.05
Factor 4 - 5 year old's school-related activities	.40	.41	.27	.30	.30	.32	.30	.20
Factor 5 - Child's earliest jobs	.04	.05	-.04	-.04	-.03	-.02	.02	-.05
Factor 6 - Mother's sex typing of activities	-.08	-.03	-.04	-.08	-.16	-.16	-.07	-.10
Factor 7 - Breakfast regimen	.05	.09	.00	.02	.04	.01	.03	.10
Factor 8 - Sibling's reading problems	-.10	-.09	-.20	-.14	-.11	-.14	-.11	-.27
Factor 9 - Child dresses self	.09	.16	.12	.17	.09	.07	.08	.03
Factor 10 - Mother's reading background	.28	.33	.33	.28	.24	.28	.20	.42
Factor 11 - Father's reading background	.16	.21	.18	.21	.14	.14	.12	.32
Factor 12 - Home reading materials	.14	.16	.11	.11	.04	.05	.06	.19

Table 8. Correlations between family history factors and criterion variables for boys

	Pre K MRT	Pre K ITPA	Pre 1 MRT	Pre 1 ITPA	WRAT Spelling	WRAT Reading	WRAT Arith-metic	SES
Factor 1 - Parental agreement	.01	.08	.09	.06	.06	.06	.11	-.04
Factor 2 - Child's reading background	.31	.30	.27	.24	.18	.23	.13	.25
Factor 3 - TV viewing habits	-.03	.01	-.05	-.01	.01	-.03	.01	-.09
Factor 4 - 5 year old's school-related activities	.48	.38	.38	.33	.40	.43	.39	.22
Factor 5 - Child's earliest jobs	.01	.03	-.03	.01	-.01	.02	.04	-.04
Factor 6 - Mother's sex typing of activities	-.09	-.10	-.11	-.08	-.14	-.16	-.02	-.17
Factor 7 - Breakfast regimen	.11	.11	.01	.02	.05	.06	.06	.08
Factor 8 - Sibling's reading problems	-.19	-.13	-.21	-.17	-.23	-.21	-.10	-.27
Factor 9 - Child dresses self	.11	.16	.13	.09	.10	.08	.09	.04
Factor 10 - Mother's reading background	.31	.32	.40	.33	.30	.31	.28	.38
Factor 11 - Father's reading background	.25	.24	.27	.23	.18	.21	.20	.31
Factor 12 - Home reading materials	.18	.16	.14	.12	.08	.12	.11	.13

Table 9. Correlations between family history factors and criterion variables for girls

in strength between the five and six year testing while mother and father's reading backgrounds increased in strength.

With the seven year WRAT achievement subtests, the highest association was with child's school-related activities followed by mother's reading, sibling's reading, child's reading and father's reading backgrounds. Again we see that the family's orientation to reading is of prime importance in school achievement from pre-kindergarten to end of first grade.

SOCIOECONOMIC STATUS

The family history factors associated with SES in decreasing order of importance are mother's and father's reading backgrounds, sibling's reading problems, and the study child's early reading background. Showing no relationship with SES were parental agreement about child-rearing practices and child's earliest home responsibilities.

STEPWISE MULTIPLE REGRESSION PREDICTIONS OF CRITERION VARIABLES FROM THE FAMILY HISTORY FACTORS

Using all 12 family history factors in a stepwise multiple regression solution to predict each of the ten criterion variables, multiple correlations of .37 to .58 were obtained for boys (See Table 9). Best predicted were the five and six year MRT and ITPA. The variables that were predicted moderately well were the WRAT subtests.

The predictions for girls were stronger than those for boys. The range of multiple prediction correlations was .48 to .63. Seventy-five percent of the multiple correlations were greater than

.50, and thirteen percent were greater than .60. The predictions were all moderately high, but best for five and six year MRT. The multiple correlations for WRAT spelling and arithmetic were somewhat lower than the other multiple correlations, although the multiple correlation for WRAT reading was quite high.

DISCUSSION

Implications for Education

Practical implications of this research could be relevant for at least three sources: parents, teachers and researchers.

Perhaps the most obvious finding is confirmation of previous research observations that parents and the home environment do make a difference in how children perform academically. If parents were aware of their potential influence, perhaps they could be encouraged to conscientiously assess and modify the quality of the home environment. Many parents believe that the school can ameliorate deficiencies in the home. While school may be able to make remedial efforts, this research indicates that the home is still a potent source of influence on the child.

Still other parents desire to do everything in their power to give their children all possible benefits and opportunities to improve their chances in school. This research may provide a focus for these parents. Certain aspects of the home environment are associated with later educational functioning. Parents who are interested in enhancing later development could be guided by the findings of this study.

Reading activities in the home were shown to be positively related to later development. In some homes reading is a frequently chosen activity. One might infer that young children who see their parents and siblings reading are likely to expect that they also will someday read. In a home where family members enjoy reading, it is highly likely that the child will be read to frequently by parents or siblings.

Activities other than reading were shown to be associated with enhancement of later educational functioning, namely school-related tasks such as cutting and pasting, knowing color names, the alphabet and counting. These activities when introduced at an early age may enhance attention to task since some attention is beneficial if not necessary for learning such things as colors, the alphabet and numbers. Another factor not directly investigated here but perhaps crucial is that parents who encourage these activities may well be interacting to a greater extent on in a different fashion with their children than parents who show no interest in these areas.

Another implication of this research is that these activities related to later development are important for all children regardless of social class. The home environment factors are not activities that are beneficial for lower class readiness-deficient children only. Rather, school-related activities such as counting, reciting, counting and exposure to reading materials from before two years of age through five years of age are beneficial and important for all children.

There are implications of this research for teachers as well as for parents. Teachers should recognize that the home environment does have an impact on children and this impact is evident even after the children have attended school for up to three years. It would seem appropriate for teachers to build on these differences in the home environment. Some children who first enter school have not had exposure to books, reading or the vocabulary associated with these activities. This research indicates that these children may be at a disadvantage academically for some years after because of these early deficits.

One very important implication of this research for teachers is that early reading activities relate to later educational achievement. Early reading experiences are not detrimental to the child. Indeed, just the opposite is indicated. Early reading experiences are highly beneficial for later reading achievement. Too long we have cautioned parents against allowing their children to learn words or spontaneously exhibit reading behavior before the teacher teaches these activities.

Most of the factors found by this investigation to be crucial for the child's educational development are amenable to manipulation. School-related activities of the five year old were found to have the highest association with all outcome variables. Preschools could be encouraged to incorporate these kinds of activities in their programs.

Before concluding that television has no benefit for children, it should be noted that the data for this investigation were gathered in 1965 to 1968, before the advant of school readiness oriented television programs such as Sesame Street and the Electric Company.

The implication of this investigation for other researchers is that with a little more time and effort than it takes to assess socioeconomic status, family history data could be collected. These data not only describe the kinds of experiences the preschool child has had at home but these data could be used to make predictions about later academic functioning. The activities found by this investigation to be important for later development could be used as the focus around which to plan school activities.

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