

## DOCUMENT RESUME

ED 141 785

CS 003 570

AUTHOR Luft, Max; And Others  
TITLE Trends in Relationships between Reading Achievement and Selected Independent Variables over a Five Year Period.  
PUB DATE 77  
NOTE 34p.; Paper presented at the Annual Meeting of the American Educational Research Association (New York City, April 1977)  
EDRS PRICE MF-\$0.83 HC-\$2.06 Plus Postage.  
DESCRIPTORS Effective Teaching; Grade 3; \*Predictor Variables; Primary Education; \*Reading Achievement; \*Reading Research; Socioeconomic Influences; \*State Surveys; \*Testing Programs  
IDENTIFIERS \*Arizona

## ABSTRACT

Since July 1970, Arizona has required that a standardized reading achievement test be administered annually to all third-grade pupils. Prior to test administration, data have been gathered on student traits, teacher background and teaching techniques, and characteristics of the school and the school district. Regression analyses were used to examine the relationship between each of the independent variables and reading achievement. During the testing period, the four variables that have had the highest correlation with total reading have been general ability to do school work, socioeconomic status, ethnic information, and language spoken at home. The four variables with the lowest correlation with total reading have been class size, basic phonics program, teacher self-improvement method, and institution where teacher received bachelor's degree. An extensive table listing the independent variables for each year of testing is included. (AA)

\*\*\*\*\*  
\* Documents acquired by ERIC include many informal unpublished \*  
\* materials not available from other sources. ERIC makes every effort \*  
\* to obtain the best copy available. Nevertheless, items of marginal \*  
\* reproducibility are often encountered and this affects the quality \*  
\* of the microfiche and hardcopy reproductions ERIC makes available \*  
\* via the ERIC Document Reproduction Service (EDRS). EDRS is not \*  
\* responsible for the quality of the original document. Reproductions \*  
\* supplied by EDRS are the best that can be made from the original. \*  
\*\*\*\*\*

# SOUTHWEST RESEARCH ASSOCIATES

*a consortium for educational advancement*

U.S. DEPARTMENT OF HEALTH,  
EDUCATION & WELFARE  
NATIONAL INSTITUTE OF  
EDUCATION

Post Office Box 4092  
Albuquerque, N.M. 87106  
(505) 266-5781

THIS DOCUMENT HAS BEEN REPRO-  
DUCED EXACTLY AS RECEIVED FROM  
THE PERSON OR ORGANIZATION ORIGIN-  
ATING IT. POINTS OF VIEW OR OPINIONS  
STATED DO NOT NECESSARILY REPRESENT  
OFFICIAL NATIONAL INSTITUTE OF  
EDUCATION POSITION OR POLICY

## TRENDS IN RELATIONSHIPS BETWEEN READING ACHIEVEMENT AND SELECTED INDEPENDENT VARIABLES OVER A FIVE YEAR PERIOD

Max Luft, Janice Lujan, and Katherine Bemis  
Southwest Research Associates  
Albuquerque, New Mexico

March, 1977

AERA Session No. 30.11

ED141785

S 003 570

### Evaluation Question

Since July 1, 1970, the State of Arizona has required that a standardized reading achievement test be adopted by the State Board of Education, and administered annually to all third grade pupils. The results of the test administered under this statute are reported to the State Board of Education. The law requires "the results shall include the score of each individual pupil, the score of each classroom, the score of each school and such other information or comparative data as the State Board may require."<sup>1</sup>

In meeting the state mandate, the Board has conducted many studies, and asked many questions. Specifically, two of the evaluation questions posed were:

- (1) What is the relationship of a series of independent teacher, school and student variables to reading achievement of third grade students enrolled in the public schools of Arizona? and,
- (2) What percent of the variance of the standardized reading test scores can be accounted for through identified independent teacher, school and student variables for students in the third grade in the public schools of Arizona?

<sup>1</sup>

Arizona Revised Statutes, Title 15:1131-1134.

## Evaluation Techniques

For the last six years the legislature of the State of Arizona has mandated a standardized reading achievement test be administered to all third grade students who are enrolled in the public schools of Arizona. Prior to test administration, data were gathered on student traits, teacher background and teaching techniques and characteristics of the school and the school district. At each test administration, data were gathered on up to 14 independent variables. As the tests were scored, the raw scores and categorizations of the independent variables were stored on computer tape. A correlation matrix was then generated to identify the relationship between each independent variable and the criterion raw reading test score. A linear regression was then performed to identify the value of the multiple correlation coefficient.

Specifically, for each independent variable a multiple regression was run. This was done by identifying various levels of the independent variables as dichotomous conditions (occurring/not occurring). A correlation matrix was then generated determining the relation between the categorized level of the variable and total reading raw score. To determine the relation between the independent variable (i.e., ethnic group) and the dependent variable (reading raw score), a multiple regression was computed using each level of the independent variable as an input variable. The following table reflects an example for calculation of the multiple correlation for ethnic group.

# MULTIPLE REGRESSION

SELECTION . . . ETHNIC GROUP

VARIABLE	MEAN	STANDARD DEVIATION	CORRELATION X vs Y	REGRESSION COEFFICIENT	STD. ERROR OF REG. COEF.	COMPUTED T VALUE
ANGLO WHITE	0.67106	0.46983	0.34978	9.49913	0.64580	14.70908
SPANISH SURNAMED	0.19996	0.39997	-0.25500	-8.00074	0.67961	-11.77251
BLACK	0.03869	0.19285	-0.12093	-10.15051	0.85320	-11.89701
INDIAN	0.04674	0.21108	-0.16982	-13.95482	0.81922	-17.03427
ORIENTAL	0.00497	0.07035	0.03088	13.94870	1.72174	8.10151
NOT INCLUDED	0.00651	0.08044	-0.00075	3.60888	1.53558	2.35018
DEPENDENT RAW SCORE	91.82971	23.17978				

INTERCEPT 88.00706

MULTIPLE CORRELATION 0.36829

STD. ERROR OF ESTIMATE 21.55254

## ANALYSIS OF VARIANCE FOR THE REGRESSION

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARES
ATTRIBUTABLE TO REGRESSION	6	2652320.00000	442053.31250
DEVIATION FROM REGRESSION	36386	16901728.00000	464.51172
TOTAL	36392	19554048.00000	

### Data Sources

Over a six year period, data were gathered on over 200,000 students. The following table indicates the number of students participating in each testing session, and the number of independent variables on which data were gathered.

Summary of Data Gathered

Testing Date	Number of Students	Student Variables	Teacher/School Variables
January 1971	35,882	3	3
January 1972	36,388	5	3
January 1973	36,211	6	7
October 1973	35,508	5	8
October 1974	34,409	4	7
October 1975	33,972	5	9
October 1976	34,482	3	2

During the first three testing sessions, the Metropolitan Achievement Test, Forms F, G and H respectively were used. During the last four testings, the Stanford 73, Primary Level II, Form A, was used as the test instrument.

In excess of thirty different independent variables have been analyzed during the last seven testing sessions. The following tables indicate the variable and the quantifiable levels of the variables.

# ANALYSIS BY YEAR OF INDEPENDENT VARIABLES

ES	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
		X	X	X		X	X
GROUP: White h Surnamed	X	X	X	X	X	X	
al f above or other							
SPOKEN AT HOME: h h and Spanish h	X						
h and Indian h and any other al							
SPOKEN AT HOME: h h and Spanish h		X					
h and Indian al							
SPOKEN AT HOME: h h and Spanish h			X	X	X	X	X
n and Indian al combinations not included above							
ABILITY TO DO SCHOOL WORK (STANDARDIZED MEASURE): average; IQ of 89 or below e; IQ of 90-110 average; IQ of 111 or above	X	X	X	X	X	X	X
							9

# ANALYSIS BY YEAR OF INDEPENDENT VARIABLES

VARIABLES	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
<b>LENGTH OF CONTINUOUS ATTENDANCE IN DISTRICT:</b> Less than 3 months since start of current year Less than 1 full year More than 1 year but less than 2 years Two school years Started 1st grade here Started Kindergarten here	X						
<b>SOCIO-ECONOMIC STATUS:</b> Below average (less than \$3,000) Average (\$3,000-\$10,000) Above average (above \$10,000)	X						
<b>SOCIO-ECONOMIC STATUS:</b> Below \$3,000 \$3,000-\$6,000 \$6,000-\$10,000 \$10,000-\$15,000 \$15,000-\$20,000 Above \$20,000		X	X				
<b>FORMAL PRESCHOOL EXPERIENCE:</b> Day Care only Kindergarten only Nursery only Head Start only Day Care and Head Start Day Care, Head Start, and Kindergarten Head Start and Kindergarten Nursery, Head Start, and Kindergarten Special Program and Kindergarten None	X						
<b>FORMAL PRESCHOOL EXPERIENCE:</b> None Less than 1 year Head Start 1 year Head Start Less than 1 year Kindergarten 1 year Kindergarten More than 1 year experience		X	X	X	X		



# ANALYSIS BY YEAR OF INDEPENDENT VARIABLES

VARIABLES	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
FORMAL PRESCHOOL EXPERIENCE: Not prior to Grade 1 K only K + less than 1 year Head Start K + 1 year or more Head Start K + less than 1 year private preschool K + 1 year or more of private preschool Combination						X	
BASIC READING PROGRAM NOW IN USE: Allyn and Bacon Harper and Row Lippincott MacMillan Scott-Foresman Combination of above Other than above	X						
BASIC READING PROGRAM NOW IN USE: None Language experience Allyn and Bacon Harper and Row Lippincott MacMillan Scott-Foresman Sullivan SRA Local program		X					
BASIC READING PROGRAM NOW IN USE: None Allyn and Bacon Harper and Row Lippincott MacMillan Scott-Foresman SRA Sullivan Open Court Local teacher-made			X				

# ANALYSIS BY YEAR OF INDEPENDENT VARIABLES

VARIABLES	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
BASIC READING PROGRAM NOW IN USE: None Allyn and Bacon Harper and Row Lippincott MacMillan Scott-Foresman				X			
BASIC STATE ADOPTED READING PROGRAM: Allyn and Bacon Harper and Row Lippincott MacMillan Scott-Foresman					X		
TYPE OF READING GROUP IN SECOND GRADE: Individualized Homogeneous Heterogeneous Other School						X	
READING PROGRAM USED IN SECOND GRADE: Allyn and Bacon Harper and Row Lippincott MacMillan Scott-Foresman Student attended other school						X	
READING PROGRAM USED IN SECOND GRADE: Economy Holt, Rinehart and Winston Houghton Mifflin Lippincott SRA Other Text Student attended other school							X

## ANALYSIS BY YEAR OF INDEPENDENT VARIABLES

VARIABLES	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
READING PROGRAM USED IN FIRST GRADE: Allyn and Bacon Harper and Row Lippincott MacMillan Scott Foresman Student attended other school						X	
BASIC PHONICS PROGRAM NOW IN USE: Economy Ginn and Company Language Arts Lyons and Carnahan Phonovisual Products Combination of above Other than above	X						
BASIC PHONICS PROGRAM NOW IN USE: Economy Ginn and Company Language Arts Lyons and Carnahan Phonovisual Products Reading Text Program Other commercial Non-commercial None		X					
BASIC PHONICS PROGRAM NOW IN USE: Economy Ginn and Company SRA Distar Lyons and Carnahan Phonovisual Products Basic Reading Text Key Vocabulary Teacher designed Other commercial			X				

# ANALYSIS BY YEAR OF INDEPENDENT VARIABLES

VARIABLES	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
BASIC PHONICS PROGRAM NOW IN USE: None Economy Ginn and Company Language Arts Lyons and Carnahan Phonovisual Products				X			
BASIC PHONICS PROGRAM IN USE: None Economy Ginn and Company Language Arts Lyons and Carnahan Phonovisual Products Local Teacher/District Other commercial					X		
PHONICS PROGRAM USED IN SECOND GRADE: None Economy Ginn Language Arts Lyons and Carnahan Phonovisual Products Teacher/District made Other commercial program Student attended other school						X	
PHONICS PROGRAM USED IN FIRST GRADE: None Economy Ginn Language Arts Lyons and Carnahan Phonovisual Products Teacher/District made Other commercial program Student attended other school						X	

## ANALYSIS BY YEAR OF INDEPENDENT VARIABLES

VARIABLES	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
TYPE OF PHONICS GROUP IN SECOND GRADE:						X	
No phonics							
Individualized							
Homogeneous							
Heterogeneous							
Student attended other school							
SIZE OF PHONICS GROUP:				X	X		
No phonics instruction							
Homogeneous 1-5							
Homogeneous 6-10							
Homogeneous 11-15							
Homogeneous 16-25							
Heterogeneous 2-5							
Heterogeneous 6-10							
Heterogeneous 11-15							
Heterogeneous 16-25							
Heterogeneous 26 +							
SUPPLEMENTARY READING PROGRAMS IN USE:				X	X		
None							
SRA							
Sullivan Readers							
Open Court							
Local Teacher Made							
Key Vocabulary							
Other commercial							
LIBRARY FACILITY:	X						
None							
School library with certified librarian							
School library with teacher supervision							
School library with clerk supervision							
Classroom collections only							
Access to Public Library only							
Bookmobile only							
Public Library and Bookmobile							

## ANALYSIS BY YEAR OF INDEPENDENT VARIABLES

VARIABLES	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
MINUTES PER PUPIL PER DAY OF READING INSTRUCTION: Less than 30 minutes 31-35 minutes 36-40 minutes 41-45 minutes 46-50 minutes 51-55 minutes 56 or more	X						
MINUTES PER PUPIL PER DAY OF READING INSTRUCTION Less than 30 minutes 31-35 minutes 36-40 minutes 41-45 minutes 46-50 minutes 51-55 minutes 56-60 minutes 61-65 minutes 66-70 minutes More than 71 minutes		X					
MINUTES PER PUPIL PER DAY OF READING INSTRUCTION 0-30 minutes 31-40 minutes 41-50 minutes 51-60 minutes 61-70 minutes 71-80 minutes 81-90 minutes 91-100 minutes 101-110 minutes 111 or more			X				
MINUTES PER PUPIL PER DAY OF READING INSTRUCTION Less than 35 minutes 36-45 minutes 46-55 minutes 56-60 minutes 61-70 minutes 71-80 minutes 81-90 minutes 91 or more				X	X		

## ANALYSIS BY YEAR OF INDEPENDENT VARIABLES

VARIABLES	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
MINUTES PER PUPIL PER DAY OF SUPPLEMENTARY INSTRUCTION:				X	X		
None							
Less than 35 minutes							
36-45 minutes							
46-55 minutes							
56-60 minutes							
61-70 minutes							
71-80 minutes							
81-90 minutes							
91 minutes or more							
SCHOOL NUTRITION PROGRAM:	X						
Breakfast only							
Breakfast and lunch							
Lunch only							
Lunch and snack							
Milk program only							
None available							
HEALTH SERVICES:	X						
Visual screening only							
Audio screening only							
Dental screening only							
Physical screening only							
Any combination of the above							
All of first four services above							
No health services							
PRIMARY INSTRUCTIONAL MODE:	X						
Basic Textbook							
Individual Instruction							
Programmed Instruction							
Language Experience							

# ANALYSIS BY YEAR OF INDEPENDENT VARIABLES

VARIABLES	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
YEARS TEACHING EXPERIENCE: First year of teaching 5 years experience 1 year experience 6 years experience 2 years experience 7 years experience 3 years experience 8 years experience 4 years experience 9 or more years experience	X						
YEARS TEACHING IN THIS DISTRICT: First year this dist. 5 years this district 1 year this district 6 years this district 2 years this district 7 years this district 3 years this district 8 years this district 4 years this district 9 years or more this district	X						
FORMAL EDUCATION OF TEACHER: B.A. or B.S. degree M.A. + 10 hours B.A. + 10 hours M.A. + 20 hours B.A. + 20 hours M.A. + 30 hours B.A. + 30 hours Educational Specialist M.A. or M.S. degree Doctorate	X						
AGE OF BUILDING: New this year 10-14 years old 1-4 years old 15-19 years old 5 years old 20 or more years old 6-9 years old	X						
DESIGN OF BUILDING: One Room School House Two Room School House Four Room School Traditional Self-contained Open interior construction	X						
PHYSICAL STRUCTURE OF CLASSROOM: Closed (traditional) Open						X	



## ANALYSIS BY YEAR OF INDEPENDENT VARIABLES

VARIABLES	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
<b>SIZE OF SCHOOL AND SETTING:</b> Large system (25,000 or more) Medium system (3,000 to 24,999) Small system (300 to 2,999) Very small system (1 to 299)	X						
<b>AVERAGE CLASS SIZE:</b> 1-5 pupils                      26-30 pupils 6-10 pupils                    31-35 pupils 11-15 pupils                  36-40 pupils 16-20 pupils                  41 or more pupils 21-25 pupils	X						
<b>CLASSROOM CLIMATE:</b> No cooling, no heating Evaporative cooling only Refrigeration cooling only Heating only, no cooling Heating with evaporative cooling Heating with refrigeration cooling	X						
<b>READING PERFORMANCE OBJECTIVES:</b> Not in use                      Combination of 1 and 2 1. District choice              Combination of 1,2 and 3 2. School choice                Combination of 1,2,3 and 4 3. Teachers collectively        Combination of 3 and 4 4. Teachers individually        Other combination			X				
<b>TEACHER HOLDS BACHELOR'S DEGREE FROM:</b> Arizona State Grand Canyon Northern Arizona University of Arizona		X					
<b>TEACHER AIDE AVAILABILITY:</b> None 1/4 time Aide 1/2 time Aide Full time Aide More than one Aide		X					

## ANALYSIS BY YEAR OF INDEPENDENT VARIABLES

VARIABLES	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
<b>CLASSROOM LEARNER FACILITATOR SITUATION:</b> 1. Certified teacher 2. More than 1 certified teacher 3. 1 or 2 above and student aide 4. 1 or 2 above and volunteer aide 5. 1 or 2 above and paid aide 6. 1 or 2 above and student teacher 7. Combination of 2 and 5 8. Combination of 2 and 4 9. Combination of 2, 3, 4, and 5 10. Other combination			X				
<b>TEACHER HOLDS MASTER'S DEGREE FROM:</b> Arizona State Grand Canyon Northern Arizona University of Arizona Brigham Young Other out of state		X					
<b>TEACHER EXPOSURE TO READING INSTRUCTION COURSE:</b> None                      Five One                        Six Two                        Seven Three                      Eight Four                        Nine		X					
<b>TEACHER SELF-IMPROVEMENT METHOD:</b> 1. Professional reading    Combination of 1 and 3 2. School workshops        Combination of 1 and 4 3. University workshops    Combination of 1,2,3 and 4 4. Community workshops    Other combination Combination of 1 and 2			X				
<b>CLASS SIZE:</b> 1-4 pupils                    25-29 pupils 5-9 pupils                    30-34 pupils 10-14 pupils                35-39 pupils 15-19 pupils                40-44 pupils 20-24 pupils                45 pupils or more				X			

## ANALYSIS BY YEAR OF INDEPENDENT VARIABLES

VARIABLES	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
SPECIAL EDUCATION PROGRAM:						X	X
No Special Education Requirements							
Gifted							
EMH							
Hearing							
Homebound							
Multi-Handicapped							
Physically Handicapped							
Learning Disability							
Speech							
Visually Handicapped							
SIZE OF READING GROUP:				X	X		
Individualized							
Homogeneous 2-5							
Homogeneous 6-10							
Homogeneous 11-15							
Homogeneous 16-25							
Heterogeneous 2-5							
Heterogeneous 6-10							
Heterogeneous 11-15							
Heterogeneous 16-28							
Heterogeneous 26 +							

## Results/Conclusions

The results of the data analysis indicate the degree to which each of the independent variables were related to reading achievement. From this information the coefficient of determination can be calculated. Each year the State Board of Education has the option of modifying the selected independent variables. Those which had the highest correlation were usually retained.

During the testing period, the four variables which have had the highest correlation with total reading are:

<u>Correlation</u>	<u>Variable</u>
.560	General ability to do school work
.402	Socio-Economic status
.371	Ethnic information
.359	Language spoken at home

The variables which have had the lowest correlation with total reading over the testing period are:

<u>Correlation</u>	<u>Variable</u>
.086	Class size
.080	Basic phonics program
.059	Teacher self-improvement method
.047	Institution where teacher received Bachelor's degree

It must be noted that the variables over which it is difficult to exhibit control account for the greatest correlations; and those which could be controlled have smaller correlations.

The greatest overall prediction of reading scores from the independent variables yielded a multiple correlation of .661. The resultant coefficient of determination was .44. The following data are for that testing period, 1972-1973.