THE UNIVERSITY OF MANITOBA

THE INTERACTION OF TEACHER SEX AND STUDENT SEX IN GRADE NINE READING ACHIEVEMENT IN THE EASTERN MANITOBA SCHOOL REGION

by

COMPTON KHAN

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ABSTRACT

The purpose of this study was to determine whether there was an interaction between teacher sex and student sex in reading achievement.

The population in the study was 2,861 grade nine students enrolled in the Eastern Manitoba School Region during the 1973-74 school year. This number represented 89% of the Region's total grade nine student population for that year.

Data on the students and teachers were obtained from a previous reading study conducted in the Region. The Iowa Silent Reading Test, Level 1, Form E was the testing device employed in that study. The ISRT, Level 1 was composed of four major tests and three sub-tests. The major tests were Vocabulary, Comprehension, Directed Reading, and Reading Efficiency. Word Power, Directed A, and Directed B were the three sub-tests.

Students were grouped into four categories. These were girls taught by male teachers, boys taught by male teachers, girls taught by female teachers, and boys taught by female teachers.

Two analytic procedures were employed to test between-group comparisons and the significance of teacher/student sex interaction in reading. T-test and analysis of variance using the SPSS procedure, Anova, at the .05 and .01 significant levels of confidence were the test methods.

Results of t-tests revealed the existence of significant between-

group differences in reading tests and sub-tests. Girls irrespective of teacher sex achieved significantly better than boys in all but one of the tests and sub-tests. The general pattern of findings suggested that the differences were not caused by effects of teacher sex.

Analysis of variance results confirmed that there was no significant interaction between teacher sex and student sex in any of the tests or sub-tests. The effects of teacher sex and student sex were together responsible for very small variations in achievement. The Anova program also revealed significant boy/girl differences in each test and sub-test. Incidental main effect findings showed that female teachers had significantly better overall student achievement than male teachers.

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CHAPTER I

INTRODUCTION

Evidence from a number of studies suggested that the reading achievement of girls was superior to that of boys in elementary and junior high schools. In the United States, this evidence had been accumulating for some time. John McNeil, James Turnure and Jay Samuels, and Cathleen Stasz et al. were but a few who conducted studies which showed that girls performed better than boys at different levels of the public school system.[1]

Evidence had also been accumulating in Manitoba. In 1971, Pandelis Halamandaris in a reading survey in Manitoba, found that girls performed significantly better than boys.[2] A study of reading achievement in Western Manitoba Region in 1973 showed that grades three and six girls achieved significantly higher than boys in the same grade.[3] The same

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[1] James D. McNeil, "Programmed Instruction versus Visual Classroom Procedures in Teaching Boys to Read," American Educational Research Research Journal (1964): 113-119; James Turnure and Jay Samuels, Attention and Reading Achievement in First Grade Boys and Girls (Minneapolis: ERIC Document Reproduction Service, ED 074 447, 1972); Cathleen Stasz et al., The Influence of Sex of Student and Sex of Teacher on Students' Achievement and Evaluation (New Jersey: ERIC Document Reproduction Service, ED 074 410, 1973).

[2] Pandelis G. Halamandaris, Reading in Manitoba Schools: A Survey (Winnipeg: Manitoba Teachers' Society, 1971).

[3] E. Bye et al., "Analysis of Reading Achievement in Western Manitoba Grade 3 and 6." (Winnipeg: Department of Education, 1973), pp. 36-37.

results were demonstrated in an Eastern Manitoba Region, June, 1974 study of grade nine reading skills.[4]

John Madden found significant differences in the interactive effects between organizational factors and sex.[5] Eunice Ashov and Thomas Fishback suggested sex differences in attitudes toward reading.[6] These were among other suggested causes for sex differences in reading achievement. One other reason that was forwarded for sex differences in achievement was the fact that schools, especially at the lower levels, were staffed largely by female teachers and that boys were at a disadvantage in their classes.

I. STATEMENT OF THE PROBLEM

The purpose of this study was to determine whether there was an interaction between the sex of the teacher and the sex of the student in reading achievement. More specifically, this study sought to ascertain; a) whether there were significant differences in the reading achievement of grade nine boys and girls taught by male and female teachers in the Eastern Manitoba School Region and b) whether differences were attributable to the sex of the teacher.

Questions generated from Figure 1 were investigated in each of the following tests and sub-tests of the Iowa Silent Reading Test: a) Test 1,

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[4]Betty Anderson et al., "Analysis of Grade Nine Reading Skills for Eastern Manitoba." (Winnipeg: Department of Education, June, 1974), pp. 11- 25.

[5]John Madden, Student Achievement in Language and the Organizational Climate of Schools (Columbia: ERIC Document Reproduction Service, ED 054 240, 1971).

[6]Eunice Ashov and Thomas Fishback, "An Investigation of Primary Pupils' Attitudes Toward Reading," Journal of Experimental Education III (1973): pp.1-7.

Vocabulary; b) Test 2, Reading Comprehension; c) Test 1 & 2, Word Power; d) Test 3, Directed Reading, Part A; e) Test 3, Directed Reading, Part B; f) Test 3, Directed Reading, Parts A and B; g) Test 4, Reading Efficiency.

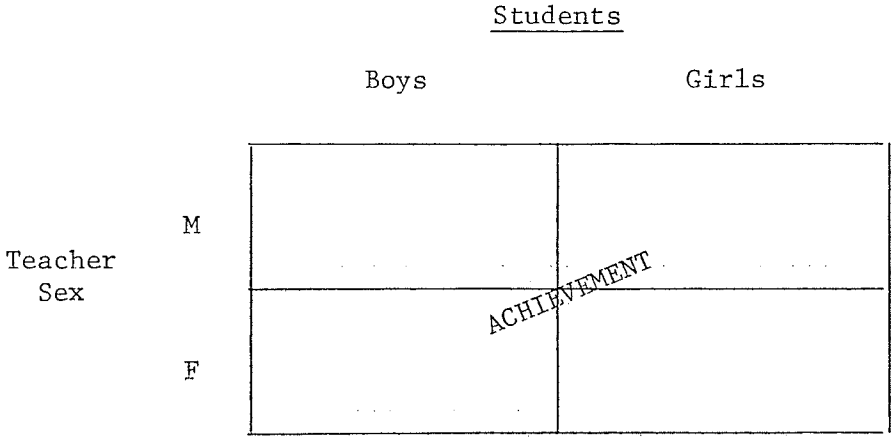

Figure 1. A Plan of Study

The questions were:

1. Were there differences in reading achievement test scores and sub-test scores between girls and boys taught by male teachers?

2. Were there differences in reading achievement test scores and sub-test scores between girls and boys taught by female teachers?

3. Were there differences in reading achievement test scores and sub-test scores between boys taught by female teachers and boys taught by male teachers?

4. Were there differences in reading achievement test scores and sub-test scores between girls taught by female teachers and girls taught by male teachers?

5. Were there differences in reading achievement test scores and sub-test scores between girls taught by female teachers and boys taught by male teachers?

6. Were there differences in reading achievement test scores and sub-test scores between girls taught by male teachers and boys taught by female teachers?

These questions were put into null hypothesis and alternative hypothesis form. The null hypotheses were tested at the .05 and .01 levels for significant differences in each test and sub-test by t-tests and by analysis of variance. The following were the null and alternative hypotheses:

1. There were no significant differences in reading achievement test scores and sub-test scores between girls and boys taught by male teachers.

There were significant differences in reading achievement test scores and sub-test scores between girls and boys taught by male teachers.

2. There were no significant differences in reading achievement test scores and sub-test scores between girls and boys taught by female teachers.

There were significant differences in reading achievement test scores and sub-test scores between girls and boys taught by female teachers.

3. There were no significant differences in reading achievement test scores and sub-test scores between boys taught by female teachers and boys taught by male teachers.

There were significant differences in reading achievement test scores and sub-test scores between boys taught by female teachers and boys taught by male teachers.

4. There were no significant differences in reading achievement test scores and sub-test scores between girls taught by female teachers and girls taught by male teachers.

There were significant differences in reading achievement test scores and sub-test scores between girls taught by female teachers and girls

taught by male teachers.

5. There were no significant differences in reading achievement test scores and sub-test scores between girls taught by female teachers and boys taught by male teachers.

There were significant differences in reading achievement test scores and sub-test scores between girls taught by female teachers and boys taught by male teachers.

6. There were no significant differences in reading achievement test scores and sub-test scores between girls taught by male teachers and boys taught by female teachers.

There were significant differences in reading achievement test scores and sub-test scores between girls taught by male teachers and boys taught by female teachers.

II. SIGNIFICANCE

This study sought a possible explanation to a problem that has attracted the attention of educators for some time. The results of this study ought to be of special importance to Manitoba'a educators at the planning and administrative levels in terms of staffing practices especially at the lower levels of the public school system; since three studies carried out in the Province of Manitoba showed that girls achieved better than boys in reading.[7]

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[7]Pandelis Halamandaris, op. cit.: E. Bye et al., op. cit.: Betty Anderson, op. cit.

III. ASSUMPTIONS

This study was based on the following assumptions:

i) There was no inherent intellectual difference in the capacity to learn between girls and boys.

ii) Any effects of prior exposure, in Language Arts, to a predominance of female teachers at the elementary level had been counteracted by the final grade (9) of the junior high level. The staffing pattern at this level was reversed. At the grade nine level, the ratio of male Language Arts teachers to female Language Arts teachers was 1.7:1. Implicit in this assumption, was the fact that students taught language skills by male teachers were exposed to that situation for at least 9-10 months prior to the administration of the tests.

iii) Any contributory effects of other subjects to learning in Language Arts were the same for boys and girls.

iv) There was an accurate scoring and recording of data in the study, "Analysis of Grade Nine Reading Skills for Eastern Manitoba" which provided the data base for this study.[8]

IV. DELIMITATIONS

i) This study was confined to students at the grade nine level of the Eastern Manitoba School Region.

ii) It was restricted to the analysis of data collected on the Iowa Silent Reading Test on the Study "Analysis of Grade Nine Reading Skills for Eastern Manitoba," 1974.[9] No attempt was made at an analysis over time.

iii) No examination at other possible explanation for differences in achievement was made.

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[8] E. Bye et al., op. cit.

[9] Ibid.

V. LIMITATIONS

1) The researcher has had no control over the testing procedures and administration of the tests. The data used in this study were already recorded. Therefore, the researcher had to rely on observations noted in that study which may become limitations of this study:

a) There was a four-week period between the administration of the test to the students in the first group and students of the last group. This meant that the last group tested had four weeks more reading instruction than the first group. Added to this, students were reported not too particularly receptive to the testing because it was done close to the end of the day.

b) There was a lack of standardization in some cases where a five-minute break was given at the end of Test 2 rather than between Part A and Part B of Test 2.

c) It was reported that many students found the test not challenging and as a result some classes became bored in the latter stages of the test. This was attributed to the fact that the test was administered to the highest level for which it was designed.[10] In the light of these observations, generalizations from the results of this study ought to be made with these limitations in mind.

2) Sex of the teachers and sex of the students were the only independent variables considered. It was possible that other variables not considered in this study might have had undetermined effects on the results of this study.

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[10] Ibid., p. ii-iii.

VI. DEFINITION OF TERMS

The Eastern Manitoba School Region: a geographical area in Manitoba which consisted of eleven school divisions and five school districts. The divisions were Lord Selkirk Division #1, Transcona #12, Agassiz #13, Seine River #14, Hanover #15, Boundary #16, Red River #17, White Horse Plains #20, Interlake #21, Evergreen #22 and Lakeshore #23. The districts were Gypsumville #1612, Pine Falls #2155, Whiteshell #2408, Sprague #2439 and Stedman School.

Grade nine students: boys and girls enrolled in grade nine classes of the schools within the Eastern Manitoba Region during the school year that ended June, 1974.

Teachers: male and female teachers of those students defined as grade nine students.

Reading Achievement: measures or scores on the Iowa Silent Reading Test, Level 1, Form E, 1972 edition. Level 1 was intended for use in grades six through nine and for high school students reading below grade level. The Iowa Silent Reading Test consisted of four test areas: Vocabulary, Reading Comprehension, Reading, and Reading Efficiency. Reading Power consisted of the sum of the Vocabulary and Reading Comprehension.

The reliability coeficients on the Kuder-Richardson Formula #20 for the ISRT, Level 1 for grade nine, as reported in the ISRT manual, were: Test 1 (Vocabulary).93, Test 2 (Reading Comprehension).91, Tests 1 and 2 (Reading Power).96, and Test 3 (Directed Reading).91.

Test 1 (Vocabulary) consisted of fifty items and it surveyed the depth, breadth, and precision of the students' general reading vocabulary.

Test 2 (Reading Comprehension) consisted of fifty items designed to measure the students' ability to comprehend literal detail, to reason in

reading, and to evaluate what was read. The test was divided into two parts. Part A had thirty-eight items and measured the students' ability to extract information from an article which they had access. Part B had twelve items and tested short term retention skills.

Test 3 (Directed Reading) consisted of forty-four times designed to measure the students' work-study skills. The test was divided into two parts. Part A had twenty-two items and measured the students' ability to skim and scan for specific information. It measured the students' skill at answering questions from a passage that was designed to be too long to be read completely in the time allotted.

Test 4 (Reading Efficiency) was a speed test which consisted of six short reading passages. The forty items were designed to measure the students' ability to read rapidly with understanding when the material was easy.

VII. ORGANIZATION OF THE STUDY

This study is divided into five chapters. The introduction, problem and hypotheses were presented in this chapter. Chapter Two consists of a review of research limited to two major areas: a) studies illustrating differences in academic achievement between boys and girls in the public school system with special emphasis on reading achievement; and b) studies that suggest the teacher as the possible cause of the sex differences and effects of teacher/student sex interaction on the outcomes in studies and experiments. Chapter Three describes the sources of data and research procedures. Results and discussions of the results are contained in Chapter Four. A summarization of findings, conclusions and implications make up the final Chapter.

CHAPTER II

REVIEW OF RELATED RESEARCH

The purpose of this cahpter is to present and discuss studies related to a) differential achievement of boys and grils in the public school system, particularly those related to reading and b) to "one of the possible causes of differential achievement, the sex of the teacher"[1] and to differential effects of teacher/student sex interaction on the outcomes of studies and experiments. Together, the two components parts of this review provide a reationale for undertaking this study.

The review is limited to the two specified areas and follows, to some extent, the organizational structure of Peterson's review of research in his doctoral dissertation.[2] Although Peterson's review was not exhaustive, it covered relevant "studies that have gained general acceptance in the many reviews of boy-girl differences in elementary school.[3] It covered relevant studies from approximately 1900-1968.

In this chapter, then, relevant studies cited by Peterson will be re-examined. These will be updated and augmented with a presentation and

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[1] Joe Peterson, Effects of the Sex of Experimenter and Sex of Subject in First and Fifth Grade Children's Paired Associate Learning (Wisconsin: The Wisconsin Research and Development Center for Cognitive Learning, June 1970), p. 3.

[2] Ibid.

[3] Ibid., p. 3.

discussion of other studies and studies that have been subsequently done.

I. SEX DIFFERENCES IN ACADEMIC ACHIEVEMENT

The studies in this section on sex differences are arranged historically to illustrate the persistence of sex differences in achievement at all levels of the public school systems and some of the early inferences from these differences.

As early as 1909, evidence was recorded which showed that girls and boys were not performing equally well in schools. Lenard Ayers reported that 12.8% more boys than girls repeated grades and 17.2% more girls than boys completed grade eight.[4] His inference of these non-promotion figures, although lacking statical sophistication, was made from the ages of children in the schools of that time. This led Peterson to state;

> Although some of this inferred non-promotion could be due to factors other than non-promotion, it is interesting to note that the figures upon which these conclusions are based showed a slightly greater number of boys than girls enrolled in elementary school and greater numbers of girls only in grades six, seven and eight.[5]

Although Ayers felt that neither his data nor any other findings, at that time, could substantiate any claim that feminization of the schools was the cause, he stated that:

> We can, however, state definitely as a conclusion from the facts that have been presented, that our schools as they now exist are better fitted to the needs and natures of the girl than of the boy pupil.[6]

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[4]Lenard Ayers, Laggards In Our Schools (New York: Russell Sage Foundation, 1909), cited by Joe Peterson, Ibid., p. 4.

[5]Joe Peterson, Ibid.

[6]Lenard Ayers, cited by Joe Peterson, Ibid., p. 5.

Twenty-three years later, a longitudinal study by Charles St. John appeared to confirm Ayers' finding that boys repeated more grades in school than girls.[7] The study was done by observing the performance levels of approximately 1,000 students over the first four years of school. He controlled for I.Q. and used standardized test scores and teachers' assigned grades as measures of performance. It was found that boys a) achieved less well in reading; b) were retained more often; c) were referred to special classes more often; and d) received lower marks in reading, effort, conduct, and the average of all their classes.[8] However, there were no apparent differences in Arithmetic and boys skipped grades with lower levels of achievement than girls.

When comparisons between the standardized test scores and teachers' assigned scores were made, a discrepancy was found which suggested that teachers over-estimated the performance of girls. St. John attributed the inferiority of boys in progress and achievement to maladmustment between boys and their teachers, all of whom were women.[9]

Sex differences in reading achievement were again found in the J.B. Stroud and E.F. Lindquist study ten years later (1942).[10] Sampled data from students in grades three through eight revealed that significant differences were found favoring girls on the Iowa Every Pupil Test of

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[7]Charles St. John, "The Maladjustment of Boys in Certain Elementary Grades." Educational Administration and Supervision XVIII (1932), cited by Joe Peterson, Ibid., p. 5

[8]Joe Peterson, Ibid., p. 6

[9]Charles St. John, cited by Joe Peterson, Ibid., p. 7.

[10]J.B. Stroud and E.F. Lindquist, "Sex Differences in Achievement in the Elementary School." Journal of Educational Psychology XXXIII (1942), cited by Joe Peterson, Ibid., p. 7.

Basic Skills. Boys had a slight, although non-significant, advantage in Arithmetic and Science especially at the higher grades. Girls were superior, with the differences significant, in reading comprehension, vocabulary, word-study skills and basic language skills.

The differences in general language skills were not significant throughout all the grades. It was found, especially in reading comprehension, that superiority of the girls diminished with increased grade level. The difference was greatest at the grade four level and although the girls performed better, after grade six the differences were not significant. On the question of diminishing sex differences through progressively higher grades, Peterson writes:

> Whereas six differences in early elementary school have been revealed in most studies of sex differences in reading, only rarely have these sex differences been shown to persist in all elementary grades.[11]

Although this may have been true of studies done at that particular time of Peterson's work, later studies revealed significant differences at higher levels of the school system. Clara Alden, Helen Sullivan and Donald Durrell in 1942, Mildred Hughes in 1953, and Marion Wozencroft in 1967 conducted studies that illustrated the same trend of sex differences in achievement.[12] Alden, Sullivan and Durrell used a one year discrepancy between the two parts of a standardized test for judging retardation in reading on data gathered on the reading abilities of ap-

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[11] Joe Peterson, Ibid., p. 8.

[12] Clara Alden, Helen Sullivan, and Donald Durrell, "The Frequency of Special Learning Disabilities." Education LXII (1942): 32-6; Mildred Hughes, "Sex Differences in Reading Achievement in the Elementary Grades." Clinical Studies in Reading II (1953), cited by Joe Peterson, op. cit., pp. 10-11; Marion Wozencroft, "Comparison of Reading Abilities at Two Grade Levels." Journal of the Reading Specialist VI (1967), cited by Joe Peterson, Ibid, p. 11.

proximately 6,000 students in grades two through six.[13] They found that although boys outnumbered girls in the retardation in reading category, the proportion declined by grade six.

On the Chicago Reading Test, Mildred Hughes made grade by grade comparisons from grades three through eight on 609 boys' and girls' reading comprehension.[14] Evidence showed that girls' scores were superior at all grade levels, but by different margins. At grade three, the difference was significant at the .01 level, grade four at the .05 level and grades five through eight, the differences were not significant.

Wozencroft used a random sample of about 1,200 grades three and six students from different elementary schools.[15] The students were broken down into high, middle and low ability groups. It was found that overall group differences favored girls and were significant at the .01 level at grade three and at .05 level at grade six. However, within ability groups, there were no significant sex differences and boys scored slightly higher than girls in the high ability groups.

1961, Arthur Gates designed his own survey instrument to measure the reading achievement of over 13,000 students in grades two through eight.[16] He found that girls achieved consistently higher than boys at all grade levels. This finding was quite different from the pattern of results by Stroud and Lindquist,[17] and others.

Twenty-one sex comparisons were made by breaking the test into its

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[14]Mildred Hughes, cited by Joe Peterson, Ibid., pp. 10-11.

[15]Marion Wozencroft, cited by Joe Peterson, Ibid., p. 11.

[16]J.B. Stroud and E.F. Lindquist, cited by Joe Peterson, Ibid., p.7.

[17]Arthur Gates, "Sex Differences in Reading Ability." The Elementary School Journal LXI (1961): 431-34.

component parts of speed, vocabulary and comprehension. Of the twenty-one comparisons, seventeen were significant at the .05 level of confidence. The four non-significant differences were, two at the grade two level, one at grade three and one at grade eight. From these findings, Gates infered that neither maturational nor hereditary factors were involved "because the distribution of achievement scores differed significantly from non-reading intelligence scores."[18] Gates suggested that environmental pressures may have accounted for the differences.

A study of two hundred grade two students tested on the Metropolitan Achievement Test at the end of the school year, revealed that nineteen boys out of twenty-one students were found to be behind by one-half year.[19] These were students who had neither low I.Q. nor interrupted schooling. The same study also pointed out that 65% of students diagnosed and referred as having reading problems were boys. Figures on the percentage of boys in clynical populations varied as high as between 75% to 90%.[20]

In the seventies, studies continued to reveal findings of sex differences in achievement at all levels of the public school system. However, like the numerous studies that preceded, no one consistent pattern was illustrated. 1970, Dee Lloyd investigated the differences between different achievement groups for sixth graders in reading achieve-

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[18]Joe Peterson, op. cit., p. 12.

[19]A. Fabian, "Reading Disability: A Index of Pathology." American Journal of Orthopsychiatry XXV (1955): 319-22.

[20]Nita Wyatt, "Sex Differences in Reading Achievement." Elementary English XLIV (1960): 596-600.

ment.[21] He found that the percentage of underachievers among male and female students was approximately the same. However, the overall performance of male underachievers was lower than that for the females. From sixth grade and throughout secondary school, female underachievers were found to have been reading .5 grades closer to the norms than their male counterparts on standardized tests.

It was also found that female underachievers did considerably better than males in coursework. In fact, grade point average of female underachievers were often higher than those of male average achievers and in some cases equal to or higher than male overachievers. Comparisons of the performance on standardized tests with coursework marks led Lloyd to suggest that:

> the success of female underachievers resulted from differential evaluation of performance of boys and girls or from qualities other than achievement level possessed by girls and not by boys.[22]

It is important to note, too, that although the performance of both sex groups of underachievers was significantly lower, female underachievers performed closer to female average- and over-achievers in business courses and male underachievers to the higher male groups in vocational courses.

Willard Bass analysed the academic achievement of Indian high school students in federal and public schools over a four-year period (1969-1970).[23]

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[21] Dee Lloyd, Reading Achievement and its Relationship to Academic Performance: Part Two (Rockville, Md.: ERIC Document Reproduction Service, ED 064 703, 1970).

[22] Ibid., p. 90.

[23] Willard Bass, An Analysis of the Academic Achievement of Indian High School Students in Federal and Public Schools (ERIC Document Reproduction Service, ED 057 933, 1971).

His sample was drawn from twenty-one high schools in seven states and was stratified according to sex, grade and geographic area. When achievement scores were compared by sex, it was found that boys scored higher than girls in reading and mathematics and girls scored considerably higher than boys in Language. Sixty-three sex comparisons were made over the four-year period and the only exception to the pattern was for grade 12 reading in the spring of 1969 testing. Bass thus concluded that:

> the evidence clearly indicates superiority of Indian boys over girls in the mastery of reading and mathematics skills and the superiority of girls over boys in the mastery of English language skills.[24]

Maybelle Hollingshead and Charles Clayton a year later (1971) investigated the relationship between the performance of Indian youth on a non-verbal intelligence test and achievement test.[25] The sample consisted of seventy-two Indian students ranging in age from 11.1 to 15.2 years. The mean age for girls was 13.4 and for boys 13.2. There were no differences between the sexes on the "Chicago Non-Verbal Test." However when sex comparisons were made on the "Wide Range Achievement Test," the mean scores for boys were higher than for girls in each component of the test - Reading, Spelling and Arithmetic. Although no test of significance between means was done, the results are different from those of the Bass study.[26] Hollingshead and Clayton suggested that cultural factors and tribal differences may have affected the results of their study.

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[24] Ibid., p. 32.

[25] Maybelle Hollingshead and Charles Clayton, Study of the Relationship Between the Performance of Indian Youth on the Chicago Non-Verbal and the Wide Range Achievement Test (Oklahoma: ERIC Document Reproducation Service, ED 057 933, 1971).

[26] Wilfred Bass, op. cit.

1972, Dee Lloyd investigated the relationship of family background and prior performance to sixth grade reading achievement.[27] His sample consisted of boys and girls from the Caucasian and Negro races. Three findings were of importance to this study. He found no significant difference in I.Q. tests between sexes. Males in both racial groups were retained more often than females. This finding, although not statistically significant, is consistent with other studies that investigated retention-rate among students. Thirdly, it was found that girls from both racial groups scored higher than boys of their respective racial group on a standardized reading test. The sex difference was significant for the Caucasians, but not significant for the Negroes.

James Turnure and Jay Samuels in 1972 used classroom observers to record the attentiveness of eighty-eight first grade boys and girls from four different classrooms.[28] The purpose was to determine whether attentiveness was related to reading achievement prior to the effects of long-term success-failure school experiences. The study also sought to determine whether expected superior reading achievement of girls was related to classroom attentiveness.

The authors found that girls were significantly superior to boys in word-recognition. This, the authors contended, supported many previous findings. Girls were significantly superior in classroom attentiveness and it was found that increasing degrees of attentiveness were related to superior word-recognition.

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[27]Dee Lloyd, Reading Achievement and its Relationship to Academic Performance: Part Three (Rockville, Md.: ERIC Document Reproduction Service, ED 064 704, 1972).

[28]James Turnure and Jay Samuels, op. cit.

In 1974, Dale Hitchcock and Glenn Pinder using a probability sample of 7,514 students to represent the United States 12-17 year student population, investigated reading and arithmetic achievement.[29] The Wide Range Achievement sub-tests in reading and arithmetic were used and results were presented by age, sex and educational level. Analysed according to age, girls performed better than boys on the reading sub-tests (word recognition and pronounciation), averaging about 2.5 raw score points higher. Higher scores were achieved by girls at all ages, with differences being significant at all but the 13 and 15 year-old groups.

When the results were analysed according to students within appropriate grade range for the population, again it was found that girls consistently scored higher at all grade levels. The differences averaged about two points higher for girls but were only significant at the grades nine and ten levels. There were no significant sex differences in arithmetic achievement.

The studies reviewed thus far have illustrated that sex differences in reading achievement have been documented at all levels of the public school system in the United States. Evidence revealed that the difference was in favor of girls. In Manitoba, three studies were conducted that confirmed the U.S. findings of sex differences in reading achievement at different grade levels of the public school system.

Pandelis Halamandaris conducted the largest reading study in Manitoba to date. He used 50% sample of all grade one, two, three and six students

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[29] Dale Hitchcock and Glenn Pinder, Reading and Arithmetic among Youths 12-17 years as measured by the Wide Range Achievement Test (ERIC Document Reproduction Service, ED 103 436, 1974).

enrolled in Manitoba schools during the 1968-69 school year. The Stanford Achievement Test in Reading was administered to students and test scores were used as measures of achievement. The scores, when analysed according to sex, showed that girls performed significantly ($P < .01$) better than boys.[30]

When mean reading achievement scores were classified according to Urban/Rural, Grade and Sex, the interaction was significant at the .05 level. Girls scored consistently higher than boys in all grades both in urban and rural schools. The differences between urban boys and girls increased from grade one (.97) to grade six (1.97). A reversed pattern was observed for rural boys and girls. The difference decreased markedly by grade six.[31]

Similarly, the interaction of sex and socio-economic level was significant at the .05 level. Girls in the Upper, Middle and Lower socio-economic levels performed better than boys in the same levels. The interaction between Grade and Sex was not significant, but girls scored slightly higher than boys in all grades in each Socio-economic level except in grade six. This observation and the decreasing difference between rural boys and girls through the progressively higher grades led the author to state that:

> It is important to notice here that the rate of development from grades three to six appears to be decreasing as an average of the mean indicates a yearly rate of 10.15 for boys and 10.03 for girls. While no conclusion can be reached as to the significance

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[30] Pandelis Halamandaris, op. cit., p. 134.

[31] Ibid., p. 135.

> of this difference, it appears that the relative developmental gain in differences between the sexes is decreasing. In turn this would suggest the possibility that the gap between male and female reading achievement could be closed during the time students are completing secondary school.[32]

Although this was merely an unstated hypothesis, it was a view expressed by Peterson.[33] Evidence in a later Manitoba study to be discussed, suggested that significant sex differences still persisted at the junior high level.

Analysis of the Halamandaris test scores according to sex and language revealed an interactive effect, significant at the .05 level. The students were classified as Monolingual/English, Bilingual/French, Bilingual/Other and Bilingual/German. It was found that except for the Bilingual/German class, girls scored higher than boys. With the exception of grade six Bilingual/Other and grades one, two and three Bilingual/German, girls' scores were higher than boys' when grade was introduced in the analysis.[34]

There were other significant sex interactions with other variables such as size of class or teachers' reading training. However, in all cases girls performed better than boys. When analysed according to grade and the other factors, the difference in performances generally favored the girls.

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[32] Ibid, p. 187.

[33] Joe Peterson, op. cit., p. 9.

[34] Pandelis Halamandaris, op. cit., p. 123.

This study has illustrated that sex differences between the students of grades one, two, three and six persisted when the test scores were analysed according to various variables. The persistence of sex differences in Manitoba schools was again evidenced in a second of reading study in the province.

In an analysis of reading achievement in the Western Manitoba Region, the Metropolitan Achievement Test was administered to 2446 grade three students and 2646 sixth graders.[35] A comparison of test scores based on sex differences revealed that girls performed superior to boys in both of the sub-test areas, word knowledge and reading. This was true for both grade levels. The differences in all cases were significant at the .05 level, although the difference between scores at the grade six level was smaller than at the grade three level.

It was also found that at both grade levels, that the boys' scores varied more widely than those of the girls. This led the authors to suggest that:

> whereas boys get most of the very low scores, they also get a larger proportion of the extremely high scores.[36]

The most recent study done in Manitoba that showed sex differences in reading achievement was initiated by the Eastern Regional Team of School Inspectors.[37] Two thousand eight hundred and sixty-five female students, which represented 89% of the region's population, were tested

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[35] E. Bye et al., op. cit.

[36] Ibid., p. 37.

[37] Betty Anderson et al., op cit.

with the Iowa Silent Reading Test Level I.

It was found, when comparisons of results were made according to sex, that girls scored higher than boys on all aspects of the test. The differences were significant at the .05 level in all cases - vocabulary, reading comprehension, word power, directed reading and reading efficiency. The variance in socres appeared to confirm the findings of the Bye et al. study of Western Region,[38] that the scores of the male students tended to vary more than the female students'.

Although the studies reviewed to this point have illustrated the persistence of sex differences in reading achievement, an explanation for these differences has not been clear no any substantiated. Gates, St. John and Lloyd are some of the writers who felt that pressure from the school environment created "the situation wherein boys do not achieve as well as girls"[39] and that teachers were agents of that environment.

II. DIFFERENTIAL EFFECTS OF ENVIRONMENT; TEACHER TREATMENT OF STUDENTS: AND TEACHER/STUDENT SEX INTERACTION

It has been ducumented that sex differences do exist in reading achievement at different levels of the public school system. In the remaining part of this chapter, conditions under which these differences occur will be shown. Studies which show that the inferred or observed cause of sex differences is the teacher will be presented. Lastly, the effect of sex interactions in experiments will also be presented and dis-

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[38] E. Bye et al., op. cit.

[39] Joe Peterson, op. cit., p. 13.

cussed.

Effects of Environment

In 1953, Sister Mary Nila found no differences in the readiness to learn to read on readiness tests, between 300 boys and girls entering first grade.[40] Approximately one year later, 63% of the students designated as reading failures were boys. It can be inferred, assuming the equal predictibility of the reading tests, that the sex differences were due to a learning environment more conducive to success of girls than boys.

George Prescott in 1955 presented findings that were suggestive of environmental influences on students' performance.[41] Fifteen thousand first grade students were tested in norming the Metropolitan Readiness Test. Boys were found to be significantly overage in first grade. Girls scored significantly higher than boys when overage students were eliminated. However, boys achieved significantly higher than girls with overage students included and overage boys also performed significantly better than overage girls. These findings:

> ...tend(s) to suggest that factors extraneous to achievement contribute to the non-promotion of these pupils. It would appear that a maladjustment may have existed between teacher and male pupil.[42]

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[40]Sister Mary Nila, "Foundations of a Successful Reading Program." Education LXXIII (1953): 543-55.

[41]George Prescott, "Sex Differences in Metropolotian Readiness Test Results." Journal of Educational Research XLVII (1965): 604-10.

[42]Joe Peterson, op. cit.,p. 14

The same year, William Meyer and George Thompson conducted a study to investigate the relative frequency of teachers' approval and disapproval evaluations of grade six boys and girls.[43] Observations of three grade six classrooms and scores of the students' perceptions of peers that fitted in the teachers approval and disapproval categories were recorded.

Significant differences were found between disapproval contacts received by boys and girls from their teacher in each classroom. Boys received the larger number of disapproval contacts. Although boys also received more approval contacts than girls, the difference was only significant in one classroom.

Boys were perceived by both boys and girls to be more in the teachers' approval category. There were no significant differences in the nominations for approval category between the sexes. These findings led the author to suggest that boys were percieved to be involved in more situations that evoked teachers' disapproval than girls.[44]

Further analysis revealed that both boys and girls responded, on their perceptions of the teachers' approval and disapproval biases, as if boys received more teacher disapproval than girls. These findings are suggestive that some maladjustment existed in schools between boys and their environment and with their teachers as part of that environment.

Nine years later, J.S. Kagan conducted a study on students sex-role

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[43] William J. Meyer and George G. Thompson, "Teacher Interaction with Boys as Contrasted with Girls," in eds. Raymond G. Kuhler and George G. Thompson, Psychological Studies of Human Development (New York: Appleton Century-Crofts, Inc., 1963).

[44] Ibid., p. 514.

classification of school objects.[45] His study was based on the assumption that the students' sex-role classification of the school environment governed the amount of motivational energy put into the mastery of academic tasks.

Second and third grade students were taught three different nonsense syllables to represent the concepts of masculine, feminine and farm. A series of pictures were presented to the students and they were instructed to apply the most appropriate nonsense syllable to each picture. It was found that the pictures of blackboard, book, page or arithmetic computations and school desks were labelled more frequently as feminine than masculine by the students. The difference was more marked among the items as labelled by the girls.

It can be inferred from these results that academic performance of girls in the primary grades is facilitated by their perception of the school as congruent with their sex-role.

In 1969, Richard Kellogg came up with findings that appeared to confirm this argument.[46] In a study of sex-role identification of school-related objects, he used as his study sample, 27 girls and 20 boys from two grade four classes taught by women teachers in a small rural community.

The students were told that some objects were generally used more often by girls than boys and vice-versa. The students were given a list of twenty-four common objects and asked to decide on which were more

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[45] J.S. Kagan, "The Child's Sex-Role Classification of School Objects," Child Development XXXV (1964): 1051-1056.

[46] Richard L. Kellogg, "A Directed Approach to Sex-Role Identification of School-Related Objects." Psychological Reports XXIV (1969): 839-41.

suitable for masculine or feminine use. Of the twenty-four objects presented to the students, eight were boy-related, eight were girl-related and eight school-related.

The results showed that girls were inclined to label school-related objects as feminine. Boys also rated four of the eight school-related objects as feminine more frequently than masculine. This led the author to argue that the difficulties encountered by boys in school were a result of their perceptions of the school as essentially feminine. He stated:

> This is not surprising as the boys' introduction to school is usually mediated by women who initiate activities of coloring, singing, writing and reading. The boy is apt to resist involvement in what he considers feminine activity. It is reasonable to hypothesize that the academic trouble experienced by males during the first four or five years of school relates to the idea that school is primarily for girls and is not appropriate to the masculine role.[47]

Robert Peck in 1971 compared sex and socio-economic differences in aptitude and achievement among eight different countries.[48] He found a lack of systematic sex difference in performance. He inferred that his findings ruled out any notion of inherent intellectual superiority of either sex and that where sex differences were favored it was due to culture. He ruled out the assumption that superior performance of girls could be attributed to the idea that they were more developmentally advanced or more conforming to school demands than boys.[49]

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[47] Ibid., p. 839.

[48] Robert T. Peck, A Cross-National Comparison of Sex and Socio-Economic Differences in Aptitude and Achievement (Texas: ERIC Document Reproduction Service, ED 049 315, 1971).

[49] Ibid., p. 9.

Joan Lunn in a study of nearly 2,000 junior high school students,[50] found evidence that contradicted Peck's inference. Significant sex differences were found in attitudes of the students toward school. Girls had significantly ($P < .01$) more favorable attitudes toward school than boys. More girls, liked school and fewer disliked it, expressed more interest in school-work, placed more importance in doing well in class, were more class-involved, had a better image of their class, and were more conforming than boys.

The studies cited so far in this section have documented that boys and girls perform differently under the school environment and it has been inferred by some writers that the perceptions of this environment were different for boys and girls. It was also further inferred that there existed a relationship between the school environment and the differential performance of boys and girls. Studies will now be considered that show inferred and observed differential treatment of boys and girls by teachers.

Differential Teacher Treatment of Students

In 1967, Ralph Preston conducted a cross-cultural study, comparing the reading achievement of American and German fourth and sixth grade students.[51] Although he encountered difficulties in comparing American and German students because of testing procedures, he did find that American girls performed better than American boys at both levels. The

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[50]Joan C. Lunn, "The Influence of Sex, Achievement Level and Social Class on Junior School Children's Attitudes," British Journal of Educational Psychology XLII (1972): 70-4.

[51]Ralph Preston, "Reading Achievement of German and American Children." School and Society XC (1962): 350-54.

opposite was true for German students, where German boys performed better than German girls.

It can be inferred that there was some effect between the sex of the teacher and the sex of the students with the following facts revealed. In Germany, the majority of teachers at that time were males and in America, females.

The inference of differential treatment by teachers of and of its effects on students was reinforced by John McNeil in 1964.[52] One hundred and thirty-two kindergarten children were introduced to reading by mechanical methods. They were taught forty words in about three weeks. When tested, boys performed significantly better than girls in mastery of the words. However, girls performed significantly better than boys after a year in a regular classroom taught by a female teacher.

Two studies completed in 1969 appeared to give evidence to the idea of differential treatment of students by teachers.[53] Fish in her study, used a sample of Negro, Indian and Caucasian grades five and six students from a lower socio-economic level. The teacher sample contained nine males and nine females.[54] She found that although girls received higher teacher assigned scores than boys at both levels across racial groups, there was no significant interactions between the students' sex and the teachers' assessment. She also found that girls achieved significantly higher than

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[52]John McNeil, op. cit.

[53]Enrica Fish, The Relationship of Teachers' Assigned Marks to Tested Achievement (Min.: ERIC Document Reproduction Service, ED 035 709, 1979): Michael Palardy, "What Teachers Beleive - What Children Achieve." The Elementary School Journal XLVIII (1965): 370-74.

[54]Enrica Fish, op. cit.

boys with the scores unadjusted and adjusted for I.Q. The same held true in each racial group. No significant difference was found in I.Q. between boys and girls. This finding reinforces the underlying assumption of this study.

Palardy investigated the relationship between teacher expectations and student achievement.[55] His popluation was first grade boys and girls who scored average or above on a pre-reading test. The students were divided into classrooms in which the teachers' expectations of the performance of the boys were different. He found that in classrooms where boys were expected to achieve as well as girsl, they fulfilled those expectations. Similarly, in other classrooms, boys achieved less well than girls as they were expected.

In study of the relationship of self-perception in the school and achievement, Jean Alberti found that primary grade girls had higher self-perception in the school than primary grade boys.[56] Girls' mean scores were steadily decreased across the grades. He stated that:

> ...apparently something was being communicated to the boys which resulted in an increasingly less positive self-perception.[57]

Significant sex effects were found in the teachers' ratings of the students' behavior. Boys received consistently lower behavior ratings than girls. The difference reached almost twice as much in grade three

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[55]Michael Palardy, op. cit.

[56]Jean M. Alberti, Correlation of Self-Perception - Sex-School (New York: ERIC Document Reproduction Service, ED 048, 336, 1971).

[57]Ibid., p. 5.

as compared to grade one. Alberti inferred that the consistently less positive attitudes of teachers towards boys may have been the cause for decreasing self-perception and probably less adequate academic achievement.[58]

Alberti's findings of differential teacher attitudes toward students' behavior was confirmed by Lunn in an earlier mentioned study.[59] In Lunn's, the teacher rated each child on how pleasurable it was to have the student in the class. When analysed according to the students' sex, it was found that the teachers tended to find girls more of a pleasure to work with than boys. The difference was significant at the .01 level.

Thomas Linton, on the other hand, found no significant differences between male and female sixth grade Anglo and Mexican-American students in self-concept and academic self-concept.[60] He did find, however, that there was no significant differences between boys and girls in reading, arithmetic and social studies on the Iowa Test of Basic Skills. Yet, there were significant differences in favor of girls in teacher-assigned grades in these subjects.

It has been shown that: sex difference in achievement existed at different levels of the public school system; the school environment is not equally satisfying to boys and girls; and that students were subjected to differential treatment by teachers. No clear pattern has been estab-

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[58] Ibid., p. 8.

[59] Joan Lunn, op. cit., p. 72.

[60] Thomas Linton, The Relationship Between Gobal Self-Concept, Academic Self-Concept and Academic Achievemtnt (Texas: Document Reproduction Service, ED 063 053, 1972).

lished in any of the areas. However, it has been suggested that one possible cause for sex difference in reading achievement was the teacher. Studies relating directly to the effects of teacher sex will now be considered.

Effects of Teacher/Student Sex Interaction

Peterson reported that relatively few studies on the influence of teacher sex on achievement were conducted.[61] The same remained true at the time of this study.

William McFarland in 1966 studied the impact of male participation in first grade instruction.[62] Fifty-five first grade students were divided into two classes. Both classes were supervised by female teachers and two junior elementary education majors, two males were assigned to one class and two females to the other class. Thus one class was subjected to only women instructors, the other class to two males.

It was found that although the difference was not significant, girls performed better than boys under the two females and boys performed better than girls in the same class under the two males. The impact of the male assistants on the boys was probably limited as they might have been perceived in a subservient role to the female supervising teacher, especially since the classes were taught by female supervising teachers.

The same year, two related studies were done. Rodney Talbot in investigating teacher performance and effectiveness, found only three areas out

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[61] Joe Peterson, op. cit., p. 18.

[62] William J. McFarland, "An Analysis of the Influence of Male Participation in First Grade Instruction" (Unpublished Ed.D. dissertation, Indiana University, 1966), cited by Joe Peterson, Ibid., pp. 18-19.

of nineteen where significant differences existed between male and female teachers.[63]

Donald Bennet found only 6 out of 162 hypotheses to be significant in a study involving fifth grade students from 15 male teachers' and 15 female teachers' classrooms. The difference favored girls under female teachers.[64]

In 1968, Richard Arnold tested 48 comparisons of fifth and sixth grade male and female students taught by male and female teachers.[65] The students were divided according to sex into socio-economic level and achievement levels. No clear pattern was established in his results. In one case, female teachers gave significantly higher marks to one group of girls than boys. This group of girls also recieved significantly higher marks from male teachers.

Richard Jaeger and Tom Freijo conducted a study to find out whether the accuracy of teachers' evaluations of their students would be higher if a) the teacher and student were of the same race and b) the teacher and student were of the same sex.[66]

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[63]Rodney N. Talbot, "Comparison of the Teaching Performance of Men and Women in Elementary Schools." (Unpublished Ed.D. dissertation, The Pennsylvania State University, 1966), cited by Joe Peterson, Ibid., pp. 19-20.

[64]Donald A. Bennett, "A Comparison of the Achievement of Fifth Grade Pupils Having Male Teachers with those Having Female Teachers." (Unpublished Ed.D. dissertation, University of Denver, 1966), cited by Joe Peterson, Ibid., p. 20.

[65]Richard Arnold, "Achievement of Boys and Girls Taught by Men and Women Teachers." The Elementary School Journal LXII (1968): 367-72.

[66]Richard M. Jaeger and Tom D. Freijo, Race and Sex as Concomitants of Teachers' Accuracy in Evaluative Ratings of Students (Florida: ERIC Document Reproduction Service, ED 096 374, 1974).

Data collected on 104,036 grade four students and 22,067 grade four teachers from a 1969 national survey were used. It was found that the accuracy of teachers rating students of the same race and sex was low. It rated sixth among eight hypothesized statements.

In 1973, Cathleen Stasz et al. designed a study to find out whether a) boys or girls had higher achievement with male or female teachers and b) boys or girls evaluated male or female teachers more positively.[67] A random sample of 170 high school students was drawn and randomly assigned to male and female teacher trainees from a large midwestern university.

The findings produced no consistent pattern. In four of the twelve courses, female students performed better than males irrespective of teacher sex. In one course males surpassed females and in seven courses there were no significant differences. Contradictory evidence of teacher/student sex interactions was found. Only in one course did students perform significantly better with teachers of the same sex.

The findings of a few sex interaction experiments reflected the same lack of a consistent pattern in outcomes as the studies cited. J.L. Gewirtz in 1954, and Gewirtz and Baer in 1958 conducted experiments in which it was found that pairings of the opposite sexes, the experimenter and child was a more productive combination than pairings of the same sex.[68]

In 1963 Harold Stevenson, Rachel Keen and R.M. Knights designed an

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[67] Cathleen Stasz et al., op. cit.

[68] J.L. Gewirtz, "Three determinants of Attention-seeking in Young Children." Monographs in Social Research and Child Development XLX (1954), No. 59, cited by Joe Peterson, op. cit., p. 26: J.L. Gewirtz and D.N. Baer, "The Effect of Brief Social Deprivation on Behaviors for a Social Reinforcer." Journal of Abnormal and Social Psychology LVI (1958): 49-56, cited by Joe Peterson, Ibid., p. 26.

experiment in which 3-5 year old nursery school children were instructed to drop marbles through a hole, by male and female experimenters.[69] It was found that the children who were instructed by males performed better than those instructed by females.

Students were subsequently, according to a standardized procedure, complemented over a five-minute period. It was found that the performance of children under male experimenters decreased while those under female experimenters increased. When the data was analysed over the total six-minute period, no significant difference in performance due to sex of the experimenter was found. However, girls had made slightly more total responses than boys.

The same year, Stevenson and R.D. Odom found that 6-7 and 10-11 year old subjects who were introduced to a lever-pulling activity by males pulled the lever more often than subjects initiated by females.[70] The findings of this experiment were different from those of Gewirtz in 1954 and Gewitz and Baer in 1958.[71]

Similarly, John Stabler in 1967 employed two experimenters of either sex to determine children's responses to authority in depressing the plunger of a hand counter. There were no significant differences in re-

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[69]Harold Stevenson, Rachel Keen and R.M. Knights, "Parents and Strangers as Reinforcing Agents for Children's Performance." Journal of Abnormal and Social Psychology LXVII (1963), cited by Joe Peterson, op. cit., pp. 24-25.

[70]Harold Stevenson and R.D. Odom, "Visual Reinforcement with Children", Unpublished Manuscript, University of Minnesota, 1966, cited by Joe Peterson, Ibid., p. 23.

sponses of children commanded by the male or by the female.[72]

In 1970 Joe Peterson conducted an experiment in which grade one and grade five boys and girls were taught a paired associate task by male and female instructors.[73] An analysis of results revealed no significant differences between boys and girls in mean correct responses, although girls scored slightly higher than boys in grade five and boys higher in grade one.

Female experimenters elicited a higher mean correct responses from the students than males, but the difference did not reach significance. Interaction between the sex of the experimenter and the sex of the student was not significant. It was shown, however, that girls under females did perform slightly higher than boys instructed by males.

III. SUMMARY

Sex differences did exist in reading achievement at different levels of the public school system. Though there was no systematic pattern, in general, the differences did favor girls more often than boys. Having assumed that no inherent intellectual difference existed between boys and girls, a possible explanation for sex differences was sought.

An examination of the school environment suggested that some incompatability existed between the environment and boys and that girls found the school environment more satisfying. Further investigation showed that students were subjected to differential treatment by teachers, and that the

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[72] John Stabler, "Measurement of Children's Response to Authority." Psychological Reports XX (1967): 587-90.

[73] Joe Peterson, op. cit.

teacher was a possible cause of the sex differences. Studies and experiments designed to determine this question revealed differential outcomes in the interaction between the sex of the teacher and the sex of the student.

CHAPTER III

RESEARCH PROCEDURES

The main purpose of this study was to determine whether the sex of the teacher interacted with the sex of the student in reading achievement. Two independent variables were studies; sex of the teacher and sex of the student. The dependent variable studied was reading achievement. The research procedures are described in this chapter.

I. POPULATION

The population in this study consisted of approximately 2861 grade nine students enrolled in the Eastern Manitoba School Region during the 1973-74 school year - 52% or 1475 students were females and 48% or 1386 were mal3s. The study population represented 89% of the total number (3224) of students registered in the Region's eleven schools divisions and five school districts. The teacher population was 133 teachers - 63% or 84 were males and 37% or 49 were females. The pupil/teacher ratio was $\frac{2865}{133} = 21.5$.

II. SAMPLING PROCEDURES

Data on the number of students and Language Arts teachers and their sex was obtained from a reading study done in the Eastern Manitoba Region.[1]

The students were divided into two groups: 1) Students tuaght by male Language Arts teachers and 2) students taught by female Language Arts teachers. The students were then sub-grouped according to the sex of the

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[1] Ibid., p. i.

student and the sex of the teacher. Table 1 illustrates the four group and their numerical composition. There were 896 male and 919 female students taught by male Language Arts teachers, 490 male and 556 female students taught by female Language Arts teachers.

TABLE 1

DISTRIBUTION OF STUDENTS BY SEX OF TEACHER

	Students taught by Male Language Arts Teachers	Students taught by Female Language Arts Teachers	
BOYS	896	490	1386
GIRLS	919	556	1475
	1815	1046	

III. INSTRUMENTATION

The Iowa Silent Reading Test, Level 1, Form E was used to measure achievement. It was composed of four tests: Vocabulary, Reading Comprehension, Directed Reading and Reading Efficiency.

Test 1 (Vocabulary) contained fifty items which conveyed the breadth and precision of the students' reading vocabulary. The students were required to choose the synonym of the first word for each item, from among four options. Fifteen minutes were allotted for this section.[2]

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[2] Ibid., p. i.

Test 2 (Reading Comprehension) was divided into two parts. Part A (38 items) measured the students' ability to extract information from an article. Part B (12 items) tested the students' short term retention skills. Forty-eight minutes were allowed for the test, Part A 28 minutes and Part B, 13 minutes.[3]

Test 3 (Directed Reading) consisted of two parts. Part A assessed dictionary skills and knowledge of research sources, with a 13-minute time limit. Part B, 17 minutes in length measured the students' skill at answering questions from a passage.[4]

Test 4 (Reading Efficiency) was a 5-minute speed test. The students were not given a time limit, but were instructed to work as quickly and accurately as possible.[5]

IV. DATA COLLECTION

The data for this study will be obtained from the study, "Analysis of Grade Nine Reading Skills for Eastern Manitoba." Raw scores for each student were recorded on sheets in each of the four tests and their component parts of the Iowa Silent Reading Test, Level 1, Form E. The scores for each individual were compiled by class and teacher, school division or school district. The sheets were stored at the Eastern Region Office of the Field Services Branch, Department of Education and released for the purposes of this study.

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[3] Ibid.

[4] Ibid., p. ii.

[5] Ibid.

V. DATA ANALYSIS

The two independent variables, sex of teacher and sex of student, were coded and the raw scores were transferred to computer cards to facilitate the statistical analysis.

If was first intended to employ only an analysis of variance using the SPSS procedure, Anova, to determine the significance of any interactive effects on achievement scores of the students. This method yield the over-all strength of relationships between the sex of teacher and sex of student, but did not provide comparative between-group statistics. As a result, in addition to Anova, sub-files were subsequently created and t-tests performed to test the significance of differences between groups in each test and subtest.

VI. SUMMARY

This chapter presented a description of the research procedures used in this study. The population consisted of grade nine male and female students taught by male and female teachers. Raw scores on the Iowa Silent Reading Test Level 1, Form E was collected from a previous study conducted in Manitoba. Factorial analysis of variance (Anova) was used to test the interaction between sex of student and sex of teacher. T-tests were subsequently employed to test the significance of differences between the means of the groups and to provide more descriptive statistics.

CHAPTER IV

RESULTS AND DISCUSSION

The two independent variables in this study were sex of teacher and sex of student. The dependent variable was reading achievement scores on the Iowa Silent Reading Test, Level 1. The data was submitted to two analytic procedures, t-test and two way analysis of variance, to determine the effects of sex interaction on reading achievement.

This chapter is divided into three sections. The first section is a presentation of t-test results of the six hypotheses investigated and which dealt with between-group differences in the reading test scores and sub-test scores. Interaction results between teacher sex and student sex is presented in the second section. A discussion of the results make up the final section of this chapter.

I. SEX DIFFERENCES IN READING ACHIEVEMENT

T-test results are illustrated in this section of the chapter. The t-test was the analytic procedure used to test the hypotheses formulated in Chapter 1. The tests were performed on between-group differences in each test and each sub-test area of the ISRT. The selected acceptable significant levels of confidence were .05 and .01.

Each question, the null hypothesis and alternative hypotheses are re-stated followed by an explanation of the test results.

Girls and Boys Taught by Male Teachers

Question 1:

Were there significant differences in reading achievement test scores and sub-test scores between girls and boys taught by male teachers?

Null Hypothesis 1:

There were no significant differences in reading achievement test scores and sub-test scores between girls and boys taught by male teachers.

Alternative Hypothesis:

There were significant differences in reading achievement test scores and sub-test scores between girls and boys taught by male teachers.

Table 2 illustrates that girls taught by male teachers performed significantly better than boys taught by male teachers in all but one instance. The null hypothesis is rejected and the alternative hypothesis accepted for all tests and sub-tests except for Vocabulary. The mean score for girls was higher than that for boys in Vocabulary, but the difference did not reach significance. The null hypothesis is accepted for Vocabulary.

In answer to Question 1, there were significant differences between girls and boys taught by male teachers in Word Power, Directed Reading A and B, Directed Reading A, Directed Reading B, and Reading Efficiency. There was no significant difference between girls' and boys' achievement in Vocabulary.

TABLE 2

COMPARISON OF MEAN ACHIEVEMENT SCORES OF GIRLS AND BOYS TAUGHT BY MALE TEACHERS

Groups*	Variable	Mean	SD	T	DF	Sig
Gp. 1	Word Power	77.48	14.75	1.93	1812	.05
Gp. 2		76.13	14.98			
Gp. 1	Vocabulary	38.74	8.48	1.37	1812	NS
Gp. 2		38.20	8.50			
Gp. 1	Comprehension	38.72	6.97	2.25	1812	.05
Gp. 2		37.95	7.53			
Gp. 1	Directed Reading A & B	31.24	7.26	9.35	1808	.01
Gp. 2		27.94	7.76			
Gp. 1	Directed Reading A	17.03	4.20	9.23	1808	.01
Gp. 2		15.15	4.50			
Gp. 1	Directed Reading B	14.29	3.84	8.07	1808	.01
Gp. 2		12.79	4.10			
Gp. 1	Reading Efficiency	28.44	7.22	2.25	1808	.05
Gp. 2		27.66	7.49			

* Gp. 1 - Girls taught by male teachers
Gp. 2 - Boys taught by male teachers

Girls and Boys Taught by Female Teachers

Question 2:

Were there significant differences in reading achievement test scores and sub-test scores between girls and boys taught by female teachers?

Null Hypothesis 2:

There were no significant differences in reading achievement test scores and sub-test scores between girls and boys taught by female teachers.

Alternative Hypothesis:

There were significant differences in reading achievement test scores and sub-test scores between girls and boys taught by female teachers.

The mean achievement scores for girls were in all cases higher than those for boys. The difference in each test and sub-test was significant at the .05 or .01 level (Table 3). The null hypothesis is rejected and the alternative hypothesis accepted for each test and sub-test.

In response to Question 2, there were significant differences in the reading achievement between girls and boys taught by female teachers in Word Power, Vocabulary, Comprehension, Directed Reading and its sub-tests, and Reading Efficiency.

TABLE 3

COMPARISON OF MEAN ACHIEVEMENT SCORES OF GIRLS AND BOYS TAUGHT BY FEMALE TEACHERS

Groups *	Variable	Mean	SD	T	DF	Sig.
Gp. 1	Word Power	78.85	14.14	2.03	1044	.05
Gp. 2		76.96	15.91			
Gp. 1	Vocabulary	39.57	7.95	2.00	1044	.05
Gp. 2		38.54	8.82			
Gp. 1	Compre-hension	39.26	7.15	2.00	1044	.05
Gp. 2		38.33	7.88			

TABLE 3 - cont'd:

Groups*	Variable	Mean	SD	T	DF	Sig.
Gp. 1	Directed Reading A & B	33.32	7.01	7.59	1044	.01
Gp. 2		28.76	8.17			
Gp. 1	Directed Reading A	17.76	3.98	7.61	1044	.01
Gp. 2		15.77	4.48			
Gp. 1	Directed Reading B	14.62	3.92	6.01	1044	.01
Gp. 2		13.07	4.41			
Gp. 1	Reading Efficiency	28.55	7.31	2.35	1044	.01
Gp. 2		27.44	7.83			

* Gp. 1 - Girls taught by female teachers
Gp. 2 - Boys taught by female teachers

Boys Taught by Female Teachers/
Boys Taught by Male Teachers

Question 3:

Were there significant differences in reading achievement test scores and sub-test scores between boys taught by female teachers and boys taught by male teachers?

Null Hypothesis 3:

There were no significant differences in reading achievement test scores and sub-test scores between boys taught by female teachers and boys taught by male teachers.

Alternative Hypothesis:

There are significant differences in reading achievement test scores

and sub-test scores between boys taught by female teachers and boys taught by male teachers.

As Table 4 shows, in six out of seven cases there were no significant differences between the mean achievement scores of boys taught by females and boys taught by males. In the sub-test Directed Reading Part A, boys taught by females achieved significantly better ($P < .01$) than boys taught by males. The alternative hypothesis is accepted for Directed Reading Part A and the null hypothesis accepted for the other test and sub-test areas.

In answer to Question 3, significant differences between the two groups were evidenced only in the Directed Reading sub-test A. All other differences were non-significant.

TABLE 4

COMPARISON OF MEAN ACHIEVEMENT SCORES OF BOYS TAUGHT BY FEMALE TEACHERS AND BOYS TAUGHT BY MALE TEACHERS

Groups*	Variable	Mean	SD	T	DF	Sig.
Gp. 1	Word Power	76.96	15.91	0.96	1383	NS
Gp. 2		76.13	14.98			
Gp. 1	Vocabulary	38.54	8.82	0.70	1383	NS
Gp. 2		38.20	8.50			
Gp. 1	Compre-hension	38.33	7.88	0.87	1383	NS
Gp. 2		37.95	7.53			
Gp. 1	Directed Reading A & B	28.76	8.17	1.85	1381	NS
Gp. 2		27.94	7.76			

TABLE 4 - cont'd:

Groups	Variable	Mean	SD	T	DF	Sig.
Gp. 1	Directed Reading A	15.77	4.48	2.46	1381	.01
Gp. 2		15.15	4.50			
Gp. 1	Directed Reading B	13.07	4.47	1.19	1381	NS
Gp. 2		12.79	4.10			
Gp. 1	Reading Efficiency	27.44	7.83	0.51	1381	NS
Gp. 2		27.66	7.49			

*Gp. 1 - Boys taught by female teachers
Gp. 2 - Boys taught by male teachers

Girls Taught by Female Teachers/
Girls Taught by Male Teachers

Question 4:

Were there significant differences in reading achievement test scores and sub-test scores between girls taught by female teachers and girls taught by male teachers?

Null Hypothesis 4:

There were no significant differences in reading achievement test scores and sub-test scores between girls taught by female teachers and girls taught by male teachers.

Alternative Hypothesis:

There were significant differences in reading achievement test scores and sub-test scores between girls taught by female teachers and girls taught

by male teachers.

A comparison of the mean achievement scores (Table 5) reveals that differences between the groups reached significance in Directed Reading Parts A and B, and Directed Reading Part A. In both cases, the differences were in favor of girls taught by teachers of the same sex. The alternative hypothesis is accepted for Directed Reading Parts A and B, and Directed Reading Part A. The null hypothesis is accepted for the other five tests and sub-tests.

In considering Question 4, it was shown that significant between-group differences existed only in Directed Reading A and B, and Directed Reading A. There were no significant differences in other cases.

TABLE 5

COMPARISON OF MEAN ACHIEVEMENT OF GIRLS TAUGHT BY FEMALE TEACHERS AND GIRLS TAUGHT BY MALE TEACHERS

Groups *	Variable	Mean	SD	T	DF	Sig.
Gp. 1	Word Power	78.85	14.14	1.75	1473	NS
Gp. 2		77.48	14.75			
Gp. 1	Vocabulary	39.57	7.95	1.86	1473	NS
Gp. 2		38.74	8.48			
Gp. 1	Compre-hension	38.26	7.15	1.41	1473	NS
Gp. 2		38.72	6.97			
Gp. 1	Directed Reading A & B	32.32	7.01	2.81	1471	.01
Gp. 2		31.24	7.26			

TABLE 5 - cont'd:

Groups	Variable	Mean	SD	T	DF	Sig.
Gp. 1	Directed Reading A	17.76	3.98	3.27	1471	.01
Gp. 2		17.03	4.20			
Gp. 1	Directed Reading B	14.62	3.92	1.55	1471	NS
Gp. 2		14.29	3.84			
Gp. 1	Reading Efficiency	28.55	7.31	0.26	1471	NS
Gp. 2		28.44	7.22			

*Gp. 1 - Girls taught by female teachers
Gp. 2 - Girls taught by male teachers

Girls Taught by Female Teachers/
Boys Taught by Male Teachers

Question 5:

Were there significant differences in reading achievement test scores and sub-test scores between girls taught by female teachers and boys taught by male teachers?

Null Hypothesis 5:

There were no significant differences in reading achievement test scores and sub-test scores between girls taught by female teachers and boys taught by male teachers.

Alternative Hypothesis:

There were significant differences in reading achievement test scores and sub-test scores between girls taught by female teachers and boys taught

by male teachers.

The null hypothesis is rejected and the alternative hypothesis accepted for all tests and sub-tests. As Table 6 shows, in all tests and sub-tests girls taught by female teachers performed significantly better than boys taught by male teachers.

In answer to Question 5, there were significant differences between the two groups in Word Power, Vocabulary, Comprehension, Directed Reading A and B, Directed Reading A, Directed Reading B, and Reading Efficiency.

TABLE 6

COMPARISON OF MEAN ACHIEVEMENT SCORES OF GIRLS TAUGHT BY FEMALE TEACHERS AND BOYS TAUGHT BY MALE TEACHERS

Groups*	Variable	Mean	SD	T	DF	Sig.
Gp. 1	Word Power	78.85	14.14	3.43	1449	.01
Gp. 2		76.13	14.98			
Gp. 1	Vocabulary	39.57	7.95	3.07	1449	.01
Gp. 2		38.20	8.50			
Gp. 1	Compre-hension	39.26	7.15	3.26	1447	.01
Gp. 2		37.95	7.53			
Gp. 1	Directed Reading A & B	32.32	7.01	10.85	1447	.01
Gp. 2		27.94	7.76			
Gp. 1	Directed Reading A	17.76	3.98	11.22	1447	.01
Gp. 2		15.15	4.50			
Gp. 1	Directed Reading B	14.62	3.92	8.40	1447	.01
Gp. 2		12.79	4.10			

TABLE 6 - cont'd:

Groups	Variable	Mean	SD	T	DF	Sig.
Gp. 1	Reading Efficiency	28.55	7.31	2.20	1447	.05
Gp. 2		27.66	7.49			

* Gp. 1 - Girls taught by female teachers
Gp. 2 - Boys taught by male teachers

Girls Taught by Male Teachers/
Boys Taught by Female Teachers

Question 6:

Were there significant differences in reading achievement test scores and sub-test scores between girls taught by male teachers and boys taught by female teachers?

Null Hypothesis 6:

There were no significant differences in reading achievement test scores and sub-test scores between girls taught by male teachers and boys taught by female teachers.

Alternative Hypothesis:

There were significant differences in reading achievement test scores and sub-test scores between girls taught by male teachers and boys taught by female teachers.

As Table 7 illustrates, the mean scores between the two groups were not significant for Word Power, Vocabulary and Comprehension. The null hypothesis is accepted for these cases. However, in Directed Reading, its sub-tests and

in Reading Efficiency, girls taught by males performed significantly better than boys taught by females. The alternative hypothesis is accepted for these four tests and sub-tests.

In response to Question 6, there were significant differences between the two groups in the Directed Reading A and B, Directed Reading A, Directed Reading B, and Reading Efficiency test scores. There were no significant differences in Word Power, Vocabulary and Comprehension.

TABLE 7

COMPARISON OF MEAN ACHIEVEMENT SCORES OF GIRLS TAUGHT BY MALE TEACHERS AND BOYS TAUGHT BY FEMALE TEACHERS

Groups*	Variable	Mean	SD	T	DF	Sig.
Gp. 1	Word Power	77.48	14.75	0.61	1407	NS
Gp. 2		76.96	15.91			
Gp. 1	Vocabulary	38.74	8.48	0.43	1407	NS
Gp. 2		38.54	8.82			
Gp. 1	Comprehension	38.72	6.97	0.96	1407	NS
Gp. 2		38.33	7.88			
Gp. 1	Directed Reading A & B	31.24	7.26	5.84	1407	.01
Gp. 2		28.76	8.17			
Gp. 1	Directed Reading A	17.03	4.20	5.27	1405	.01
Gp. 2		15.77	4.48			
Gp. 1	Directed Reading B	14.29	3.84	5.41	1405	.01
Gp. 2		13.07	4.41			
Gp. 1	Reading Efficiency	28.44	7.22	2.40	1405	.01
Gp. 2		27.44	7.83			

* Gp. 1 - Girls taught by male teachers
Gp. 2 - Boys taught by female teachers

II. INTERACTION BETWEEN TEACHER SEX AND STUDENT SEX

Results of analysis of variance (Anova) tested at the .05 and .01 significant levels are presented and explained in this part of the chapter. The results for each test and sub-test involved the following three elements; significance of sex interaction, significance of boy/girl difference and an analysis of contributing effects of sex interaction on achievement. Incidental findings on the analysis of variance of teacher sex differences in overall student achievement is presented at the end of this section.

Word Power

As Table 8 indicates there was no significant interaction between the sex of the student and sex of teacher in Word Power achievement scores. However, there was a significant difference ($P < .01$) in achievement between boys and girls. This difference was in favor of girls (Table 9). Girls achieved .76 deviation above and boys .81 deviation below the grand mean with scores unadjusted for teacher sex. The difference between scores was 1.57 deviation. When the scores were adjusted for teacher sex, the difference remained relatively unchanged (1.55) illustrating the non-significant effect of the sex of the teacher. Together, sex of student and sex of teacher accounted for .4% variation (R^2) in the achievement score.

TABLE 8

ANALYSIS OF VARIANCE OF STUDENT SEX AND STUDENT SEX BY TEACHER SEX: WORD POWER

Source	DF	MS	F	Sig.
Student Sex	1	1704.982	7.663	.01

TABLE 8 - cont'd:

Source	DF	MS	F	Sig.
Student Sex by Teacher Sex	1	47.912	0.215	NS

TABLE 9

MULTIPLE CLASSIFICATION ANALYSIS: WORD POWER

Student Sex	Grand $\bar{X}$	Unadjusted Dev'n	Adjusted for Independents Dev'n	R^2
Females		+0.76	+0.75	
Males		-0.81	-0.80	
	77.24			0.004

Vocabulary

The interaction between teacher sex and student sex in Vocabulary achievement was not significant (Table 10). As was the case for Word Power, there was a significant difference ($P < .05$) in achievement between boys and girls. This difference was in favor of girls (Table 11). Girls' mean score was .36 deviation above and boys' .38 deviation below the grand mean with scores unadjusted for teacher sex. The difference between scores was .74 deviation. Adjusted for teacher sex, the difference was .72. Together the two independent variables accounted for .3% variation (R^2) in achievement.

TABLE 10

ANALYSIS OF VARIANCE OF STUDENT SEX, AND STUDENT SEX BY TEACHER SEX: VOCABULARY

Source	DF	MS	F	Sig.
Student Sex	1	375.365	5.258	.05
Student Sex by Teacher Sex	1	39.688	0.556	NS

TABLE 11

MULTIPLE CLASSIFICATION ANALYSIS: VOCABULARY

Student Sex	Grand $\bar{X}$	Unadjusted Dev'n	Adjusted for Independents Dev'n	R^2
Females		+0.36	+0.35	
Males		-0.38	-0.37	
	38.70			0.003

Comprehension

Table 12 shows that there was no significant interactive effect between the independent variables in Comprehension. However, the difference between boys and girls in achievement was significant ($P < .01$). Table 13 indicates that girls performed better than boys. The difference in unadjusted scores was .84 deviation. When the scores were adjusted the difference was .83. The variation in the achievement accounted for by teacher sex and student sex was .4%.

TABLE 12

ANALYSIS OF VARIANCE OF STUDENT SEX, AND STUDENT SEX BY TEACHER SEX: COMPREHENSION

Source	DF	MS	F	Sig.
Student Sex	1	487.596	9.035	.01
Student Sex by Teacher Sex	1	4.219	0.78	NS

TABLE 13

MULTIPLE CLASSIFICATION ANALYSIS: COMPREHENSION

Student Sex	Grand $\bar{X}$	Unadjusted Dev'n	Adjusted for Independents Dev'n	R^2
Females		+0.41	+0.40	
Males		-0.43	-0.43	
	38.52			0.004

Directed Reading Parts A and B

In Directed Reading Parts A and B (Table 14), there was no interaction between the sex of the student and sex of the teacher. Again there was a significant effect ($P < .01$) in achievement according to student sex. Girls performed at 1.66 deviation above and boys at 1.77 deviation below the grand mean (Table 15) with scores unadjusted for teacher sex. Adjusted for the sex of the teacher, there was only .03 (3.43-3.40) change between the differences in deviations. Teacher sex

and student sex together accounted for 5.2% variation in achievement. As would be later seen, this percentage in variation, although very small, was the second largest produced by an interaction of student sex and teacher sex. The remaining 94.8% variation in achievement is unaccounted for or due to effects other than sex of student and sex of teacher.

TABLE 14

ANALYSIS OF VARIANCE OF STUDENT SEX, AND STUDENT SEX BY TEACHER SEX: DIRECTED READING A & B

Source	DF	MS	F	Sig.
Student Sex	1	8241.398	145.066	.01
Student Sex by Teacher Sex	1	11.276	0.198	NS

TABLE 15

MULTIPLE CLASSIFICATION ANALYSIS: DIRECTED READING A & B

Student Sex	Grand $\bar{X}$	Unadjusted Dev'n	Adjusted for Independents Dev'n	R^2
Females		+1.66	+1.65	
Males		-1.77	-1.75	
	30.00			0.052

Directed Reading Part A

In Directed Reading Part A, there was no significant interaction between teacher sex and student sex (Table 16). The difference in achievement between students was significant at the .01 level. This difference was in favor of female students (Table 17). Girls' mean unadjusted score was .94 deviation above and boys' 1.00 deviation below the grand mean. The differences between the unadjusted and adjusted means was .02. The two independent variables accounted for 5.4% variation in Directed Reading Part A. This was the largest percentage in variation for which teacher sex and student sex were responsible.

TABLE 16

ANALYSIS OF VARIANCE OF STUDENT SEX, AND STUDENT SEX BY TEACHER SEX: DIRECTED READING A

Source	DF	MS	F	Sig.
Student Sex	1	2645.637	142.671	.01
Student Sex by Teacher Sex	1	1.718	0.903	NS

TABLE 17

MULTIPLE CLASSIFICATION ANALYSIS: DIRECTED READING A

Student Sex	Grand $\bar{X}$	Unadjusted Dev'n	Adjusted for Independents Dev'n	R^2
Female		+0.94	+0.93	

TABLE 17 - cont'd:

Student Sex	Grand $\bar{X}$	Unadjusted Dev'n	Adjusted for Independents Dev'n	R^2
Male		-1.00	-0.99	
	16.37			0.054

Directed Reading Part B

Analysis of variance for the interactive effect of student sex and teacher sex in Directed Reading Part B produced a non-significant result (Table 18). There was a significant difference ($P < .01$) in achievement between male and female students. Table 19 shows that girls' mean score was .74 deviation above and boys' mean score .79 deviation below the grand mean with scores unadjusted for teacher sex. The adjusted scores for teacher sex was the same as the unadjusted scores, indicating that teacher sex had no effect on the scores. Together, the two independent variables were responsible for 3.6% variation in Directed Part B achievement.

TABLE 18

ANALYSIS OF VARIANCE OF STUDENT SEX, AND STUDENT SEX BY TEACHER SEX: DIRECTED READING B

Source	DF	MS	F	Sig.
Student Sex	1	1653.604	101.111	.01

TABLE 18 - cont'd:

Source	DF	MS	F	Sig.
Student Sex by Teacher Sex	1	.273	0.017	NS

TABLE 19

MULTIPLE CLASSIFICATION ANALYSIS: DIRECTED READING B

Student Sex	Grand $\bar{X}$	Unadjusted Dev'n	Adjusted for Independents Dev'n	R^2
Females		+0.74	+0.74	
Males		-0.79	-0.79	
	13.68			0.036

Reading Efficiency

Table 20 illustrates the same trend for teacher/student sex interaction in Reading Efficiency as in the six previous cases. There was no significant interaction between student sex and teacher sex. However, there was a significant difference in achievement between male and female students.

Female students again performed better than male students (Table 21). The unadjusted scores for girls (.43) and boys (.46) remained unchanged when adjusted for the sex of the teacher. Together, the two independent variables accounted for .4% variation in Reading Efficiency.

TABLE 20

ANALYSIS OF VARIANCE OF STUDENT SEX, AND STUDENT SEX BY TEACHER SEX: READING EFFICIENCY

Source	DF	MS	F	Sig.
Student Sex	1	572.965	10.365	.01
Student Sex by Teacher Sex	1	17.226	0.312	NS

TABLE 21

MULTIPLE CLASSIFICATION ANALYSIS: READING EFFICIENCY

Student Sex	Grand $\bar{X}$	Unadjusted Dev'n	Adjusted for Independents Dev'n	R^2
Females		+0.43	+0.43	
Males		-0.46	-0.46	
	28.05			0.004

Summary of Sex Interaction

Table 22 presents a summary of the results of the interaction of student sex and teacher sex in each achievement test and sub-test. In every case, there was no significant interaction between teacher sex and student sex.

TABLE 22

SUMMARY: ANALYSIS OF VARIANCE OF STUDENT SEX BY TEACHER SEX

Variable	DF	MS	F	Sig.
Word Power	1	39.688	0.556	NS
Vocabulary	1	47.912	0.215	NS
Comprehension	1	4.219	0.78	NS
Directed Reading A & B	1	11.276	0.198	NS
Directed Reading A	1	1.718	0.093	NS
Directed Reading B	1	.273	0.017	NS
Reading Efficiency	1	17.226	0.312	NS

Analysis of Variance: Teacher Sex

Although not directly related to investigation of this study, results produced by Anova indicated that in all cases female teachers had higher achievement results than male teachers (Table 23). In Word Power, Directed Reading, and its two sub-tests, students taught by female teachers achieved significantly better than students taught by male teachers. In no instance did male teachers have significantly better results than female teachers. In the other three test areas, the differences were not significant.

TABLE 23

ANALYSIS OF VARIANCE OF TEACHER SEX

Variable	Means (unadjusted) Female	Male	MS	F	DF	Sig.
Word Power	77.97	76.82	817.404	3.674	1	.05

TABLE 23 - cont'd:

Variable	Means (unadjusted) Female	Male	MS	F	DF	Sig.
Vocabulary	39.06	38.32	235.938	3.305	1	NS
Comprehension	38.93	38.09	139.290	2.581	1	NS
Directed Reading A & B	31.66	28.23	607.972	10.702	1	.01
Directed Reading A	16.83	16.11	301.531	16.261	1	.01
Directed Reading B	14.42	12.89	0.273	3.719	1	.05
Reading Efficiency	28.03	28.05	1.717	0.031	1	NS

III. DISCUSSION

Results produced by t-tests between group means tend to suggest that girls achieved significantly better than boys regardless of teacher sex. Girls taught by teachers of the same sex performed significantly better than boys taught by females in six out of seven instances (Table 3, page 45). Girls also achieved significantly better than boys in all seven cases where both groups were taught by males (Table 2, page 44).

In the other two boy/girl group comparisons, the trend was also evident. Girls taught by teachers of the same sex performed significantly better than boys taught by teachers of their sex in all seven cases (Table 8, page 54). There were four cases out of seven where the difference between means reached significance when students were grouped with teachers of opposite sex. In all four instances girls did better than boys (Table 7, page 53).

Twenty-four out of twenty-eight boy/girl comparisons showed that girls achieved significantly better than boys irrespective of teacher sex. In the other four non-significant instances, girls scored slightly higher than boys. The sex of the teacher appeared to have had no significant effect on the achievement of the students.

Boy/girl comparisons revealed that in no case did boys perform significantly better with teachers of the same sex. Acutally, in one instance, boys taught by females achieved significantly higher than boys taught by teachers of the same sex (Table 4, page 47). Girls taught by teachers of the same sex achieved better than girls taught by the opposite sex. The differences were significant in two cases (Table 5, page 49).

In general, girls performed better than boys with teacher of either sex. In no comparison did boys perform better than girls. In one case boys achieved significantly higher with teachers of the opposite sex as compared with teachers of the same sex. Girls with teachers of the same sex in two cases did significantly better than girls with teachers of the opposite sex.

These results show significant between-group differences with the majority of cases in favor of girls. However, these differences cannot be justifiably attributed to effects of teacher sex.

Whereas, t-test provided results that showed boy/girl differences in achievement and implied that differences were not due to interaction of teacher sex and student sex; two-way analysis of variance (Anova), produced results that confirmed this inference.

In each test and sub-test, there were significant overall differences in achievement between boys and girls. These were in all cases in favor

of girls. However, as Table 22, page 63 indicates, there were no significant interaction between student sex and teacher sex. It has been shown that the sex of student and sex of teacher were responsible for very small percentages of variation in achievement. The largest variation was 5.4% in Directed Reading Part A.

These results are somewhat similar to findings by Peterson, and Stasz et al. among others. Peterson found that there were no significant interaction between student sex and experimenter sex. He also found that female experimenters elicited more responses from the subjects than male experimenters.[1] It was shown (Table 23, page 63) that female teachers had better achievement results from their students than did male teachers.

Stasz et al produced results which supported the finding that girls generally performed better than boys irrespective of teacher sex.[2] In four out of twelve courses, girls did significantly better than boys, regardless of teacher sex and in one course students performed significantly better with teachers of the same sex.

The results of this study have demonstrated that the sex differences in student achievement were not attributable to teacher sex. The reasons for these differences remain unexplained. Perhaps prior exposure to and probable prior effects of predominantly female teachers were not conteracted by the known nine to ten months of student exposure to male teachers. The time period to male exposure might have very well been too short to have had any meaningful effects on student achievement.

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[1] Peterson, op. cit.

[2] Stasz et al., op. cit.

The analysis of student achievement of male and female teachers seem to lend some support to such an hypothesis. In none of the seven test and sub-tests did students of male teachers perform non-significantly or significantly better than students of female teachers (Table 23, page 63).

CHAPTER V

SUMMARY, CONCLUSIONS AND IMPLICATIONS FOR FURTHER RESEARCH

I. SUMMARY AND CONCLUSIONS

The Problem Restated

The present study was undertaken to determine whether there was an interaction between the sex of the student and the sex of the teacher in reading achievement. Specifically, this study sought to ascertain whether significant differences existed between Eastern Manitoba School Regions's grade nine boys and girls taught by male and female teachers; and whether differences were attributable to the sex of the teacher.

Procedures

The population in the study was approximately 2,861 grade nine students enrolled in the Eastern Manitoba School Region during the 1973-74 school year. This number represented 89% of the Region's total grade nine student population for the same year.

Data on the students and teachers were obtained from a previous reading study conducted in the Region. That study had made use of the Iowa Silent Reading Test, Level 1, Form E to measure achievement.

The ISRT, Level 1 was composed of four tests: Vocabulary, Comprehension, Directed Reading and Reading Efficiency. Directed Reading consisted of two sub-tests. The sum of Vocabulary and Comprehension scores was known as Word Power. In all there were seven tests and sub-tests.

Raw scores on the test were recorded on sheets and stored at the Eastern Manitoba Region Office of the Field Services Branch. These were released for the purpose of this tudy.

The students were divided into two groups: 1) students taught by female teachers and 2) students taught by male teachers. The students were further sub-grouped according to sex of student and sex of teacher. A table was formed to illustrate the four sub-groups and their numerical composition.

The two independent variables, sex of teacher and sex of student, were coded and with the raw scores transferred to computer cards. The data was first subjected to a two-way analysis of variance using the SPSS prodecure, Anova. It was later sub-filed and submitted to t-tests because the Anova program did not yield descriptive statistics on the individual sub-groups and between sub-group comparisons.

Findings

This study revealed that there were significant differences in reading achievement between grade nine boys and girls. T-test results showed that in twenty-eight between groups comparisons, girls achieved better than boys. Twenty-four out of the twenty-eight cases were significant. In these comparisons, girls achieved better than boys irrespective of the sex of the teacher.

One case was found significant where boys taught by teachers of the oppostie sex achieved better than boys taught by teachers of the same sex. Six other boy/boy comparisons were not significant.

There were two cases where girls taught by teachers of the same sex achieved significantly better than with teachers of opposite sex. Five

other girl/girl comparisons were not significant.

Analysis of variance illustrated that, in all tests and sub-tests, girls performed significantly better than boys. There were no significant interactions between student sex and teacher sex in any of the tests or sub-tests. Student sex and teacher sex accounted for very small percentages of variation in achievement.

The overall results of this study indicate that differences in reading achievement between grade nine boys and girls in the Eastern Manitoba existed. However, these differences were not attributable to interaction between the sex of the teacher and sex of the student.

Incidental findings showed that students of female teachers achieved better than students of male teachers. There were four significant and three non-significant instances.

II. IMPLICATIONS FOR FURTHER RESEARCH

The results of this study indicated that sex differences in grade nine reading achievement existed and that teacher/student sex interaction had no significant effects on achievement. Together teacher sex and student sex accounted for very small variations in achievement. It is evident that factors not considered in this study might have been responsible for the differences in performance between boys and girls.

Perhaps teacher expectations is a good place to start. It might be that teachers, regardless of sex, do expect girls to achieve better than boys in the public school system. It might be that students do live up to teacher expectations. Palardy in his investigation of the relationship between teacher expections and student achievement found that:

i) Where boys were expected to do less well, they actually did and

ii) Where they were expected to achieve as well as girls, they fulfilled expectations.[3]

Secondly, a longitudinal study investigating sex differences in achievement by controlling student exposure to teacher sex starting at kindergarden could produce more creditable results.

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[3]Michael Palardy, op. cit.

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