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THE SEX-ROLE CLASSIFICATION OF SCHOOL-RELATED
OBJECTS BY SELECTED FOURTH-GRADE SUBJECTS
FROM CONTRASTING LEARNING ENVIRONMENTS
INCLUDING A TREND ANALYSIS, K - 4

DISSERTATION

Presented In Partial Fulfillment of the Requirements for
the Degree Doctor of Philosophy In the Graduate
School of The Ohio State University

By

Clyde Eugene Harrison, B.S.Ed., M.A.

* * * * * * * *

The Ohio State University
1976

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Dr. Charles Galloway

Approved By

Lorron L. Stull
Adviser
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DEDICATION

I dedicate this to my people, all of them.

Clyde Harrison
December, 1976
ACKNOWLEDGMENTS

These brief remarks are intended to acknowledge the invaluable assistance given me by those persons who have worked so diligently in my behalf but I cannot express in such limited space the gratitude they deserve. The gifts of time and concern they have given me cannot be repaid.

To Dr. Lorren L. Stull, my adviser and mentor, I express my appreciation for his encouragement, guidance, and inspiration. His wise words and good humor will continue to be a model for me.

To the members of my committee, Drs. Alexander Frazier and Charles Galloway I express thanks for their willingness to serve in my behalf. I especially thank Dr. Frazier who was a major source of inspiration for my graduate studies. He will continue to inspire me to "profess" in our field.

To my fellow graduate students, especially Byron Naum and Frances Squires, I express gratitude. As my research assistant, Frances Squires was superb. As a friend, she is irreplaceable.

I thank all the members of my family, large and small, young and mature, for their patience and support. Thanks to many others, not named.

To paraphrase the poet, if I stand tall, it is because I stand on the shoulders of others.
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FIELDS OF STUDY

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Studies in Early and Middle Childhood Mathematics Education
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CHAPTER I

INTRODUCTION TO THE PROBLEM

Rationale

1. Introduction

For many years there has been interest but in recent years there has been a dramatic explosion of interest, knowledge, theorization, and research related to the topics of sexuality, sex differences, sexual attitudes — sex related topics in general. Human sexuality has a multiplicity of subtopics as do most topics related to that complex organism called the human. The area of sex has been of such interest because it is of so fundamental importance to the lives of humans in its physical, psychological, and social dimensions. As such it is of interest to the educator, psychologist, sociologist, physician — to all who study the human (Maccoby, ed., 1966; Maccoby and Jacklin, 1974).

The subtopic of sex differences and sex development is of particular interest to the educator. Since the earliest studies of children, scholars have recognized, to a greater or lesser degree, more or less validly, that sex differences affect the educational process because they are so vital to human growth and development.

Another topic of much recent scholarly activity has been the educational alternative of open or informal education (Walberg and Thomas 1971). The proponents of this type of schooling, as well as the
opponents, have been quite in evidence in educational dialogue.

Schooling of whatever type should, theoretically, be a sexually neutral activity. American public education has for many years been coeducational and compulsory in almost all areas of the nation. The type of classroom organizational environment, whether open or conventional, would, also theoretically, seem to be sexually neutral in its various dimensions; student achievement, attitudes toward schooling and perception of schooling as appropriate would be similar for both boys and girls. Sexton (1965), Kagan (1964), Mayer and Thompson (1956) present evidence that this, however, is not the case. These scholars and others have found that school is perceived by children as being feminine. Sexton has written that schools "emasculate" boys and that, to them, it is a "woman's world" (Sexton, 1965, p.57).

This incongruity between what is supposedly a neutral sexual entity, schooling, and the perception by males of it as feminine has been recognized as a concern by the scholars cited, among others. However, Lindsay (1973) found that in second-grade open classroom environments boys viewed schooling as less feminine and more masculinely appropriate than boys in conventional classroom environments. This incongruity and the means to resolve it would seem to be worthy of further study.

The purpose of this study is to describe the relationship between fourth-grade students' perceptions of the sex-appropriateness of school and the type of classroom environment in which they are enrolled. For both boys and girls the study will also attempt to describe the effects of the sex of the subjects and the degree of masculino
sex-role preference upon those students' perceptions of the sex appropriateness of school. Finally, the study will attempt to identify and describe the trend of those perceptions through several levels of schooling.

II. Sex Differences: Overview

In this section an overview of sex differences will be presented insofar as they apply to the rationale of this study. That sex differences exist is not a topic for debate; it is obvious that males and females differ in more than the physical realm. The scholarly questions relative to sex differences are concerned with the degree of sex differences and their origin. Basically, the scholarly questions involve the role of nature and nurture, both of which contribute to the sex differences noted in human behavior. While genetic influences are acknowledged to be vital, this study will be more concerned with the child's learning of sex-patterned behavior.

This study relates to the sex-role and sex identification differences among children. There are three major theories that attempt to explain sex differentiation in the child. These theories will be briefly discussed below.

The imitation of same-sex models by the child is one way in which sex identity and sex-patterned behavior is learned by children. This selective modeling may or may not be conscious or deliberate by the individual.

The positive and negative reinforcement of the child's behavior by parents and significant others is another theory to explain sex-role
differentiation. The male is rewarded for what these others perceive as "boylike" behavior. Girls are similarly but oppositely reinforced for their behavior.

The third theory to explain sex-role differentiation involves the child's cognition and development. Through self-socialization the child develops a concept of what it is to be a boy or girl and to which gender he or she belongs. Through modeling, imitation, and differential reinforcement the child's concept of what it is to be a boy or girl is formed and the child behaves in a manner which is consistent with this self-concept or sex-appropriate behavior.

Thus, as the child grows, certain sex-patterned roles and preferences which affect the overall pattern of behavior are learned. The intensity of these sex-role preferences is one of the variables investigated in this study. The measurement of this factor is achieved by the use of the IT Scale for Children by Brown (1956). The intensity of the child's masculine or feminine sex-role preference is measured through the child's choices of pictured objects and activities that are masculinely or femininely associated. Brown's findings indicate that boys have a stronger preference for the masculine role than girls for the feminine and that boys are more consistent than girls in showing less variability in this sex-role preference. The ITSC will be further discussed in Chapter III.

Another variable studied through this investigation is the effect of the sex of the subject on the perception of school-related objects. This seems to be of valid concern when the differences in school achievement between boys and girls are viewed. Larkin (1972)
found that the child's sex was an important variable in the child's attitude toward school and that the boys studied had a less favorable attitude toward school than did the girls. Kagan (1964) found that second-grade children viewed school-related objects as more clearly feminine than masculine. It was hypothesized that this was responsible for the young boy viewing school as sexually inappropriate. This, when compared with the findings of Brown that boys have a great preference for the male role, would seem to indicate that the greater achievement of elementary school girls may be linked to the attitude of boys that school is not sex-appropriate. Because of the factors noted above, the inclusion of sex of subject as a variable in this study seems logical and worthwhile. If the school environment affects the sexes differentially, the effects of different types of environment and their relationships to the two sexes seem worthy of study.

III. Contrasting Learning Environments

The type of classroom environment which is commonly called "open" or "informal" has received much attention in recent years (Silberman, ed., 1973, Barth, 1972, and Featherstone, 1971). The characteristics of open classrooms have been studied by Walberg and Thomas (1971) in order to designate classroom environments as either open or conventional. The characteristic features of open education were also studied by Katz (1972). To Walberg and Thomas, these variables could be grouped in eight themes, as will be later detailed. Katz identified five variables for identification of the open classroom. Whatever the list of criteria adopted, it seems clear that open classrooms and
conventional classrooms are contrasting environments. The Classroom Observation Rating Scale by Evans, based on the work of Walberg and Thomas, will be used to define the two environments.

The differential effects of these two types of classroom environments on the perceptions of children in kindergarten, first, and second-grade was studied by Lindsay (1973) and Wright (1975). Lindsay found that second-grade boys in open classrooms viewed school as more sex-appropriate than did boys in conventional classrooms. Wright was unable to replicate these findings for boys and girls in kindergarten and first-grade. The interest in defining the effects of these contrasting environments and the interest in sex differences in schooling in general seems to justify further study such as that done in this investigation.

IV. Justification for the Study

The preceding discussion presented in an encapsulated form the sex differences in role perception and school achievement, present and hypothesized, along with a discussion of two contrasting learning environments. Also discussed were previous studies on the relationships of varying degrees of sex-role preference, the sex of the subject, the type of learning environment, and the grade level of students on the perception of the gender of school-related objects. This discussion and the fact that the Lindsay and Wright studies called for a replication of their investigations seem to justify the present study of fourth-grade subjects and an analysis of trends suggested in these studies.
The findings of this study would be of interest to educators interested in sex differences and in alternative types of learning environments for children. It is hoped that consumers of this research will have more data and insight than otherwise might be available on which to base further study, practice, and decisions related to the studied topics.

V. Summary of the Rationale of this Study

This study is designed to determine and assess the relationship of varying degrees of intensity of sex-role preference on the subjects' perceptions of the gender of school objects and to determine whether selected fourth-grade subjects in open education learning environments perceive the gender of school objects differently from selected fourth-grade subjects in conventional learning environments. This study is a replication in design and main problem of the work of Lindsay (1973) and Wright (1975). It compares the results of the investigation with the earlier reported results of Lindsay and Wright and investigates developmental trends which seem to be present.

In her study with second-grade male subjects, Lindsay found that there was a significant difference (p. .05) in the perception of the gender of school-related objects between male subjects in open education learning environments and male subjects in conventional learning environments. Wright used the same design to investigate the same area of interest with kindergarten and first-grade subjects, both boys and girls. The present study extends these specific investigations with data collected from fourth-grade subjects, both boys and
girls. The analysis of the data from the three populations, kinder
garten and first-grade, second-grade, and fourth-grade should provide
a basis for extending the original studies and the present study into a
developmental perspective of the gender identification of school-related
objects by subjects in the age and grade levels indicated.

The main rationale for the Lindsay study was to investigate
the possibility that contrasting learning environments may be different-
ly associated with the gender identification of school-related objects
by children. Lindsay's abstract states that:

The classroom learning environment appears to be the key to the
child's perception of the gender of school objects. The students
in open education programs tended to view school as a more sex-
appropriate activity than did the students in conventional education
programs. (p. 3).

The present study explores the possibility of making a similar
statement about students outside of the specific populations investiga-
ted by Lindsay and Wright.

This study also investigates with these three populations, id
est, the population to be studied, Lindsay's and Wright's, the age
trends of sex-typed preferences as detailed in Kohlberg (1966) and
Kohlberg and Sigler (1967). Kohlberg writes that the "... greatest
individual variations in children's sex-role attitudes (within a given
culture) are those related to age and to intellectual and social
maturity." (p. 84). The data from Lindsay's, Wright's and the present
study will be used to view this cognitive-developmental aspect of the
sex-role classification of school-related objects.

In summary, this study replicates Lindsay's study with a popu-
lation different from that previously studied. In addition, this study
Investigates age trends in a developmental analysis of the new data and the data from the two similar previous studies.

Problem Statement

This study investigates two main problems:

1. Does the classroom learning environment make a significant difference on the perceptions of selected fourth-grade subjects regarding the gender of school-related objects?

2. Does the data resultant from the investigations with kindergarten, first-grade, second-grade, and fourth-grade subjects exhibit any developmental trends in the perceptions of these selected subjects regarding the gender of school-related objects?

Hypotheses

The following null hypotheses were tested in this study.

Hypothesis 1: There is no significant difference (p. < .05) attributable to type of classroom environment between selected male and female fourth-grade subjects enrolled in open and conventional education classrooms in their perceptions of the gender of school-related objects.

Hypothesis 2: There is no significant difference (p. < .05) attributable to sex of subject between selected male and female fourth-grade subjects in their perceptions of the gender of school-related objects.

Hypothesis 3: There is no significant difference (p. < .05) attributable to degree of masculine orientation between selected
male and female fourth-grade subjects who show high and those who
show low masculine sex-role preference in their perceptions of the
gender of school-related objects.

Hypothesis 4: There is no significant difference (p. < .05)
attributable to the interaction of type of classroom environment
and sex of subject between selected male or female fourth-grade
subjects enrolled in open or conventional education classrooms in
their perceptions of the gender of school-related objects.

Hypothesis 5: There is no significant difference (p. < .05)
attributable to the interaction of type of classroom environment
and degree of masculine orientation between selected male and female
fourth-grade subjects enrolled in open or conventional education
classrooms and showing high or low masculine sex-role preference in
their perceptions of the gender of school-related objects.

Hypothesis 6: There is no significant difference (p. < .05)
attributable to the interaction of sex of subject and degree of
masculine orientation between selected male or female fourth-grade
subjects and showing high or low masculine sex-role preference in
their perceptions of the gender of school-related objects.

Hypothesis 7: There is no significant difference (p. < .05)
attributable to the interaction of the type of classroom environ-
ment, sex of subject, and degree of masculine orientation between
selected fourth-grade subjects in their perceptions of the gender
of school-related objects.

Hypothesis 8: There is no significant linear trend (p. < .05)
among the means of groups of selected kindergarten, first, second,
and fourth-grade subjects in their perceptions of the gender of school-related objects.

**Hypothesis 9:** There is no significant quadratic trend \( p < .05 \) among the means of groups of selected kindergarten, first, second, and fourth-grade subjects in their perceptions of the gender of school-related objects.

**Hypothesis 10:** There is no significant cubic trend \( p < .05 \) among the means of groups of selected kindergarten, first, second, and fourth-grade subjects in their perceptions of the gender of school-related objects.

**Operational Definition of Terms**

1. **Open Education Learning Environment** -- Those classrooms identified by the Classroom Observation Rating Scale as having a preponderance of factors indicative of open education or modern education.

2. **Conventional Education Learning Environment** -- Those classrooms identified by the Classroom Observation Rating Scale as having to a lesser degree the characteristics of the open or modern education programs.

3. **Contrasting Environments** -- The term used to refer to the open education programs and the conventional education programs collectively.

4. **Fourth-Grade Subjects** -- For the purpose of this study, a fourth-grade subject will be defined as ranging in age from 9.25 years to 10.75 years who has not been retained in the fourth-grade
nor in any previous grade.

5. Fourth-Grade Subjects in Open Education Learning Environments -- Those students who qualify for the above definition who have been in an open education learning environment for the current year.

6. Fourth-Grade Subjects in Conventional Education Learning Environments -- Those subjects who qualify in the definition of a fourth-grade subject and who have been in a conventional learning environment for the current year.

7. Sex-Role Identification -- The behavior associated with one sex or the other that the individual introjects and acquires on his own.

8. Sex-Role Preference -- The behavior associated with one sex or the other that the individual would like to adopt, or that he perceives as the preferred or more desirable behavior.

9. Intensity of Sex-Role Preference -- The degree of intensity of sex-role preference in this study will be determined by the results obtained by the subject on the IT Scale for Children, referred to in this study as ITSC.

10. Gender -- The classification of an object as masculine or feminine.

11. School-Related Objects -- Objects that contain no cue as to gender but are primarily associated with the school situation. These would include items such as an easel, child's desk, book, pencil, school building.

12. Age Trends -- The likelihood that age will be associated
significantly (p. < .05) with the level of sex-role classification of school-related objects by subjects in kindergarten, first-grade, second-grade and fourth-grade.

**Design**

The variables in this study are:

1. The classroom learning environment.
2. The degree of intensity of sex-role preference.
3. The perceptions of fourth-grade subjects regarding the gender of school-related objects.
4. Grade level of subjects.
5. Sex of subjects.

The diagram in Appendix A (after Lindsay, p. 80) represents the research design followed in this study. Appendix A diagrammatically shows that the research consisted of five stages, three of which were data collection phases.

**Stage 1:** Stage 1 consisted of identification of twenty-one fourth-grade classrooms from a pool of classrooms which were designated as appropriate for this study by school officials and this researcher. To be considered appropriate for this study a classroom was located in a school which is not eligible for federal or state assistance based on its percentage of low-income or Aid to Dependent Children eligible families. The classrooms to be studied were those in which the teachers were willing to permit this type of study and were designated by the principals as more typically open education or more typically conventional education learning
environments.

Stage 2: The administration of the Classroom Observation Rating Scale in the twenty-one classrooms identified in Stage 1 provided data for the identification of the five classrooms designated as most typically open education learning environments and the five classrooms designated as most typically conventional education learning environments. Those ten classrooms then provided the pool of subjects for the study.

Stage 3: To determine the degree of sex-role preference, the Brown ITSC was administered to the subjects identified in Stage 2. From the pool of subjects the sixty subjects who scored the highest (30 from each of the two learning environments, 15 male and 15 female) and the sixty subjects who scored the lowest (30 from each of the two learning environments, 15 male and 15 female) in sex-role preference as measured by the ITSC were selected for further study.

Stage 4: The Kagan Sex-Role Classification of School Objects Task as modified by Wright was administered to the population sample of one hundred twenty subjects selected in Stage 3.

Stage 5: The fifth stage in the study was the analysis of the data. The data collected in Stage 4 were analyzed in two substages. In the first substage of the data analysis, the subjects' scores on the SRCSOT were analyzed by the use of multivariate analysis of variance to determine whether the classroom learning environment, the sex of subject, and the degree of masculine sex-role preference made a significant difference on the perceptions of selected fourth-
grade subjects regarding the gender of school-related objects. In the second substage, the data collected in the present study were pooled with the data from the Lindsay and Wright studies and a trend analysis was applied to describe age and grade developmental trends present or not present in the groups studied. In that Lindsay's study used only male subjects, this second substage of the data analysis examined male subjects only.

Assumptions and Limitations

Assumption:

The following assumptions are made in this study.

1. The subjects in this study possessed mental ability at an educable level.

2. The investigators were adequately prepared to administer the appropriate instruments.

3. The data collected were analyzed by an appropriate statistical procedure.

4. The data resultant from this study, the Lindsay study, and the Wright study are comparable at a level which would allow them to be used in a developmental age trend analysis.

Limitations

The problems investigated by this study are limited by the following.

1. This study is confined to one segment of the population in one selected group of schools, limiting generalization to other
populations.

2. The accuracy of the measures of the tests administered is determined by the child's response to and rapport with the examiners.

3. Due to variations in schools and schedules, the instruments could not be administered at the same time of day nor in the same location for all subjects.

4. The data from this study, the Lindsay study, and the Wright study were collected at different times, in different locales and with different populations. These factors tend to limit generalization to other populations.

5. The methodology of Lindsay and Wright was adhered to as much as possible. Variations may be present which were not controlled, however. This may limit generalization.

Population

The source of the population for this study was public schools in the suburban areas of Columbus, Ohio. As indicated in the design of this study, a pool of school classrooms was designated for use by this researcher with the permission of school officials and teachers.

The number of classrooms visited was twenty-one. The number of subjects studied was the total enrollment in the ten classrooms selected as detailed in the design of the study.

The characteristics of the schools in this study was controlled by restricting the selection process to only those schools which have enrollments of students from middle-income suburban areas in the Columbus, Ohio area. As other demographic variables such as parent status,
siblings, et cetera, were found to be not significant in the Lindsay study, such variables were not controlled nor studied in this investigation. By controlling the school characteristics, the population of subjects was considered to be controlled.

**Instrumentation**

As indicated in the design of this study, there were three instruments used in this study:

1. **Classroom Observation Rating Scale** by Evans
2. **I T Scale for Children** by Brown
3. **Sex-Role Classification of School Objects Task** by Kagan as modified by Wright.

These instruments were used precisely as used in the Lindsay study.

**Statistical Treatment**

The multivariate analysis of variance, $F$-ratio was used to compare the fourth-grade groups in this study. The data on group means from the three studies were subjected to a trend analysis using orthogonal polynomial coordinates.

**Summary**

This chapter has presented the problem studied and presented a rationale for the study. The hypotheses to be tested were presented, the design of the study was discussed, operational definitions of terms were presented, assumptions and limitations were discussed.
The remainder of the study is organized as below detailed.

Chapter II presents a review of related literature and research.

Chapter III presents the methodology used in the study in detail.

Chapter IV presents a summary of the results obtained and an analysis of this data.

Chapter V presents a summary of the study, conclusions and suggestions.

The Appendices present material supplementary to the main body of the study.

The Bibliography presents both references cited and related literature on interest in the study.
CHAPTER 11

REVIEW OF RELATED LITERATURE

In this chapter a review of literature related to the content of this study will be presented. The material in this chapter is organized into three main sections: (1) sex-roles, (2) sex as a factor in schooling, and (3) the open classroom. Any literature review is, by definition, selective; this organization was chosen for this chapter in that it roughly follows the main factors in this study: degree of sex-role preference, sex of subjects, gender classification of school-related objects, and type of classroom environment.

Sex-Roles

1. The Elements of Sex-Roles

The literature on sex-role relates to a concept which is one part of the overall topic of sex and sex differences. Sex is the property by which organisms are classified according to their reproductive function. Sex differences are the factors in which the sexes differ. Sex differences consist of biological or physical sex differences and psychological sex differences. The subordinate concept of sex-role has been theoretically divided into three components: sex-role preference, sex-role adoption, and sex-role identification. Sex-role preference is the behavior the child perceives as desirable for
emulation. Sex-role adoption is the behavior the child demonstrates overtly. Sex-role identification is the assimilation of a given role (Moglia and Abraham, 1973).

Kagan adds to the above the concepts of sex-role identity and sex-role standards. Sex-role identity refers to the covert label applied to the self. Sex-role standards are the attributes that the culture has labeled as masculine or feminine. Kagan postulates that the child must acquire an appropriate sex-role identification (Kagan, 1964).

Sex-role identity is in three types according to Burton and Whiting (1961). Those three types of identity are attributed, subjective and optative. Attributed sex identity consists of statuses assigned to the individual by others. Subjective sex identity consists of the statuses which the individual considers himself or herself to occupy. Optative sex identity consists of the statuses which the individual wishes to occupy. Through socialization the child begins to have congruent attributed, subjective and optative sex identities which are carried on to adulthood.

This set of conceptualizations indicates that the concept of sex-role is a complex one that has been segmented in various ways. The concept of sex-role in general will be treated in this review; recognizing the above treated relationships.

II. Age and Degree of Sex-Role Typing

The acquisition of a sex-role begins quite early in life. The attribute of sex is used by others to differentiate children as early
as birth. There is some research to indicate that the child by the age of two or three begins to distinguish between masculinity and femininity and behaviors considered to be masculine or feminine (Brown, 1958). Sears found that four-year olds had clearly sex-stereotyped preferences in their choice of activities and play areas (Sears, et al., 1965). Emmerich found a lack of definite sex constancy in children of ages 4-6 in that they felt it possible for a pictured person's sex to change with changes in clothing or style of hair (Emmerich, 1971). Thompson and Bentler found, however, that when the 4-6 year old child was asked about his or her own possibility of being a "mommy" or "daddy" when he or she grew up, the responses were overwhelmingly sex-appropriate. The children felt that they could not be the opposite sex parent even if they wished (Thompson and Bentler, 1973).

The age and degree of sex-role typing was reviewed by Fling and Manosevitz (1972) and it was concluded that the conflicting results of earlier studies called for more research. Their research indicated that 3 and 4 year-old children do make sex-typed choices of objects and activities with a nonsignificant trend for boys to be more strongly sex-typed. Ross (1972) found that young boys were much more resistant to playing with sex-inappropriate toys than were girls. Hartup and Moore (1963) found boys to be more likely to avoid sex-inappropriate toys than girls. Maccoby and Jacklin (1974) point out that while conflicting results as indicated above are achieved when projective measures are used to measure degree of sex-role typing, behavioral evidence consistently shows that boys are more strongly sex-typed than are girls starting around age 4 and continuing through adulthood.
The work of Hodelman (1973) confirms these findings with both American and English children of various age levels. It was found that the children studied were more likely to know, recall and prefer same-sex items. Girls were found to be less rigidly sex-stereotyped on these measures. Older children of both sexes were more rigidly stereotyped. It was also found that these sex differences were greater in working class children than in middle-class children. American girls were less sex-typed than English girls.

Brown (1958) postulates that this higher degree of sex-typing in males may be due to factors in our society which make it more acceptable for girls to be cross sex-typed — the "tomboy" — than it is for boys to be cross sex-typed — "sissy".

III. Processes and Theories of Sex-Roles and Sex-Role Identification

Maccoby and Jacklin (1974) point out that psychological sex differentiation occurs through three hypothesized processes: imitation, reinforcement, and self-socialization. These are briefly discussed below.

The imitation of same-sex models by the child is one way in which sex identity and sex-patterned behavior is learned. This may or may not be a conscious or deliberate selective modeling by the child for the patterning of behavior.

Another process in sex-role differentiation is the positive and negative reinforcement of behavior by parents and significant others. The male is rewarded for what these others perceive as proper masculine
behavior. Girls are similarly but oppositely reinforced for feminine behavior. As pointed out previously, boys may feel more pressure to conform to a masculine role than girls feel in conforming to a feminine role.

The third process postulated to explain sex-role differentiation involves the child's cognition and development pattern. Through self-socialization the child develops a concept of what it is to be a boy or girl and to which gender he or she belongs. Through modeling, imitation and differential reinforcement the child's concept of what it is to be a boy or girl is formed and the child behaves in a manner which is consistent with this self-concept of sex-appropriate behavior. These three processes are congruent with and are instrumental in the three basic theories of sex-role concepts and attitudes: the Freudian or psychoanalytic theory, the social learning theory, and the cognitive-developmental theory (Kohlberg, 1966). These three theories are exemplified in the sequence involved in the sex-role identification of the male, as below discussed.

In the Freudian-psychoanalytic view, the male's desire for his mother leads to a fear of the father's retaliation. This fear leads to an identification with the father, leading, in turn, to a male sex-typed identity. Mischel (1966) states that while the greater love and desire for his mother is present in the boy, positive feelings for the father are present which intensify and lead to imitation and subsequent masculine identification.

In the social learning view, the male child's attachment to the father as major rewarder and punisher-controller leads to identification
and modeling of the father. Sex-typed behaviors are seen as those behaviors which elicit differential rewards for males or females. The individual adopts those behaviors which are seen as typical and appropriate for his own sex and which involve the greater set of rewards.

The cognitive-developmental point of view, in contrast, sees the sex-typed identity of the child as the prerequisite of modeling attachment to the father as the same-sex parent. The child organizes elements of his world along sex-role dimensions. This cognitive organization accounts for universals in sex-role attitudes. Outside influence is a means of facilitating the process of sex-appropriate modeling — not the basic determinant of model choice.

The sex-typed identity of the child combines with the egocentric tendency of children to positively value objects and activities which are like the self. The child will prefer to engage in activities and acquire objects which enhance the self through being viewed as sexually alike and, therefore, appropriate (Kohlberg, 1966).

Whichever theoretical framework is adopted, all theorists would seem to agree that sex-role development and acquisition is interactive, no matter at which point the sex-typed identity is acquired. The biological-genetic factors involved interact with the cultural-environmental factors in the development of the child’s sex-role concepts and attitudes (Maccoby and Jacklin, 1974).

In summary, this section of the chapter has presented an overview of the concept of sex-roles with particular emphasis on sex-role identification and its acquisition. The purpose of the overview has been to better define the factors and processes which contribute to
the development of sex-role in the school-age child which is the subject of this study.

**Sex as a Factor in Schooling**

Moglia and Abraham (1973) report much of the research on the relationship of sex-role identity and its relationship to school achievement and state that "...findings have great significance for educators because of indications that strong sex-role development is related to many forms of successful achievement in school (p. 115)." Grob (1972) is reported to have found that girls with a high sex-role preference tend to be higher achievers in fifth-grade SRA standardized tests. Other studies have found that elementary school children with high sex-role preference also seem to be high in reading and arithmetic achievement (Anastaslow, 1965 and Sears, 1970). Garal and Schelinfeld (1968) report studies which indicate that girls receive better grades than boys although there was no difference found in intelligence. It was hypothesized that this difference may be due to the girls' higher conformity to classroom rules. It must be remembered, however, that grading and achievement are not synonymous.

There is some evidence to indicate that teachers' evaluations of certain behaviors may influence children's classroom performance; especially in the case of boys. As reported by Lindsay (1973), various studies have indicated greater aggression in boys and that in school boys were tough minded, reacted negatively to learning tasks and school authority, were impatient, and less appreciative of teachers. This makes for poor adjustment in the typical elementary school classroom.
as reported by Wright (1975). Sadker and Sadker (1974) have indicated that boys receive more teacher reprimands, more verbal information about subject matter, and participate in child-teacher verbal interaction more often than girls. Boys received more disapproving and control messages than girls. Etaugh and Hughes (1975) found that male and female teachers in both lower-class and middle-class neighborhoods approved of the female sex-typed behavior of dependency more often than the male sex-typed behavior of aggression in both boys and girls. Etaugh and Harlow (1973) found that boys and girls that they studied were similar in behaviors but that boys were scolded more by both male and female teachers. The boys and girls in this study rated same-sex teachers more positively than opposite-sex teachers. The major percentage of elementary school teachers, of course, are female. This seems to reinforce the point of view that school is a more femininely appropriate activity than a masculinely appropriate activity.

Another explanation for boys' problems in school is their attitude toward failure, which is part of the environment in many elementary school classroom. Caplan and Kinsbourne (1974) note that the fact that boys have more frequent learning difficulties than girls is explained by boys having a more negative emotional response to failure than do girls. Stein, Pohlu and Mueller (1971) found that achievement motivation was positively influenced by the individual's perception of the sex-role appropriateness of the task.

The basic abilities of boys and girls would seem to be related to their achievement and attitudes toward schools and schooling. From a maze of findings Maccoby and Jacklin (1974) have concluded that the
sexes differ in: (1) the female's greater verbal ability, (2) the male's greater visual-spatial ability, (3) the male's greater mathematical ability, and (4) the male's greater aggression. Of these differences, however, only the difference in aggression is found in the elementary school years. Boys' aggression is found to be greater at all ages. The roots of later sex differences in ability may be found in the sex-role standards of children. Stein and Smithells (1969) found that both males and females perceived reading activities as being feminine and arithmetic activities as being masculine. Much research has been done on reading and arithmetic achievement with the results, in general, indicating females' greater reading achievement. (Anastas, 1958; Dwyer, 1973; Lewis, 1968; Maccoby, 1966). Dwyer (1974) found that for 385 children in grades 2, 4, 6, 8, 10 and 12, sex-role standards contributed significantly in the variability in reading and arithmetic achievement test scores. The results of the study, it was suggested by Dwyer, indicate that reading and arithmetic sex differences are more a function of the child's perception of them as sex-appropriate or sex-inappropriate than the child's biological sex, individual sex-role preference, or attitude toward the subjects. Schickedanz (1973) found that for third-grade boys the appropriate sex-typing of high interest reading materials in various subject matter areas was significantly related to greater reading comprehension achievement.

There have been numerous studies which have suggested that schooling and school materials contribute to sexual stereotyping. Saarlo (1973) conducted research on sex-role stereotyping in three major areas: elementary school basal readers, educational achievement
tests, and differential curricular requirements for males and females. Male characters were found to be more in evidence and to be more powerful and able. The conclusions reached were that: diversity was needed in the materials' presentation of males and females; more flexibility was needed in activities presented and role models depicted; and a more tolerant definition of sex-role was needed in the materials.

Gunderson (1975) notes that sex-role stereotyping in trade and text books can be seen in the use of masculine nouns twice as often in books surveyed. In order to avoid the biased sexual stereotyping noted and to allow girls to reach their full potential Gunderson calls for educational materials to be realistic in presenting contributions of women, the presentation of both males and females as equally able and in equally popular life situations.

Sheridan (1975) studied textbooks in use in the South Bend, Indiana schools and found a definite masculine bias. The Holt basal readers showed males three times as frequently as girls. The Holt mathematics tests pictured 75 percent of problems being solved by males. The Silver Burdett speller had twice as many masculine pronouns as feminine pronouns. The Silver Burdett social studies texts showed males in adult roles three times as often as females and in a greater variety of roles. Changes in the texts and in public awareness programs were recommended to rectify these inequities.

Schmaljohn (1974) surveyed elementary career education materials including books, filmstrips and prints in use in the Colorado Exemplary Career Education Project. Illustrations were analyzed and a definite masculine bias was found. The materials did not: (1) show an equal
distribution of occupational roles; (2) give equal representation of the sexes; (3) show an equal division of dominant roles; (4) give equal representation of the sexes as active rather than passive, and; (5) show life behaviors equally divided. It was felt that this masculine bias needed to be eliminated in order to increase options for all people and to avoid the limitations and restrictions in options fostered by sex-role stereotyping.

These works agree with similar surveys of school materials done by others (Hagar and Deffenbaugh, 1974; Weitzman, et al., 1972; Key, 1971; and Levy, 1972).

It is fairly clear that schools perpetuate and possibly polarize sex stereotyping (Wright, 1975). This stereotyping, as Wright points out, is a negative factor in education and needs action based on concern for "...de-emphasizing the effects of the school in continuing sex-typing from external factors." p.57.

In summary this section of the chapter has presented an overview of sex-related factors in schooling. The relationships of sex-roles and school achievement were treated and it was seen that sex-typing and sex-typed behaviors have definite effects in school adjustment and achievement. The different basic abilities brought to the school environment and the possible relationship of these abilities to school achievement were discussed. Finally, the contributions of schooling in perpetuating sexual stereotypes was noted with recommendations made to lessen this negative role.
In this section a discussion of the open classroom educational alternative will be presented. This will be preceded, however, by a brief treatment of the conventional classroom.

In recent years much interest has been shown in the concept of educational alternatives. These alternatives have been presented as changes from what is known as the "traditional" or "conventional" classroom. The term "traditional," however, has itself taken on special meaning to describe an educational alternative and will not be used hereinafter in order to avoid ambiguity. Ruedi and West (in Wright, 1975) describe the typical conventional classroom as having these characteristics:

1. Grouped by grade level.
2. All pupils work on the same thing.
3. All pupils work on tasks assigned by the teacher.
4. The teacher instructs the entire group.
5. Every student is expected to accomplish the same tasks.
6. Desks face the teacher or blackboard.
7. Quiet is maintained.
8. Only the teacher or one student at a time may speak.
9. Tests are given to all students over the same material at the same time.
10. Standards are set by the teacher.
11. Clear expectations are made for all students in the group.
12. The teacher has specific goals for the year's work.
In the conventional classroom the assumption is made that children need authority figures, clearly structured curricula, and strict supervision. Frequent testing is conducted over the curriculum elements and the child is expected to correct learning deficiencies. The test is considered the criteria of mastery.

As an alternative to the conventional type of classroom described above, the open classroom has received much interest in recent years. The writings of Silberman, Holt, Kohl, Barth, Rathbone, Featherstone, Porrone, King, Frazier, and others attest to the enthusiasm of its proponents. Most of the literature on this type of classroom environment is philosophical and descriptive. It is termed as "open," "informal," or "modern" in various sources. The term open will be used hereinafter to avoid ambiguity.

King (1974) defines this alternative through the following summary statements:

1. The goals are humanistic inasmuch as the total development of the child is central.
2. The child is conceived as an active agent in his own learning, bringing his individuality and learning style to the task.
3. The curriculum is planned and the classroom provisioned with the child's needs and potential for learning in mind.
4. Learning comes about as children find their own questions in real, firsthand experience and have the opportunity to pursue their investigations in the school setting.
5. Materials, conditions and resources are such that the school facilitates and supports the learning child in his inquiry and
allows him to test out and validate his findings among his peers.

6. The classroom environment reflects the teacher's degree of awareness of herself as a facilitator of learning and reveals her understanding of and confidence in the child as a learning organism.

7. The teacher's insight into the potentialities for learning in ordinary materials and her ability to see how basic concepts can be acquired through the exploration and use of materials are reflected in the provisioning and organization of the classroom.

(King, 1974, p. 7-8)

Spodok (1971) cautions that open education is not easily defined in that it may not follow a single specific dogma. While this caution is of value, the definition of King seems worthy of consideration.

The roots of open education are seen by Perrone (1972) as extending for their philosophical and psychological basis back to the writings of Rousseau, Tolstoy, Pestalozzi, Montessori, Froebel, Dewey, Bruner, Holt, Featherstone, Kohl, Dennison, Herndon, and Plaget. He describes the practices as being present in the progressive education movement in the 1920's and '30's and in the earlier "little red schoolhouse". The re-establishment of the viability of these practices can be attributed to the English influence which was most strongly felt through the issuance of the English Plowden Report which regenerated new interest in this alternative in the United States. As Perrone writes, "The bandwagon has been gaining momentum since" (Perrone, 1972 pp. 12).
The "promise" of open education is great but problems are present also. Perrone saw the promise in the below listed factors:

1. Classrooms that:
   a. foster initiative and responsibility.
   b. address themselves to what is known about children, childhood, and learning.
   c. extend children's intellectual growth.
   d. prepare children for dealing confidently with new problems.
   e. are more humane.

2. A re-examination of educational assumptions.

3. A re-definition of children and their learning.

4. A re-establishment of a school-community tie.

5. Better use of human resources -- children, teachers, parents, the community.

6. Smaller schools more suited to be learning environments.

The Problems are seen as:

1. The need for time to develop good programs of open education.

2. The possibility of hasty errors due to ignoring the above need for time.

3. The need for structures necessary for children to learn.

4. The need for a support system.

5. A need and concern for continuity. (Perrone, 1972, pp.27-35)

Research on the open classroom educational alternative in the United States is far from catching up with theorization, description and practice. Barth (1972) points out that there is little research which indicates the effects of open education upon the development of
children's thinking, attitudes, and behaviors as compared with the effects associated with more conventional education.

Ruedl and West (1972) found no significant differences in autonomy and interpersonal adequacy when open and conventional education fourth, fifth, and sixth-grade subjects were studied. While sixth-grade conventional education students scored significantly higher in academic areas, open education students indicated that they felt school to be interesting and enjoyable.

Silberman (1970) summarized research comparing the two types of classroom environments and found that no significant differences were present in the mastery of conventional school subjects. He did find advantages to the open education students in initiative, critical thinking, written expression, and ability to work independently.

Klaff and Docherty (1975) found that there were no significant differences in self-concept and attitudes toward school when open and conventional kindergarten, first and second-grade children were compared. They also found that "self-selection", or the parental attitude toward open education did not significantly affect the child's self-concept or attitude toward school. These findings were in conflict with the findings of Ruedl and West (1973) which indicated more positive attitudes toward school among open classroom subjects. Also the research of Minuchin (1965) concluded that children in open schools had a better self-concept and attitude toward school. The results are conflicting and more substantiation is needed in this area.

Lindsay (1973) assessed the sex-role perceptions of school objects and, assumedly, of school in general. She found that second-grade
boys in open classroom environments viewed school as a more sex-appropriate activity than did second-grade boys in conventional classrooms. She concluded that the environment was related to the child's perception of the sex-role appropriateness of school. Wright (1975) was unable to satisfactorily replicate these findings, although a nonsignificant trend was present when kindergarten and first-grade subjects of both sexes were studied.

The open school has as one of its objectives the provision of appropriate learning situations (King, 1974). Kagan states that, "It is reasonable to assume that the child's sex-role classification of the school environment governs the degree of motivation he will invest in mastery of academic tasks. For the child should be more highly motivated to master tasks that he perceives as sex-appropriate than those he views as representative of the opposite sex" (Kagan, 1964, p. 1051). The findings of Lindsay would seem to indicate that the open classroom is a more appropriate environment for boys although the weak findings of Wright do not strongly support this statement.

Walberg, Thomas, and Evans worked to develop an operational definition of open education. They attempted to define the essential features of open education, to develop concrete indicators of these features, to check the validity of these features and indicators with open education authorities, and to compare their results with other sources. Using the theoretical framework of others, Walberg and Thomas formulated eight themes around which the student-child and child-child relationship is formed in the open education concept. These are:

1. provisions for learning,
2. humaneness, respect, openness, and worth.
3. diagnosis of learning events.
4. instruction, guidance and extension of learning.
5. evaluation of diagnostic information.
6. opportunities for professional growth.
7. self-perception of teachers.
8. assumptions about children and the learning process.

A group of 106 characteristics of open education classrooms was formulated based on these themes. This list was submitted to 43 authorities in the field and a 90 item revised list was formulated. From this list Evans devised a 50 item observational checklist which was found to be effective in distinguishing between open and conventional classroom environments. The results indicated that the open classroom could be effectively defined and identified.

In summary, this section of the chapter has described the open classroom educational alternative and has discussed research findings on comparisons between open environments and conventional environments.

Summary

This review of literature has presented a body of research and the theory relevant to this study. The chapter was divided into three sections: Sex-Roles; Sex as a Factor in Schooling; and the Open Classroom.

The review has indicated that a study which further investigates the impact of contrasting learning environments on the sex-role perception of school as measured through the sex-role classification of
2. Humaneness, respect, openness, and worth.
3. Diagnosis of learning events.
4. Instruction, guidance and extension of learning.
5. Evaluation of diagnostic information.
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The review has indicated that a study which further investigates the impact of contrasting learning environments on the sex-role perception of school as measured through the sex-role classification of
school-related objects would be a valuable addition to the body of knowledge already accumulated.
CHAPTER III

METHODOLOGY AND PROCEDURES

This chapter presents the procedures followed in this investigation. The hypotheses, research design, instrumentation, study population selection procedures, preliminary data results, and selection of data analysis methodology are described in the remainder of this chapter.

Hypotheses

The following null hypotheses were tested in the study:

Hypothesis 1: There is no significant difference (p < .05) attributable to type of classroom environment between selected male and female fourth-grade subjects enrolled in open and conventional education classrooms in their perceptions of the gender of school-related objects.

Hypothesis 2: There is no significant difference (p < .05) attributable to sex of subject between selected male and female fourth-grade subjects in their perceptions of the gender of school-related objects.

Hypothesis 3: There is no significant difference (p < .05) attributable to degree of masculine orientation between selected male and female fourth-grade subjects who show high and those who show low masculine sex-role preference in their perceptions of the
gender of school-related objects.

Hypothesis 4: There is no significant difference (p. < .05) attributable to the interaction of type of classroom environment and sex of subject between selected male or female fourth-grade subjects enrolled in open or conventional education classrooms in their perceptions of the gender of school-related objects.

Hypothesis 5: There is no significant difference (p. < .05) attributable to the interaction of type of classroom environment and degree of masculine orientation between selected male and female fourth-grade subjects enrolled in open or conventional education classrooms and showing high or low masculine sex-role preference in their perceptions of the gender of school-related objects.

Hypothesis 6: There is no significant difference (p. < .05) attributable to the interaction of sex of subject and degree of masculine orientation between selected male or female fourth-grade subjects and showing high or low masculine sex-role preference in their perceptions of the gender of school-related objects.

Hypothesis 7: There is no significant difference (p. < .05) attributable to the interaction of the type of classroom environment, sex of subject, and degree of masculine orientation between selected fourth-grade subjects in their perceptions of the gender of school-related objects.

Hypothesis 8: There is no significant linear trend (p. < .05) among the means of groups of selected kindergarten, first, second, and fourth-grade subjects in their perceptions of the gender of school-related object.
Hypothesis 9: There is no significant quadratic trend (p. < .05) among the means of groups of selected kindergarten, first, second and fourth-grade subjects in their perceptions of the gender of school-related objects.

Hypothesis 10: There is no significant cubic trend (p. < .05) among the means of groups of selected kindergarten, first, second, and fourth-grade subjects in their perceptions of the gender of school-related objects.

Research Design

The two areas of interest in this study involved a replication of the Lindsay and Wright studies and a trend analysis of the data in this study and the prior studies. Thus, hypotheses 1 - 7 are typical of descriptive research and hypotheses 8 - 10 are typical of developmental research. To test hypotheses 1 - 7, a 2 x 2 x 2 factorial design was devised. Hypotheses 8 - 10 were tested by a trend analysis using orthogonal polynomial components.

Figure 1. represents the 2 x 2 x 2 factorial design used to test Hypotheses 1 - 7. The first factor was the two types of classroom environments, open and conventional, as determined by the Classroom Observation Rating Scale. The second factor was the sex of the subjects. The third factor was the two levels of masculine identification, high and low, as determined by the IT Scale for Children.

Figure 2 parts A, B and C represent the three types of trends of mean scores on the Sex-Role Classification of School Objects Task tested for in the test of Hypotheses 8 - 10. A linear trend paradigm
Figure 1. A 2x2x2 Factorial Design

is represented by Figure 2A and was tested for in Hypothesis 8. A quadratic trend paradigm is represented by Figure 2B and was tested by Hypothesis 9. A cubic trend paradigm is represented by Figure 2C and was tested by Hypothesis 10.

Twenty-one fourth-grade classrooms in two school districts were made available for use in the study. The twenty-one classrooms were selected on the basis of their willingness to be included in the study, their similar socio-economic status, their designation as more typically conventional or more typically open in type of classroom environment, and their being in schools where at least two classrooms could be studied. Each of these classrooms was visited on three separate dates for observation and rating by use of the CORS. The total CORS scores
Figure 2. Examples of Polynomial Functions

A. Linear Trend: Significant Slope

B. Quadratic Trend

C. Cubic Trend
from the three visits were used to select the five most typically open education classrooms and the five most typically conventional education classrooms; the five greatest scores designating the most typically open education classrooms and the five lowest scores designating the most typically conventional education classrooms among those studied. The ITSC was administered to the 244 eligible subjects enrolled in these ten classrooms. A subject was considered to be eligible for this study if he or she was age 9.25 to 10.75 years, had not been retained in any grade including the fourth-grade, and had been a member of the studied classroom for the current year. Half of those subjects were tested by the male investigator and half were tested by his female assistant. The study sample was selected from these tested subjects on the basis of high and low test scores of degree of masculine orientation on the ITSC. The total study sample was 120 -- 60 male subjects and 60 female subjects. These subjects were assigned to eight subgroups according to the results of this preliminary data gathering process. The eight subgroups are listed below:

15 high male subjects enrolled in conventional classrooms,
15 high female subjects enrolled in conventional classrooms,
15 high male subjects enrolled in open classrooms,
15 high female subjects enrolled in open classrooms,
15 low male subjects enrolled in conventional classrooms,
15 low female subjects enrolled in conventional classrooms,
15 low male subjects enrolled in open classrooms,
15 low female subjects enrolled in open classrooms.

The 120 subjects in the eight subgroups were studied through the administration of the Sex-Role Classification of School Objects Task. One half of the subjects were administered the task by the female researcher and one-half were administered the task by the male researcher. The results of this phase of the study are detailed in
Chapter IV of this study.

The steps in the data collection procedures described above are shown in schematic form in Appendix A, Flow Chart for Data Collection Procedures.

A multivariate analysis of variance, $F$-ratio was used to analyze the data gathered, permitting the testing of the main effects and interaction effects of the three variables: type of classroom environment, sex of subjects, and degree of masculine sex-role preference.

The mean scores of masculine sex-role preference as measured by the Sex-Role Classification of School Objects Task of the subgroups in this study and of the subgroups in the Lindsay and Wright studies were subjected to a trend analysis using orthogonal polynomial components. The results of this phase of the study are detailed in Chapter IV.

**Instrumentation**

In this section the three instruments used in the study will be discussed. These instruments were used in stages to select the most typically open education and most typically conventional education classrooms, to select the subjects to be studied, and to collect the dependent variable data for the study. These instruments were the Classroom Observation Rating Scale by Evans, The It Scale for Children by Brown, and a modified form of the Sex-Role Classification of School Objects Task by Kagan. These instruments are reproduced in Appendices B, C, and D, and will be discussed in the following pages.
I. Classroom Observation Rating Scale

The Classroom Observation Rating Scale was developed by Walberg, Evans and Thomas in 1971. A review of literature on open education was performed and underlying assumptions were identified. Eight major themes in learning and child development were identified as being unique to open education and on hundred-six statements within these themes which were descriptive and characteristic of open education environments were formulated. These statements were critiqued by prominent open educators and a fifty item classroom observation scale was devised from their reactions.

The scale is a four-point continuum with the weighted value of four being given by the observer to the observations most typical of open education environments and the value of one being given to the observations least typical of open education environments. The possible scores, therefore, range from fifty to two-hundred. The degree of openness of a classroom is determined by finding the total of the scaled item values.

The validity and the reliability of the instrument was studied by Walberg and Thomas (Walberg and Thomas, 1972, pp. 197-208). The validity study found no significant difference at the .05 level between American and British open schools but a significant difference at the .05 level when the open schools and the conventional schools were studied.

The reliability of the instrument measured by Cronbach's alpha method ranged from \( r = .848 \) to \( r = .916 \) between internal and external observers. The standard error of the mean was: \( SE_m = 5.26 \). The mean
score of the United States conventional classrooms was 117.46 with a standard deviation of 19.59. The mean score of the United States open classrooms was 163.17 with a standard deviation of 14.80. The mean score of the British open classrooms was 160.80 with a standard deviation of 13.07. The findings of these studies seem to support the use of the scale to differentiate open education classrooms from conventional education classrooms and was used by this researcher to identify the five most typically open classrooms and the five most typically conventional classrooms for further study. See Appendix B.

II. It Scale for Children

The It Scale for Children by Brown is an individually administered projective test developed in 1956 and is intended as a sex-role preference scale. It consists of thirty-six picture cards of various figures, objects, and activities which are socially and traditionally defined and identified with either the masculine or feminine roles in contemporary American society (Brown, 1956). See Appendix C.

The scale is administered by the subject being shown a picture card of "It", a sexless stick figure, and is told that he or she is to play a game by choosing things that "It" would choose from the series of sexually stereotypic items. Being a projective test, it assumes that these choices, ostensibly made by the subject for "It", are the choices that the subject would make for himself or herself.

A criticism of the ITSC has been that the stick figure is perceived by subjects as being a male rather than as a sexless figure. This criticism has been supported by the work of Hartup and Zook (1960),
Lansky and McKay (1963, 1969), Sher and Lansky (1968) and Thompson and McCandless (1970). Because of these criticisms, the administration of the instrument was altered by Hartup and Zook so that the figure of "It" was concealed until after the subjects' choices had been made. More sex-appropriate choices have been achieved using this form of the test by other researchers as well (Lansky and McKay, 1963); therefore this form was used by this investigator.

The scale is scored by assigning weighted values for each of the choices made by the subject. The highest possible score value is eighty-four, which represents the most masculine score. The lowest possible score value is zero, which represents the most feminine score. The range of possible scores, therefore, is from zero to eighty-four. A score of forty-two indicates equality of sex-role preference with scores greater than forty-two representing more of a masculine orientation and scores less than forty-two representing more of a feminine orientation in sex-role preference choices. The Mental Measurement Yearbook lists the reliability of the ITSC satisfactory: $r = .71$ for boys and $r = .84$ for girls using a test-retest interval of one month format (Buros, 1965).

III. Sex-Role Classification of School Objects Task

The Sex-Role Classification of School Objects Task was developed by Kagan for a study of how children view common classroom objects. Second and third grade students were subjects of an investigation to determine whether they would have any preference for labeling school objects as masculine or feminine. In devising the task Kagan used the
following premises:

1. The experimental strategy of concept transfer can be used to determine the degree to which the child regards school as masculine or feminine.

2. The method of teaching the child a new label to represent a concept of construct is a valid tool in the measurement of personality related variables.

3. The child's responses on the task will be determined by his or her perception of which gender is associated with the pictured objects.

4. The child has a symbol system and will usually behave toward a new situation in a manner that is congruent with the symbol system label applied to that situation.

Kagan felt that it was reasonable to make the following assumptions about the child's classification of school objects:

1. The child's sex-role classification of school objects will govern the degree of motivation he or she will invest in the mastery of tasks in school.

2. The child will be more highly motivated to master tasks that he or she perceives as sex-appropriate than those viewed as representative of the opposite sex (Kagan, 1964).

The task which was devised based on these premises and assumptions consists of two phases — a learning phase and a transfer phase. Both phases are individually administered.

The learning phase consists of twenty-one picture cards of objects typically associated with the concepts of male, female, and
farms respectively. The pictures in the series are presented to the subject until ten consecutive correct classification responses using the nonsense syllables are elicited. The correct response was told to the child if help was needed until the response criterion level was met.

The transfer phase consists of nineteen pictured objects some of which are school-related objects. The series of picture cards are shown to the subject and responses are elicited. No praise or answer is given to the responses made by the subject on these items. The researchers record the responses.

Lindsay (1973) and Wright (1975) used this task in a modified form in their studies. Items were added to determine how they would be classified by the child in the learning phase. The modified form of the task was used in this study. See Appendix D.

The scores are the number of masculine responses on the pictured items in the transfer phase. It is assumed that more or less masculine responses on the pictured items indicate a more or less masculine perception of school objects.

Research Assistant

The investigator in this study was assisted by a female doctoral candidate at the Ohio State University with a Master's degree in education and thirteen years of elementary school classroom teaching experience. This assistant was trained in the use of the instruments by the primary investigator through a process of reading, direct training, and field experience.
Study Population

In this section the procedures followed in the designation and selection of schools, classrooms and students that were used in the study will be described. All of the research was performed in the schools of Franklin County, Ohio, in the Ohio State University area and, therefore, the data collection process was governed by the procedures of the Ohio State University College of Education Field Experience Office.

Copies of the research proposal and a three-page prospectus were submitted to the Field Experience Office. These items were submitted to five school districts in Franklin County, Ohio, which were designated as being appropriate for the study. Two of these districts granted permission for the research to be performed in their schools during the months of April and May, 1976.

Meetings with school administrators of the two identified school districts were held and seven schools were identified as appropriate for the study. The criteria for selection of the schools are detailed below.

1. The schools were designated as being similar in socio-economic status. The schools selected were those which were not eligible for federal or state assistance based on their percentage of low-income or Aid to Dependent Children eligible families. All of the schools were located in middle income residential communities with the majority of homes valued from $25,000 to $35,000. The racial composition of the schools were 90 - 95% white.
2. The principals and teachers were willing to permit this research to be conducted in their schools and classrooms.

3. These schools contained classrooms which were designated to be either more typically open education classrooms or more typically conventional education classrooms and were organized as heterogeneous fourth-grade units.

4. There were two or more appropriate classrooms in each of the schools that were studied.

The subjects studied were members of the classroom units meeting the above criteria who were 9.25 to 10.75 years of age and had not been retained in the fourth-grade nor any previous grade.

Preliminary Results

1. Selection of the Study Population

In this section the results of the data collection stages used in the selection of the study population will be described. The designation of the ten classrooms, five open education and five conventional education, to be included in the study and the assignment of subjects into groups based on the subjects' degree of masculine sex-role preference, high and low, were stages which preceded the data collection of primary interest in this study. The particular instruments used to select the study population, the Classroom Observation Rating Scale and the IT Scale for Children are described in the section on instruments elsewhere in this chapter. The stages in the collection process are described in the section on research design elsewhere in this chapter and represented in flow chart form in Appendix A.
All twenty-one of the classrooms available for this study were visited during April and May, 1976. During these visits the Classroom Observation Rating Scale was used to determine the five most typically open education classroom environments and the five most typically conventional education classroom environments of the twenty-one observed classrooms. Three observations of from ten to twenty minutes were made of each of the twenty-one classrooms. The results of the observational visits are shown in Table 1.

Of the possible total of 600 points for the three visits, the greatest total score was 439, the mean of which is 146.33. The range of the mean scores was 58.66. The overall group mean was 116.03 with a standard deviation of 17.38. The mean of the five greatest scoring classrooms, which were designated as the most typically open education classrooms, was 140.20. The mean of the five least scoring classrooms, which were designated as the most typically conventional education classrooms, was 94.47. The range between the means of these scores is 45.73.

Table 2. represents a comparison among the means, standard deviations, and range between open and conventional education groups for this study sample population, the Wright study sample populations, the Lindsay study sample population, and the Welborg-Thomas validation study sample population. The data on the means of the sample populations gathered in this study are in all cases, one or more standard deviations below the data on the means gathered in other studies, suggesting that the groups are not comparable. It is reasoned that this difference was due to the grade level investigated in this study, in
<table>
<thead>
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<th></th>
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<th>Third</th>
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<td>263</td>
<td>87.67</td>
</tr>
</tbody>
</table>

200 maximum points per observation possible
600 maximum points possible for total of three observations

* represents high-scoring classrooms, designated "open"
+ represents low-scoring classrooms, designated "conventional"

Range = 58.67
Mean = 116.0371
Standard Deviation = 17.379

that some of the Classroom Observation Rating Scale items were not
evident at the fourth-grade level investigated in this study. It is
also recognized that both the classrooms available for this study and
the concepts of both open and conventional education may have been more
TABLE 2
DEGREE OF OPENNESS: STUDY POPULATION COMPARED TO PREVIOUS STUDIES
MEANS, STANDARD DEVIATIONS AND RANGE BETWEEN MEANS

<table>
<thead>
<tr>
<th>Study</th>
<th>Open</th>
<th>Conventional</th>
<th>Range Between Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walberg-Thomas Study</td>
<td>Mean 163.17</td>
<td>117.46</td>
<td>45.71</td>
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<tr>
<td></td>
<td>S.D. 14.08</td>
<td>19.59</td>
<td></td>
</tr>
<tr>
<td>Lindsay Study</td>
<td>Mean 161.62</td>
<td>117.32</td>
<td>44.3</td>
</tr>
<tr>
<td></td>
<td>S.D. 7.75</td>
<td>7.06</td>
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<tr>
<td>Wright Study Kindergarten</td>
<td>Mean 161.62</td>
<td>119.73</td>
<td>41.53</td>
</tr>
<tr>
<td></td>
<td>S.D. 9.04</td>
<td>5.47</td>
<td></td>
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<tr>
<td>Wright Study First Grade</td>
<td>Mean 159.46</td>
<td>111.80</td>
<td>47.80</td>
</tr>
<tr>
<td></td>
<td>S.D. 6.35</td>
<td>5.28</td>
<td></td>
</tr>
<tr>
<td>Harrison Study</td>
<td>Mean 140.20</td>
<td>94.47</td>
<td>45.73</td>
</tr>
<tr>
<td></td>
<td>S.D. 6.46</td>
<td>5.24</td>
<td></td>
</tr>
</tbody>
</table>

conservative than those previously studied, resulting in lower scale scores for each. Rater differences may also account for some of the differences in scores. The similarity in the ranges between the two groups, open and conventional education, indicates that the instrument did distinguish between the two types of classroom. The range of the Wright kindergarten was the least, 41.53. The range of the Wright first-grade study was the greatest, 47.80. The range of this study was 45.73, the median range. The grouping and designation of classrooms as being open or conventional was therefore accepted as sufficiently differentiating between types of classrooms when the ranges between types of classrooms are considered.

The It Scale for Children was administered to 244 pupils, 121 in open classrooms and 123 in conventional classrooms, enrolled in the
classrooms selected as detailed above. The distribution of the scores are indicated in Table 3, below. The scores determined the assignment of subjects to the eight subgroups in the study as indicated in the research design.

**TABLE 3**

**SCORE DISTRIBUTION OF THE IT SCALE.**

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<th>Conventional Male</th>
<th>Conventional Female</th>
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<td>1</td>
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<td>1</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>4</td>
</tr>
</tbody>
</table>

Totals of subjects: 61 60 60 63
by groups: 121 123
The sample subjects were chosen from the total population of subjects on the basis of those who scored highest and lowest in each subgroup. In the case of ties, the subject from the classroom with the more extreme classroom environment, as measured by the Classroom Observation Rating Scale, was selected. If this did not resolve the tie, the subject was selected alphabetically on the basis of last name, the subject whose last name was first alphabetically being chosen over others. The means of the subgroups are indicated in Table 4.

**TABLE 4**

SUBGROUP MEAN SCORES ON ITSC

<table>
<thead>
<tr>
<th></th>
<th>High Masculine</th>
<th>Low Masculine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open Male</td>
<td>84.00</td>
<td>56.47</td>
</tr>
<tr>
<td>Open Female</td>
<td>82.67</td>
<td>5.07</td>
</tr>
<tr>
<td>Conventional Male</td>
<td>84.00</td>
<td>53.40</td>
</tr>
<tr>
<td>Conventional Female</td>
<td>83.80</td>
<td>.87</td>
</tr>
</tbody>
</table>

The 120 subjects selected through the process detailed above were given the Sex-Role Classification of School Objects Task, as indicated in the research design. The obtained data are presented in Chapter IV, which follows.

**Analysis of the Data**

There were two options for the analysis of the data collected in the study inasmuch there were two different data analysis procedures...
followed in the Lindsay and Wright studies. Lindsay chose a nonparametric method using the Mann-Whitney U test for data analysis in her study of second-grade male subjects. Wright chose a parametric method using the analysis of variance for data analysis in her study of kindergarten and first-grade subjects. While other methods could have been chosen for this investigation, the above two options were considered most viable in that this study replicated studies using those approaches.

The nonparametric Mann-Whitney U test was chosen by Lindsay due to her reluctance to accept her data as interval data. This reluctance was not shared by Wright in her choice of the parametric analysis of variance approach. This investigator was willing to accept the data as being interval data in that the raw scores indicated a quantitative measure, that is, the number of masculine choices from the total set of cards in the SRCSTOT. Moreover, this investigator is inclined to be pragmatic and share the view of Kerlinger that often even ordinal data can be assumed to be interval data for analysis purposes. As Kerlinger states "...the results we got from using scales and assuming equal intervals are quite satisfactory" (Kerlinger, 1973, p.440). It is believed by this investigator that with conservatism in data interpretation the assumption of equality of intervals may be safely made. As Kerlinger states:

In the state of measurement at present, we cannot be sure that our measurement instruments have equal intervals. It is important to ask the question: How serious are the distortions and errors introduced by treating ordinal measurements as though they were interval measurements? With care in the construction of measuring instruments, and especially with care in the interpretation of the results, the consequences are evidently not serious (Kerlinger, pp. 440-441).
In addition to a willingness to accept the data as acceptable for parametric analysis, this investigator chose the parametric approach due to the greater statistical power of this approach. As Kerlinger states, unless data assumptions are flagrantly violated "...It is usually unwise to use a nonparametric statistical test in place of a parametric one. The reason for this is that parametric tests are almost always more powerful than nonparametric tests" (p.287). He further states the "In brief, in most cases in education and psychology, it is probably safer -- and usually more effective -- to use parametric tests rather than nonparametric tests" (p. 288).

In summary, the multivariate analysis of variance was chosen to analyze the data collected in the study because of its use in one of the studies which were replicated, a willingness to accept the data as Interval data, and a desire to achieve the greater power of the parametric approach.

The data were analyzed in two stages. For the first problem investigated, the replication of the studies of Lindsay and Wright, the data were analyzed using the multivariate factorial analysis of variance method. The data were further analyzed using the orthogonal polynomial coordinates method of trend analysis for the second problem, the investigation of trends in the present study and the prior studies. The facilities and programs of the Ohio State University Instructional and Research Computer Center were used in both stages.

The factorial analysis of variance is the statistical method that analyzes the independent and interactive effects of two or more independent variables on a dependent variable (Kerlinger, 1973, p.245).
Analyses of variance are performed on the main effects and interaction effects of the independent variables and an F-ratio is obtained for each. The F-ratio compares the variance due to the experimental effect, the between groups variance, against the measure of chance error, the within groups variance. The obtained F-ratio is compared with entries in a statistical table at the specified level to determine its significance (Kerlinger, 1973, p. 220-226).

In trend analysis using orthogonal polynomial coefficients the overall trend in treatment group means is considered. The group means are plotted and comparisons are made to determine whether the resultant plot has a slope other than zero, whether the plot is fitted by a straight line, or how the shape of the plot may be described. The variability of the treatment means may be due to chance variability or to trends in the population. A series of F-ratios are obtained by dividing the plot sums of squares by the error term. The F-ratio can then be used to determine whether the plots vary significantly due to trends in the population (Myers, 1966, p.348-361).

Summary

In this section the procedures followed in this investigation have been described in detail.

Chapter IV follows and presents the data collected and data analysis of these results.
CHAPTER IV

SUMMARY OF DATA COLLECTED AND ANALYSIS OF THE RESULTS

In this chapter the data collected in this study will be summarized and reported. The statistical analysis of the data will also be reported and the results will be discussed.

Ten hypotheses were devised to investigate the areas of interest in this study. A $2 \times 2 \times 2$ factorial design using multivariate analysis of variance was devised to test seven of these hypotheses. A strategy using orthogonal polynomial components was utilized to test the remaining three hypotheses. All of the hypotheses were tested at the .05 level of significance. The facilities of the Ohio State University Instruction and Research Computer Center were utilized in the statistical analysis of the data collected.

The $2 \times 2 \times 2$ factorial design has two levels on each of three factors. The first factor in this study was the type of classroom environment. The two levels of this factor will be termed open and conventional heroinafter in this study. The term open will be used to refer to those classrooms identified by the Classroom Observation Rating Scale as having to a greater degree the factors indicative of open education. The term conventional will be used to refer to those classrooms identified by the Classroom Observation Rating Scale as having a lesser degree of the factors indicative of open education.
The second factor in this study was the sex of the subjects, the two levels, of course, being male and female.

The third factor in this study was the degree of masculine sex-role preference. The two levels of this factor will be termed high and low hereinafter in this study. The term high will be used to designate students who scored highest on the IT Scale for Children. The term low will be used to refer to students who scored lowest on the IT Scale for Children.

The study population sample consists of 120 subjects, 60 male and 60 female. There were eight subgroups of 15 subjects each. The schools from which the subjects were chosen were considered to be similar through controls used, as detailed in Chapter III.

The data collected and analysis of the results will be presented for the multivariate analysis of variance initially in the following pages. The first seven hypotheses, which were tested by this analysis, will then be discussed in numerical order. Then the testing of the final three hypotheses through trend analysis will be reported and discussed, also in numerical order.

Multivariate Analysis of Variance

The scores for all of the subjects in this study were the result of the administration of the Sex-Role Classification of School Objects Task by Kagan as modified by Lindsay and Wright. The modified form of the SRCSOT consists of twenty-five items which are classified by the subjects as being masculine, feminine, or farm related. As was the case in the Lindsay and Wright studies, the scores were achieved by counting only the number of items in the SRCSOT which were classified as
masculine by the subjects. The scores were the total number of male choices on the eighteen items originally included by Kagan on the SRCSOT and as such the scores ranged from 0 - 18, a total of nineteen possible points. Although, as previously indicated, the SRCSOT used a total of twenty-five pictured objects, only eighteen were scored in order to follow the procedures used by Lindsay and Wright. (An analysis of scores using the entire set of twenty-five items in the modified SRCSOT is included in Appendix E.)

The means and standard deviations of the eight subgroups included in this study are presented in Table 5, below. These means represent the average of the fifteen scores of the subjects in each of the eight subgroups. The magnitude of the standard deviation reflects the variability among the subjects included in each subgroup.

TABLE 5

MEANS AND STANDARD DEVIATIONS OF THE EIGHT SUBGROUPS ON THE SEX-ROLE CLASSIFICATION OF SCHOOL OBJECTS TASK

<table>
<thead>
<tr>
<th></th>
<th>High Masculine</th>
<th>Low Masculine</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Open</td>
<td>Mean</td>
<td>5.667</td>
</tr>
<tr>
<td></td>
<td>S.D.</td>
<td>2.093</td>
</tr>
<tr>
<td>Conventional</td>
<td>Mean</td>
<td>5.733</td>
</tr>
<tr>
<td></td>
<td>S.D.</td>
<td>2.154</td>
</tr>
</tbody>
</table>

The range among the mean scores was 2.734. Female subjects who were classified as low masculine in open classrooms obtained the least
mean scores with \( M = 4.333, SD = 2.024 \). Female subjects who were classified as high masculine in conventional classrooms obtained the greatest mean scores with \( M = 7.067, SD = 2.463 \).

Open subjects, both male and female and both high and low masculine, scored less than subjects enrolled in conventional classrooms when males are compared with males and females with females, a total of four possible comparisons.

Of the four possible comparisons of males with females at similar classroom and masculinity levels, the males scored higher in three comparisons. The exception was female conventional high masculine subjects, whose mean score was higher than that of the male conventional high masculine subjects.

Of the four possible comparisons of high masculine scorers with low masculine scorers in similar types of classrooms and of the same sex, with one exception high masculine scorers achieved greater means on the SRCSOT than low masculine scorers. The exception occurred in conventional classrooms where low masculine subjects scored greater mean scores than the high masculine subjects.

The results of multivariate analysis of variance of the \( 2 \times 2 \times 2 \) factorial research design are shown in Table 6, below. The testing of Hypotheses 1 - 7 through this analysis will be discussed in numerical order in the following pages. Each hypothesis was tested at the .05 level of significance.

**Testing of the Hypotheses**

**Hypothesis 1.** Hypothesis 1 is restated below in the null form.
### TABLE 6

MULTIVARIATE ANALYSIS OF VARIANCE FOR FOURTH-GRADE SUBJECTS

<table>
<thead>
<tr>
<th>Source</th>
<th>Sums of Squares</th>
<th>Degrees of Freedom</th>
<th>Mean Squares</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classroom Type, Open X Conventional</td>
<td>19.200</td>
<td>1</td>
<td>19.200</td>
<td>3.206</td>
<td>0.076</td>
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<tr>
<td>Sex, Male X Female</td>
<td>2.133</td>
<td>1</td>
<td>2.133</td>
<td>0.356</td>
<td>0.552</td>
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<td>Masculinity, High X Low</td>
<td>26.133</td>
<td>1</td>
<td>26.133</td>
<td>4.363</td>
<td>0.039*</td>
</tr>
<tr>
<td>Classroom X Sex</td>
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<td>1</td>
<td>2.133</td>
<td>0.356</td>
<td>0.552</td>
</tr>
<tr>
<td>Classroom X Masculinity</td>
<td>0.533</td>
<td>1</td>
<td>0.533</td>
<td>0.089</td>
<td>0.766</td>
</tr>
<tr>
<td>Sex X Masculinity</td>
<td>16.134</td>
<td>1</td>
<td>16.134</td>
<td>2.694</td>
<td>0.104</td>
</tr>
<tr>
<td>Classroom X Sex X Masc.</td>
<td>10.800</td>
<td>1</td>
<td>10.800</td>
<td>1.803</td>
<td>0.182</td>
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<tr>
<td>Within Cells</td>
<td>670.800</td>
<td>112</td>
<td>5.989</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* P < .05

There is no significant difference (p. < .05) attributable to the type of classroom environment between selected male and female fourth-grade subjects enrolled in open and conventional education classrooms in their perceptions of the gender of school-related objects.

Table 7 represents the means of the subjects in open classroom environments and the means of the subjects in conventional classroom environments when the scores are collapsed over sex and masculinity scale ratings.

When all subjects enrolled in open classroom environments were compared with all subjects enrolled in conventional classroom...
environments, the obtained F - ratio was 3.206 which yielded a statistical significance value of 0.076 with 1 and 112 degrees of freedom. While this value closely approaches and may indicate a trend toward significance, the .05 level of significance was not reached. Therefore, the hypothesis of no significant difference attributable to the type of classroom environment, open and conventional, was retained and the null hypothesis 1 was accepted.

Hypothesis 2. Hypothesis 2 is restated below in the null form. There is no significant difference (p. < .05) attributable to sex of subject between selected male and female fourth-grade subjects in their perceptions of the gender of school-related objects.

Table 8 represents the means of the male subjects and the means of the female subjects when the scores are collapsed over type of classroom environment and degree of masculinity preference.

When all male subjects were compared with all female subjects, the obtained F - ratio was 0.356 which yielded a statistical significance value of 0.552 with 1 and 112 degrees of freedom. The .05 level
of significance was not reached and, therefore, the hypothesis of no significant difference attributable to the sex of subjects, male and female was retained and null hypothesis 2 was accepted.

**Hypothesis 3.** Hypothesis 3 is restated below in the null form.

There is no significant difference (p < .05) attributable to degree of masculine orientation between selected male and female fourth-grade subjects who show high and those who show low masculine sex-role preference in their perceptions of the gender of school-related objects.

Table 9 represents the means of the subjects who were designated as high and those who were designated as low in masculine sex-role preference when the scores are collapsed over sex of subject and type of classroom environment.

When all subjects who scored high on masculine sex-role preference were compared with all subjects who scored low on masculine sex-role preference, the obtained F-ratio was 4.363 which yielded a statistical significance value of 0.039 with 1 and 112 degrees of freedom. The .05 level of significance was reached and therefore, the
TABLE 9

MEAN SCORES ON THE SRCSOT FOR HIGH MASCULINE SUBJECTS
VERSUS LOW MASCULINE SUBJECTS

<table>
<thead>
<tr>
<th></th>
<th>High Masculine</th>
<th>Low Masculine</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5.933</td>
<td>5.000</td>
</tr>
<tr>
<td>n =</td>
<td>n = 60</td>
<td>n = 60</td>
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</table>

Range: 0.933

Hypothesis of no significant difference attributable to the degree of masculine sex-role preference, high and low, was not retained and null hypothesis 3 was rejected. As a consequence of this rejection an alternative hypothesis was accepted: there was a difference, significant at the .03 level, attributable to the degree of masculine sex-role preference, high or low, in the subjects' perception of the gender of school-related objects.

Hypothesis 4. Hypothesis 4 is restated below in the null form. There is no significant difference (p. < .05) attributable to the interaction of type of classroom environment and sex of subject between selected male and female fourth-grade subjects enrolled in open or conventional education classrooms in their perceptions of the gender of school-related objects.

Table 10 represents the means of the subjects in the two types of classroom environments, open and conventional by sex of subject, male and female, when the scores are collapsed over the degree of sex-role preference.
TABLE 10

MEAN SCORES ON THE SPCSO FOR TYPE OF CLASSROOM ENVIRONMENT AND SEX OF SUBJECT

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open</td>
<td>5.333</td>
<td>4.800</td>
</tr>
<tr>
<td>n = 30</td>
<td></td>
<td>n = 30</td>
</tr>
<tr>
<td>Conventional</td>
<td>5.867</td>
<td>5.867</td>
</tr>
<tr>
<td>n = 30</td>
<td></td>
<td>n = 30</td>
</tr>
</tbody>
</table>

When the two types of classroom environment and the sex of the subjects were crossed and collapsed over degree of masculine sex-role preference, the obtained F - ratio of the interaction of these factors was 0.356 which yielded a statistical value of 0.552 with 1 and 112 degrees of freedom. The .05 level of significance was not reached and, therefore, the hypothesis of no significant difference attributable to the interaction of type of classroom environment, open and conventional, and sex of subject, male and female, was retained and null hypothesis 4 was accepted.

**Hypothesis 5.** Hypothesis 5 is restated below in the null form. There is no significant difference (p. < .05) attributable to the interaction of type of classroom environment and degree of masculine orientation between selected male and female fourth-grade subjects enrolled in open or conventional education classrooms and showing high or low masculine sex-role preference in their perceptions of the gender of school-related objects.
Table II represents the means of the subjects enrolled in the types of classroom environments, open and conventional, by degree of masculine sex-role preference, high and low, when the scores are collapsed over the sex of subjects.

**TABLE II**

**MEAN SCORES ON THE SRCQST FOR TYPE OF CLASSROOM ENVIRONMENT AND DEGREE OF MASCULINE SEX-ROLE PREFERENCE**

<table>
<thead>
<tr>
<th></th>
<th>High Masculine</th>
<th>Low Masculine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open</td>
<td>5.467</td>
<td>4.667</td>
</tr>
<tr>
<td>n = 30</td>
<td></td>
<td>n = 30</td>
</tr>
<tr>
<td>Conventional</td>
<td>6.400</td>
<td>5.333</td>
</tr>
<tr>
<td>n = 30</td>
<td></td>
<td>n = 30</td>
</tr>
</tbody>
</table>

When the two types of classroom environment and the degree of masculine sex-role preference were crossed and collapsed over the sex of subjects, the obtained F-ratio of the interaction of these factors was 0.039 which yielded a statistical significance value of 0.760 with 1 and 112 degrees of freedom. The .05 level of significance was not reached and, therefore, the hypothesis of no significant difference attributable to the interaction of the type of classroom environment and degree of masculine orientation was retained and null hypothesis 5 was accepted.

**Hypothesis 6.** Hypothesis 6 is restated below in the null form:

There is no significant difference (p. < .05) attributable to the
interaction of sex of subject and degree of masculine orientation between selected male or female fourth-grade subjects and showing high or low sex-role preference in their perceptions of the gender of school-related objects.

Table 12 represents the means of the male and female subjects by the two degrees of masculine sex-role preference, high and low, when the scores are collapsed over the sex of subjects.

**TABLE 12**

<table>
<thead>
<tr>
<th></th>
<th>High Masculine</th>
<th>Low Masculine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>5.700</td>
<td>5.500</td>
</tr>
<tr>
<td>n = 30</td>
<td></td>
<td>n = 30</td>
</tr>
<tr>
<td>Female</td>
<td>6.167</td>
<td>4.500</td>
</tr>
<tr>
<td>n = 30</td>
<td></td>
<td>n = 30</td>
</tr>
</tbody>
</table>

When the sex of subjects and the degree of masculine sex-role preference were crossed and collapsed over the sex of subjects, the obtained $F$ - ratio of the interaction of these factors was 2.694 which yielded a statistical significance value of 0.104 with 1 and 112 degrees of freedom. The .05 level of significance was not reached and, therefore the hypothesis of no significant difference attributable to the interaction of the sex of subject and degree of masculine orientation was retained and null hypothesis 6 was accepted.
Hypothesis 7. Hypothesis 7 is restated below in the null form. There is no significant difference (p. < .05) attributable to the interaction of the type of classroom environment, sex of subject, and degree of masculine orientation between selected fourth-grade subjects in their perceptions of the gender of school-related objects.

Table 5, page 62 represents the means and standard deviations of the eight subgroups investigated in this study.

When the interaction of the three factors in this study was analyzed, the obtained F-ratio of the interaction of factors was 1.803 which yielded a statistical significance value of 0.182 with 1 and 112 degrees of freedom. The .05 level of significance was not reached and, therefore, the hypothesis of no significant difference attributable to the interaction of type of classroom environment, sex of subject, and degree of masculine sex-role orientation was retained and hypothesis 7 was accepted.

Trend Analysis

Hypotheses 8 - 10 in this study were concerned with a trend analysis of the data collected in this study and the two similar studies replicated, the study of Lindsay (1973) and Wright (1975). Only the data on male subjects were considered in this section of the study as only males were studied by Lindsay.

Table 13 represents the means and standard deviations of the scores on the Sex Role Classification of School Objects Task achieved by the kindergarten, first, second, and fourth-grade subjects investigated in the three studies mentioned. As indicated by the table, no
TABLE 13

MEANS AND STANDARD DEVIATIONS OF THE TWENTY-EIGHT SUBGROUPS ON THE SEX ROLE CLASSIFICATION OF SCHOOL OBJECTS TASK

<table>
<thead>
<tr>
<th>Kindergarten</th>
<th>First</th>
<th>Second</th>
<th>Third</th>
<th>Fourth</th>
</tr>
</thead>
<tbody>
<tr>
<td>M M</td>
<td>6.000</td>
<td>5.467</td>
<td>6.333</td>
<td>7.933</td>
</tr>
<tr>
<td>SD</td>
<td>2.299</td>
<td>3.642</td>
<td>3.885</td>
<td>2.491</td>
</tr>
<tr>
<td>High Masc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F M</td>
<td>5.000</td>
<td>4.267</td>
<td>5.067</td>
<td>5.933</td>
</tr>
<tr>
<td>SD</td>
<td>2.204</td>
<td>2.052</td>
<td>3.050</td>
<td>2.520</td>
</tr>
<tr>
<td>Low Masc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M M</td>
<td>6.000</td>
<td>7.000</td>
<td>6.600</td>
<td>6.533</td>
</tr>
<tr>
<td>SD</td>
<td>2.299</td>
<td>2.420</td>
<td>2.262</td>
<td>1.922</td>
</tr>
<tr>
<td>F M</td>
<td>6.067</td>
<td>5.267</td>
<td>5.267</td>
<td>4.333</td>
</tr>
<tr>
<td>SD</td>
<td>1.945</td>
<td>2.251</td>
<td>2.492</td>
<td>2.289</td>
</tr>
</tbody>
</table>

Data were available for female second-grade or for male and female third-grade subjects. For the purpose of the trend analysis used to test Hypotheses 8 - 10, the data which were not available were ignored.

A 2 x 2 x 4 factorial design was devised to test the trend analysis hypotheses, Hypotheses 8 - 10. The first factor was the type of classroom environment, open or conventional. The second factor was the degree of masculine sex-role preference, high or low. The third factor was the quantitative variable of years in school, i.e., the grade level of kindergarten was considered to be one year in school, first-grade was considered two years in school, second-grade was considered three years in school, and fourth-grade was considered five years in school. The 2 x 2 x 4 factorial design has a total of sixteen cells. The means and standard deviations from Table 13 were considered to be
one observation in each of these sixteen cells. The trend analysis was performed on the data from these sixteen observations.

An analysis of variance for this factorial design was performed and the grade level factor was tested for trend. Table 14 is a summary of the results of this analysis. The testing of hypotheses 8-10 by this analysis is discussed in the following pages, hypothesis by hypothesis.

TABLE 14
ANALYSIS OF VARIANCE AND TREND ANALYSIS FOR CLASSROOM ENVIRONMENT, MASculine ORIENTATION, GRADE LEVEL

<table>
<thead>
<tr>
<th>Source</th>
<th>Degrees of Freedom</th>
<th>Sums of Squares</th>
<th>Mean Squares</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classroom Environment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Open X Conventional</td>
<td>1</td>
<td>0.04010</td>
<td>0.04010</td>
<td>0.071</td>
<td>0.456</td>
</tr>
<tr>
<td>Masculine Orientation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High X Low</td>
<td>1</td>
<td>0.00111</td>
<td>0.00111</td>
<td>0.002</td>
<td>0.755</td>
</tr>
<tr>
<td>Grade Level</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K, 1, 2, 4</td>
<td>3</td>
<td>4.49389</td>
<td>1.64796</td>
<td>2.926</td>
<td>0.085</td>
</tr>
<tr>
<td>Linear</td>
<td>1</td>
<td>0.67216</td>
<td>0.67216</td>
<td>1.193</td>
<td>0.253</td>
</tr>
<tr>
<td>Quadratic</td>
<td>1</td>
<td>3.99900</td>
<td>3.99900</td>
<td>7.099</td>
<td>0.075</td>
</tr>
<tr>
<td>Cubic</td>
<td>1</td>
<td>0.27273</td>
<td>0.27273</td>
<td>0.484</td>
<td>0.552</td>
</tr>
<tr>
<td>Classroom X Masculinity</td>
<td>1</td>
<td>0.24975</td>
<td>0.24975</td>
<td>0.443</td>
<td>0.354</td>
</tr>
<tr>
<td>Classroom X Grade</td>
<td>3</td>
<td>3.50426</td>
<td>1.16808</td>
<td>2.074</td>
<td>0.956</td>
</tr>
<tr>
<td>Masculinity X Grade</td>
<td>3</td>
<td>1.55176</td>
<td>0.51725</td>
<td>0.918</td>
<td>0.415</td>
</tr>
<tr>
<td>Within Subjects (Error)</td>
<td>3</td>
<td>1.68978</td>
<td>0.56326</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
<td>11.98064</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Hypothesis 8. Hypothesis 8 is restated below in the null form.

There is no significant linear trend (p. < .05) among the means of groups of selected kindergarten, first, second and fourth-grade subjects in their perceptions of the gender of school-related objects.

When the analysis of variance was performed as detailed above, no significant differences were found among and between the various factors and their combinations. When the grade levels were tested for a linear trend, an F-ratio of 1.193 was achieved which, with one and three degrees of freedom, fails to reach the .05 level of significance. Therefore, the hypothesis of no significant linear trend among the grade levels was accepted and Hypothesis 8 was retained.

Hypothesis 9. Hypothesis 9 is restated below in the null form.

There is no significant quadratic trend (p. < .05) among the means of groups of selected kindergarten, first, second, and fourth-grade subjects in their perceptions of the gender of school-related objects.

When the analysis of variance was performed as detailed above, no significant differences were found among and between the various factors and their combinations. When the grade levels were tested for a quadratic trend, an F-ratio of 7.099 was achieved which, with one and three degrees of freedom, fails to reach the .05 level of significance, although it approaches this level. Therefore, the hypothesis of no significant quadratic trend among the grade levels was accepted and Hypothesis 9 was retained.

Hypothesis 10. Hypothesis 10 is restated below in the null form.

There is no significant cubic trend (p. < .05) among the means of groups of selected kindergarten, first, second and fourth-grade subjects in
their perceptions of the gender of school-related objects.

When the analysis of variance was performed as detailed above, no significant differences were found among and between the various factors and their combinations. When the grade levels were tested for a cubic trend, an $F$-ratio of 0.484 was achieved which, with one and three degrees of freedom, fails to reach the .05 level of significance. Therefore, the hypothesis of no significant cubic trend among the grade levels was accepted and Hypothesis 10 was retained.

Discussion

This study investigated two main problems which are restated below.

1. Does the classroom learning environment make a significant difference on the perceptions of selected fourth-grade subjects regarding the gender of school objects?

2. Does the data resultant from the investigations with kindergarten, first-grade, second-grade and fourth-grade subjects exhibit any developmental trends in the perceptions of those selected subjects regarding the gender of school-related objects?

To investigate these problems, a set of ten hypotheses amenable to statistical analysis was devised. The data results relative to the testing of these ten hypotheses were presented in the preceding sections on the findings of this study. In this section these findings will be discussed as they relate to the two main problems in the study.

The first problem in the study is relative to the description of characteristics of subjects in two types of educational environments,
open and conventional. As such, this problem may be characterized as involving descriptive research. Isaac and Michael define the purpose of descriptive research to be to "...describe systematically the facts and characteristics of a given population or area of interest, factually and accurately." (Isaac and Michael, 1971, p.18) The specific given population in this study was fourth-grade subjects in both open and conventional education environments who were controlled as much as reasonably practical in their general profile to represent the described selected population. The study attempted to describe systematically the fourth-grade subjects' perceptions of the gender of school-related objects and Hypotheses 1 - 7 were devised to test the significance of these perceptions. It was postulated that the subjects enrolled in open education environments would be less stereotyped in their perceptions of the gender of school-related objects and, assumedly, in the perceptions of school in general.

The findings of this study seem to refute this postulation when the data are subjected to a test of statistical significance at the .05 level. In terms of the main problem studied in this investigation, the classroom learning environment did not seem to make a significant difference in the perception of the gender of school-related objects by the subjects in this study. All of the null hypotheses containing the factor of classroom environment, open or conventional (Hypotheses 1 - 7) were retained in the data analysis procedures. It may be reasoned, therefore, that there were no differences attributable to the type of classroom environment or, if there were differences, this study did not find them among the investigated subjects.
The second problem in this study is relative to an investigation of the trends present in the perceptions of school-related objects across age and grade levels and the categorization of these trends (Hypotheses 8 - 10). This part of the Investigation may be categorized as developmental research. Isaac and Michael define the purpose of developmental research as being to "... investigate patterns and sequences of growth and/or change as a function of time" (p.19). This particular study was a cross-sectional developmental study in that it investigated the nature and rate of change in the perceptions of school-related objects by samples of different children from various age and grade levels. This approach to studying trends in the studied factor was chosen over a longitudinal approach because of the availability of the data and the savings in time and expense achieved. It was felt that the steps in controlling the population variables taken by each of the investigators reasonably and acceptably, compensated for differences present and that the groups were comparable.

The data gathered in the similar studies which preceded this study seemed to indicate the possible trend toward a positive linearity among the subjects studied. It was postulated that a trend would exist and that this trend could be defined. This postulate was not supported by the data collected in this study nor by the statistical trend analysis applied to all of the data. The changes and variability among the groups of subjects cannot be described as other than as being due to chance on the basis of the statistical tests used in this study. In terms of the second problem of this study, the data resultant from the investigations with kindergarten, first-grade, second-grade, and
fourth-grade subjects did not exhibit any developmental trends in the perceptions of these selected subjects regarding the gender of school-related objects.

The data did indicate that there was an increase in the scores on the Sex-Role Classification of School Objects Task from kindergarten to first-grade and to second-grade. The scores then lessened to the fourth-grade which, when informally inspected, suggested a quadratic trend for the males studied in this part of the study. When the data were subjected to a formal test (Hypotheses 8 - 10) this indication was not statistically significant. The total trend analysis for all groups, factors, and scores did not indicate any significant trend, null hypotheses 8 - 10 were retained, and the second main problem question in the study was answered negatively.

Summary

In this chapter the data and its statistical analysis were reported and discussed. The testing of the hypotheses was reported and the hypotheses relationship to the two main problems in this study was discussed. While significance was found for one of the null hypotheses which were tested, this hypothesis was not a factor related to these main problems.

In the next chapter the study will be summarized, conclusions will be discussed and recommendations for further research will be made.
CHAPTER V

SUMMARY AND CONCLUSIONS

In this concluding chapter the study will be summarized, conclusions will be drawn and discussed, and recommendations for other future research will be made.

Overview

The purposes of the study were to investigate and describe the gender classification of school-related objects by male and female fourth-grade subjects who exhibit high and low sex-role preference in both open and conventional classroom environments and to describe the trends present in this gender classification by a cross-section of subjects in kindergarten, first-grade, second-grade and fourth-grade.

There were two main problems posed by the study:

1. Does the classroom learning environment make a significant difference in the perceptions of selected fourth-grade subjects regarding the gender of school-related objects?

2. Do the data resultant from the investigations with kindergarten, first-grade, second-grade, and fourth-grade subjects exhibit any developmental trends in the perceptions of those selected subjects regarding the gender of school-related objects?

The study sample population was chosen from two school districts in the Columbus, Ohio area. The study was conducted during the months
of April and May, 1976. The male primary investigator was assisted by
a female assistant at the Ohio State University, who saw equal numbers
of male and female subjects in both types of classroom environments,
open and conventional. The steps followed in the study are summarized
in flow chart form in Appendix A.

Appendix A summarizes the five stages in the data collection
procedures used in this study. Stage 1 consisted of the designation of
21 classrooms as appropriate and available for this study. Stage 2
consisted of the administration of the Classroom Observation Rating
Scale for all of the 21 classrooms and the subsequent use of the ratings
to designate the five classrooms most typical of open education environ­
ments and the five classrooms most typical of conventional education
environments. In stage 3, the IT Scale for Children was administered
to all eligible subjects enrolled in the ten designated classrooms; a
total of 244 subjects. The results were used to designate the eight
subgroups of interest in the study. Stage 4 consisted of the admini­
stration of the Sex-Role Classification of School Objects Task to the
120 subjects in these groups. Stage 5 consisted of the statistical
analysis of the data.

Chapter I of the study presented the problems to be investigated.
The hypotheses were presented which were tested in the study.

Chapter II presented a review of pertinent literature for the
areas related to the purposes of the study.

Chapter III presented in detail the methodology, procedures,
and instrumentation of the study. The research design was described
and an overview of the entire project was given.
Chapter IV presented the data collected. The data were presented and summarized. The hypotheses were tested and the evidence collected for the hypothesis testing was detailed.

This chapter, Chapter V, presents the summary and conclusions which are made on the basis of the data. Recommendations will be made for future studies.

Conclusions

Ten basic research hypotheses were formulated for the investigation and a 2 x 2 x 2 factorial research design was devised to test seven of them. A trend analysis strategy was devised to test the remaining three hypotheses. Each hypotheses was tested at the .05 level of statistical significance. The results of the statistical analysis are reflected in the following restatement of those ten hypotheses in an inferential form.

From the testing of Hypothesis 1, it is inferred that there is no significant difference attributable to the type of classroom environment between selected male and female fourth-grade subjects enrolled in open and conventional education classrooms in their perceptions of the gender of school-related objects.

From the testing of Hypothesis 2, it is inferred that there is no significant difference attributable to the sex of subjects between selected male and female fourth-grade subjects in their perceptions of the gender of school-related objects.

From the testing of Hypothesis 3, it is inferred that there is a significant difference attributable to the degree of masculinity
orientation between selected male and female fourth-grade subjects who show high and those who show low masculine sex-role preference in their perceptions of the gender of school-related objects in that those who show high masculine sex-role preference seem to have a masculine perception of the gender of these objects. Those subjects who show a low masculine sex-role preference seem to have a less masculine perception of the gender of these objects.

From the testing of Hypothesis 4, it is inferred that there is no significant difference attributable to the type of classroom environment and sex of subject between selected male or female fourth-grade subjects enrolled in open or conventional education classrooms in their perceptions of the gender of school-related objects.

From the testing of Hypothesis 5, it is inferred that there is no significant difference attributable to the interaction of type of classroom environment and degree of masculine orientation between selected male and female fourth-grade subjects enrolled in open or conventional education classrooms and showing high or low masculine sex-role preference in their perceptions of the gender of school-related objects.

From the testing of Hypothesis 6, it is inferred that there is no significant difference attributable to the interaction of sex of subject and degree of masculine orientation between selected male or female fourth-grade subjects and showing high or low masculine sex-role preference in their perceptions of the gender of school-related objects.

From the testing of Hypothesis 7, it is inferred that there is no significant difference attributable to the interaction of the type of classroom environment, sex of subject, and degree of masculine
orientation between selected fourth-grade subjects in their perceptions of the gender of school-related objects.

From the testing of Hypothesis 8, it is inferred that there is no significant linear trend among the means of groups of selected kindergarten, first, second and fourth-grade subjects in their perceptions of the gender of school-related objects.

From the testing of Hypothesis 9, it is inferred that there is no significant quadratic trend among the means of groups of selected kindergarten, first, second and fourth-grade subjects in their perceptions of the gender of school-related objects.

From the testing of Hypothesis 10, it is inferred that there is no significant cubic trend among the means of groups of selected kindergarten, first, second and fourth-grade subjects in their perceptions of the gender of school-related objects.

The generalizability of these findings is restricted by the following conditions:

1. The study was confined to one segment of the population in one selected group of schools.

2. The accuracy of the measures of the tests administered is determined by the child's response to and rapport with the examiners.

3. Due to variations in schools and schedules, the instruments could not be administered at the same time of day nor in the same location for all subjects.

4. The data from this study, the Lindsay study, and the Wright study were collected at different times, in different locales, and with different populations.
Because this study was a replication of others, some conclusions may be drawn based on comparison of these various investigations.

This investigation failed to find any significant difference in any of the comparisons which included the factor of type of classroom environment, open education or conventional education. Lindsay found that there was a significant difference in the main effects of this variable in that more second-grade males in open education programs perceived school as a more sex-appropriate activity than did males in conventional education programs (p. 81-82). Wright found no significant differences in this variable for kindergarten or first-grade children (p. 159-162). Thus, the findings of Lindsay's study were not replicable in either Wright's study or this study, and it may be concluded that the type of educational environment, open or conventional, cannot be said to make any statistically significant difference in the perceptions by subjects of the gender of school-related objects in the majority, three of four, of the grade levels studied.

This investigation found a statistically significant difference in comparing the main effects of the masculinity factor, high or low, in the perception of the gender of school-related objects. Therefore, it may be concluded that there was a general inability to replicate Lindsay's findings in that two of the three replications were unsuccessful. The Lindsay study found no differences attributable to the degree of masculinity for second-grade subjects (p. 82-83). The findings of this study and the findings of the Wright study with kindergarten subjects were comparable with each other in finding significant differences due to the degree of masculine sex-role preference. The findings of the
present study and the findings of the Wright study of kindergarten subjects were not comparable to the Wright study of first-grade subjects which found no significant differences due to the degree of masculine sex-role preference (pp. 154-156).

Wright's study as did the present study, used the sex of subjects as a factor for investigation. As Lindsay studied male subjects only, comparisons by sex of subjects were not possible in her study. In Wright's study, significant differences were found for six of eight comparisons using sex of subjects as a factor. The findings of the present study did not replicate those of Wright; no significant differences were found for any of the comparisons based on the sex of subjects in the subjects' perception of the gender of school-related objects. From this it may be concluded that there was an inability to replicate earlier findings on the effects of sex of subjects on the perceptions by subjects of the gender of school-related objects.

The pattern established in the preceding paragraphs may indicate the major findings of this study, id est, there seems to be an inability to systematically replicate the results of the studies on this topic even though identical methodologies are followed. The inability of follow-up studies to replicate the findings of an original study may cast doubt on the findings of the original study. However, while it is true that neither this study nor Wright's study found results comparable to Lindsay's, it is also true that this study did not find results comparable to those of Wright. Thus, it would appear equally appropriate to restate the main finding of this study as: there are no consistencies in the sex-role classification of school-related objects for groups of
differing school grades. Both the comparison of the main hypotheses related to sex, classroom environment, and degree of masculine orientation and the trend analysis used in this study indicate an ambiguity of results which may be interpreted in either of the ways suggested.

Another major finding of this study may be that the type of classroom environment does not seem to affect the sex-role classification of school-related objects and, assumedly, that the type of classroom environment does not seem to affect the perceptions by fourth-grade subjects of the sex-appropriateness of school. The major factor which determines these perceptions, as indicated by the findings in this study, is the degree of masculine sex-role preference of the subjects. This may be a quite positive finding in that it suggests that the fourth-grade subjects studied saw school as sexually appropriate regardless of their sex or of the type of school environment in which they were enrolled. The highly masculine subjects showed a higher masculine perception of school-related objects and assumedly, school in general; the lower masculine subjects saw school with a lower masculine perception. Kagan suggests that the student should be more highly motivated in situations which are seen as role-appropriate. If Kagan is correct, then the findings of this study are supportive of current educational practices.

Suggestions and Recommendations

In this section a group of recommendations growing out of the study will be made. In that this study was descriptive only, causal statements as to particular factors which might have contributed to the
results cannot be made for either type of classroom environment studied, nor can particular school practices related to sex-role identification, preference, or perception be recommended or discouraged. Most of what can be confidently discussed or recommended, therefore, relates to further study of the variables involved in the study.

Although the cautions detailed above must be attended to by this investigator, some apparently reasonable recommendations which relate to the factors studied by this investigation will be discussed below. It is recognized that many of these recommendations are common practice in many schools, that few are original, and that none were systematically verified by this study. But all seem to be worthy of consideration and, as a consequence of their relation to the topics of the study, they are listed first and for this discussion are termed "suggestions".

The following suggestions seem reasonable:

1. The open education alternative should be available for those students who seem to find school inappropriate in terms of their sex-role identification.

2. The open education type of classroom environment can be recommended as a general alternative to a single approach to schooling inasmuch as it was not a negative factor in this study. This suggestion is most applicable in areas where the conventional approach has been the only approach to schooling.

3. Elements of the open classroom approach which appeal to the greater aggression of boys and some girls are recommended for adoption in other types of classroom environments and continuance.
in open classrooms. The elements which appeal to more aggressive students are active experiences, the availability of opportunities for decision-making, a choice of varied activities, a variety of materials available for learning, and multiple opportunities for social interaction.

4. Sex-role identification is a vital part of the child's personality, self-concept, and development. It should be a consideration in the educator's thinking and planning for children.

5. The equal assignment of male and female staff members to elementary school and in various grade levels, K-8, seems a worthwhile personnel practices goal.

6. The sex-appropriateness of school activities or the child's perceptions of the sex-appropriateness of those activities should be considered in choosing activities for classrooms.

7. While sex-appropriateness should be considered by educators, sexual stereotypes should be recognized as part of the popular culture and should be avoided.

8. Although the grouping of children by sex is efficient for such mundane educational practices as lining children, playing games, etcetera, these practices can just as efficiently be done by hair color, clothing color, etcetera. These alternative grouping practices might be just as efficient and are less likely to create arbitrary sex divisions.

9. The child's perceptions of the sex-appropriateness of school may be a valid factor to consider in the assignment of children to teachers and classrooms.
10. From the studios on sex biases in curriculum materials such as textbooks, filmstrips, films, workbooks, et cetera, it seems apparent that school materials quite often do, in fact, reflect sexual stereotypes and biases. It is suggested that curriculum materials and the classroom use of those materials include males and females, both children and adults, equally and with variety.

11. The area of sexuality seems to be a valid part of the school curriculum. A sex education program including sexual stereotype awareness experiences should be included in the school curriculum in all grades.

12. The sexual development of the child should be a part of the educator's professional training.

13. Increasingly, the area of values and value clarification are becoming parts of school programs. Sex-linked values need to be explored as well as other values.

14. Parent education in regards to sex-typing, sex-stereotyping, sexual perceptions, and sex-role seems to be a reasonable goal in home-school contacts.

The following are considered valid recommendations based on the experience and findings of this investigation.

1. The replication of this study and the studies of Lindsay and Wright with different but similar instruments is recommended for verification of the findings from the three studies mentioned.

2. Replication of this study for all elementary school grades may be valuable in adding further knowledge as it seems inappropriate to generalize the findings from this study and earlier studies.
to other school grades.

3. A longitudinal study rather than a cross-sectional study may provide additional insights and/or verification of the findings of this study.

4. Other factors such as race, sex of teacher, and ethnic backgrounds may be studied for their contributions in various types of classroom environments to the perceptions of the gender of school-related objects.

5. A study of teacher behaviors and of children’s perceptions of school-related objects may isolate positive and negative behaviors in various environments in terms of these behaviors effect on students’ perceptions.

6. Verification studies using larger subgroups may be of value. This study used subgroup sizes of 15 in its design. Perhaps 30 or more subjects per subgroup would yield benefits in further research.

7. If it is true that the perception of school as sex-appropriate contributes to higher motivation, perhaps this higher motivation can be assessed differentially in contrasting educational environments. Whether this postulated higher motivation contributes to greater student achievement may also be studied.

8. A study of various types of groupings, for example, family grouping rather than single grade organization, may indicate significant differences in the sex-role perceptions of students and in their perception of the gender of school-objects.

9. A study using manipulative variables for subgroups may add to the data gained from this and other purely descriptive studies.
10. A follow-up study of students may indicate whether their perceptions of the sex-appropriateness of school in elementary schools has any effect on their rate of school dropout or graduation.

Summary

This chapter has provided an overview of the study, conclusions drawn, suggestions for educators and recommendations for further study.
APPENDICES
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<td>96</td>
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<td>102</td>
</tr>
<tr>
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<td>104</td>
</tr>
<tr>
<td>E</td>
<td><strong>An Analysis of the Data Resultant from the Modified Sex-Role Classification of School Objects Task</strong></td>
<td>108</td>
</tr>
</tbody>
</table>
APPENDIX A

FLOW CHART FOR DATA COLLECTION PROCEDURES
FLOW CHART FOR DATA COLLECTION PROCEDURES

STAGE 1

TWENTY-ONE ORIGINAL
FOURTH-GRADE CLASSROOMS

STAGE 2

ADMINISTRATION OF THE
CLASSROOM OBSERVATION RATING SCALE

FIVE CLASSROOMS
DESIGNATED AS
MOST TYPICALLY
OPEN EDUCATION

FIVE CLASSROOMS
DESIGNATED AS
MOST TYPICALLY
CONVENTIONAL ED.

121
SUBJECTS

123
SUBJECTS

STAGE 3

ADMINISTRATION OF IT SCALE
FOR CHILDREN

ADMINISTRATION OF
IT SCALE
FOR CHILDREN

15
HIGHEST
MALE SCORERS

15
HIGHEST
FEMALE SCORERS

15
LOWEST
MALE SCORERS

15
LOWEST
FEMALE SCORERS

15
HIGHEST
MALE SCORERS

15
HIGHEST
FEMALE SCORERS

15
LOWEST
MALE SCORERS

15
LOWEST
FEMALE SCORERS

STAGE 4

ADMINISTRATION OF THE SEX-ROLE CLASSIFICATION TASK

ADMINISTRATION OF THE SEX-ROLE CLASSIFICATION TASK

STAGE 5

STATISTICAL ANALYSIS OF FOURTH-GRADE DATA

STATISTICAL ANALYSIS OF FOURTH-GRADE DATA

AGE TREND ANALYSIS OF DATA IN THIS STUDY, LINDSAY AND WRIGHT STUDIES
APPENDIX B

THE CLASSROOM OBSERVATION RATING SCALE
CLASSROOM OBSERVATION RATING SCALE

1. Texts and materials are supplied in class sets so that all children may have their own.

2. Each child has a space for his personal storage and the major part of the classroom is organized for common use.

3. Materials are kept out of the way until they are distributed or used under the teacher's direction.

4. Many different activities go on simultaneously.

5. Children are expected to do their own work without getting help from other children.

6. Manipulative materials are supplied in great diversity and range with little replication.

7. Day is divided into large blocks of time within which children, with the teacher's help, determine their own routine.

8. Children work individually and in small groups at various activities.

10. Children are not supposed to move about the room without asking permission.

11. Desks are arranged so that every child can see the blackboard or teacher from his desk.

12. The environment includes materials developed by the teacher.

13. Common environmental materials are provided.

14. Children may voluntarily make use of other areas of the building and school yard as part of their school time.

15. The program includes use of the neighborhood.

16. Children use "books" written by their classmates as part of their reading and reference materials.

17. Teacher prefers that children not talk when they are supposed to be working.

18. Children voluntarily group and regroup themselves.

19. The environment includes materials developed or supplied by the children.

20. Teacher plans and schedules the children's activities through the day.

21. Teacher makes sure children use materials only as instructed.

22. Teacher groups children for lessons directed at specific needs.

23. Children work directly with manipulative materials.
<table>
<thead>
<tr>
<th></th>
<th>Materials are readily accessible to children.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Teacher promotes a purposeful atmosphere by expecting and enabling children to use time productively and to value their work and learning.</td>
</tr>
<tr>
<td></td>
<td>Teacher used test results to group children for reading and/or math.</td>
</tr>
<tr>
<td></td>
<td>Children expect the teacher to correct all their work.</td>
</tr>
<tr>
<td></td>
<td>Teacher bases her instruction on each individual child and his interaction with materials and equipment.</td>
</tr>
<tr>
<td></td>
<td>Teacher gives children tests to find out what they know.</td>
</tr>
<tr>
<td></td>
<td>The emotional atmosphere is warm and accepting.</td>
</tr>
<tr>
<td></td>
<td>The work children do is divided into subject matter areas.</td>
</tr>
<tr>
<td></td>
<td>The teacher's lessons and assignments are given to the class as a whole.</td>
</tr>
<tr>
<td></td>
<td>To obtain diagnostic information, the teacher closely observes the specific work or concern of a child and asks immediate, experienced based questions.</td>
</tr>
<tr>
<td></td>
<td>Teacher bases her instruction on curriculum guides or text books for the grade level she teaches.</td>
</tr>
<tr>
<td></td>
<td>Teacher keeps notes and writes individual histories of each child's intellectual, emotional and physical development.</td>
</tr>
<tr>
<td></td>
<td>Teacher has children for a period of just one year.</td>
</tr>
</tbody>
</table>

<table>
<thead>
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<th>No Evidence</th>
<th>Weak</th>
<th>Infrequent</th>
<th>Moderate</th>
<th>Occasional</th>
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</tr>
</tbody>
</table>
37. The class operates with clear guidelines made explicit.

38. Teacher takes care of dealing with conflicts and disruptive behavior without involving the group.

39. Children's activities, products and ideas are reflected abundantly about the classroom.

40. The teacher is in charge.

41. Before suggesting any extension or re-direction of activity, teacher gives diagnostic attention to the particular child and his particular activity.

42. The children spontaneously look at and discuss each other's work.

43. Teacher uses tests to evaluate children and rate them in comparison to their peers.

44. Teacher uses the assistance of someone in a supportive, advisory capacity.

45. Teacher tries to keep all children within her sight so that she can make sure they are doing what they are supposed to do.

46. Teacher has helpful colleagues with whom she discusses teaching.

47. Teacher keeps a collection of each child's work for use in evaluating his development.

48. Teacher views evaluation as information to guide her instruction and provisioning for the classroom.

49. Academic achievement is the teacher's top priority for the children.

50. Children are deeply involved in what they are doing.
<table>
<thead>
<tr>
<th>ITEM</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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</table>
APPENDIX C

THE IT SCALE FOR CHILDREN
TOY PICTURES SECTION

Made up of sixteen pictures, eight male objects (e.g., tractor and rifle) and eight female objects (e.g., doll and dishes) to which the child responds by having "It" make a total of eight choices. Each choice of a male item is scored one point, each choice of a female item is scored zero.

EIGHT PAIRED PICTURES SECTION

Made up of eight pairs of pictures of masculine and feminine alternatives (e.g., Indian Chief and Indian Princess, Cosmetic articles and Shaving articles, etc.) to which the child responds by having "It" choose the one of each pair that "It" would rather be, have, or wear. Each choice of a male item is scored eight points. Each choice of a female item is scored zero.

FOUR CHILD-FIGURES SECTION

Made up of pictures of four children: a girl, a girlish boy (boy dressed as a girl), a boyish girl (girl dressed as a boy) and a boy, to which the child responds by having "It" choose the one "It" would rather be. Choice of the boy is scored twelve points, of the girlish boy eight points, of the boyish girl four points, and of the girl zero.

PARENTAL ROLE SECTION

Involves asking the child whether "It" would rather be a mother or a daddy when "It" grows up.

NAMING "IT"

Each child is asked to give a name to "It".
APPENDIX D

THE SEX-ROLE CLASSIFICATION OF SCHOOL OBJECTS TASK
SEX-ROLE CLASSIFICATION OF SCHOOL OBJECTS TASK

by Jerome Kagan

PROCEDURE FOR ADMINISTERING TASK

The following procedure for administering the task has been adopted from Kagan's study.

Each S will be seen by an adult E. A male and a female E will see an equal number of male subjects.

Each S will be taught three different nonsense syllables to represent the following concepts: (a) objects associated with males, (b) objects associated with females, (c) objects associated with the farm. The nonsense syllables DEP, ROV, and FAS will represent the concepts male, female, and farm respectively.

LEARNING PHASE

E will say, "I am going to show you some pictures. These pictures belong to one of three groups. All of the pictures are alike or go together in some way. We are going to call these groups three crazy words. One group is called DEP, one group is called ROV, and one group is called FAS. First I want you to learn these three words. Now I am going to show you these pictures. Some of the pictures belong in the DEP group, others belong in the ROV group, and some belong to the FAS group. You must guess which group they belong to. I will tell you after each trial what the correct answer is. In order to give you a hint I will show you one of the DEP pictures."

E will then show S a picture of a man and say that it is a DEP; he will then show a picture of a woman and say that it is a ROV; he
will then show a picture of a silo and say that it is a FAS. E will then show S 21 pictures, allow him six seconds to answer, and, if no answer is given, give him the correct answer. E will continue to present the 21 pictures in the learning series until S has 10 consecutive correct reports. Some of the pictures in the learning series include a man's trousers, a boy, a baseball bat, a man's tie (masculine items); a woman's shoe, sewing machine, lipstick, doll, girl, dress (feminine items); and a chicken, pig, cow, haystack, corn (farm items).

**TRANSFER PHASE**

After S has reached a criterion of 10 successive correct items, E will say, "Now I am going to show you some different items and I want you to tell me if they are DEP, ROV, or FAS." E will present 25 new picture stimuli and record S's responses. E will not give any answer or praise to these stimuli. The stimuli in the transfer series in the order of administration are:

- pencil
- tree
- chalkboard with A B C on it
- lion
- teacher's desk
- rabbit
- easel with paints
- rowboat
- open book
- bird
- page of arithmetic
apple
school building
red marking pencil
alligator
pupil's desk
ruler or yardstick
cup
globe
carrot
a boy and girl sitting at separate desks
phonograph
tape recorder
chalk
chalkboard eraser
APPENDIX E

AN ANALYSIS OF THE DATA RESULTANT FROM THE MODIFIED SEX-ROLE CLASSIFICATION OF SCHOOL OBJECTS TASK
Appendix E presents an analysis of the data collected in the study. This analysis differs from the data analysis in the body of the study in that the entire set of twenty-five items on the modified SRCSOT was used as the basis for the scores. The scores reported in this Appendix represent the number of masculine items chosen by the subjects expressed as a percentage of the total number of twenty-five items in the modified form of the SRCSOT. This approach was not used in the main body of the study inasmuch as it was not used by either Lindsay or Wright in their scoring for data analysis. The information is included in this appendix because of its interest to the investigator and possible interest to the reader. It is also of interest in that it represents trends toward significance which may be worthy of further study.

Table 15 represents the mean percentages and standard deviations for each of the eight subgroups investigated in the study. Table 16 is a summary of the multivariate analysis of variance applied to the 120 subjects' scores.

Table 16 indicates a trend approaching significance for one main effect and one interaction. The main effect of the degree of masculine sex-role preference, high or low, approaches significance, p < .054. The interaction of the factor of type of classroom environment, open or conventional and the sex of subjects also approaches
significance, p. < .00.

The non-significant trend in the main effect of the degree of masculine sex-role preference results from the tendency for subjects who score high in sex-role preference as measured by the ITSC to score high on the SRCSOT and the tendency of the subjects who score low on the ITSC to score low on the SRCSOT.

The non-significant trend in the interaction of type of classroom environment and sex of subject results from the tendency of males in open classrooms to score high on the SRCSOT while males in conventional classrooms score low on the SRCSOT, while females in conventional classrooms score higher than females in open classrooms. In terms of the interactions of these factors it may be stated that there is a non-significant trend for females in conventional classrooms to score high on the SRCSOT and males in open classrooms to score high on the SRCSOT.

The trends suggested using this type of scoring methodology may suggest further possibilities for research.

TABLE 15

MEANS AND STANDARD DEVIATIONS OF THE EIGHT SUBGROUPS ON THE MODIFIED SRCSOT IN PERCENTAGES

<table>
<thead>
<tr>
<th>Classroom</th>
<th>High Masculine</th>
<th>Low Masculine</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male Female</td>
<td>Male Female</td>
</tr>
<tr>
<td>Open</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>39.200 34.667</td>
<td>35.200 26.133</td>
</tr>
<tr>
<td>SD</td>
<td>12.757 15.832</td>
<td>18.895 12.727</td>
</tr>
<tr>
<td>Conventional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>33.600 43.467</td>
<td>35.467 32.800</td>
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<tr>
<td>SD</td>
<td>11.593 15.990</td>
<td>14.803 15.943</td>
</tr>
</tbody>
</table>
### TABLE 16

**MULTIVARIATE ANALYSIS OF VARIANCE FOR FOURTH-GRADE SUBJECTS ON THE MODIFIED SRC5OT**

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>Degrees of Freedom</th>
<th>Mean Squares</th>
<th>F</th>
<th>P</th>
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<td>Classroom Type, Open X Conventional</td>
<td>192.539</td>
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<td>192.539</td>
<td>0.858</td>
<td>0.356</td>
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<tr>
<td>Sex, Male X Female</td>
<td>76.795</td>
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<td>0.342</td>
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<tr>
<td>Masculinity, High X Low</td>
<td>853.309</td>
<td>1</td>
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<td>Classroom X Sex</td>
<td>811.179</td>
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<td>Classroom X Masculinity</td>
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<td>Sex X Masculinity</td>
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<td>Classroom X Sex X Masculinity</td>
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<td>0.535</td>
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<td>Within Cells</td>
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<td>224.476</td>
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*P < .05*
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