

1980

The teaching interaction patterns of secondary female physical education teachers with high-skilled students and with low-skilled students

Pamela J. Reisenweaver
Ithaca College

Follow this and additional works at: http://digitalcommons.ithaca.edu/ic_theses

 Part of the [Health and Physical Education Commons](#)

Recommended Citation

Reisenweaver, Pamela J., "The teaching interaction patterns of secondary female physical education teachers with high-skilled students and with low-skilled students" (1980). *Ithaca College Theses*. Paper 224.

THE TEACHING INTERACTION PATTERNS OF SECONDARY FEMALE
PHYSICAL EDUCATION TEACHERS WITH HIGH-SKILLED
STUDENTS AND WITH LOW-SKILLED STUDENTS

by

Pamela J. Reisenweaver

An Abstract

of a thesis submitted in partial fulfillment
of the requirements for the degree of
Master of Science in the School
of Health, Physical Education
and Recreation at
Ithaca College

September 1980

Thesis Advisor: Dr. Victor H. Mancini

ABSTRACT

This investigation was conducted to determine if the teaching interaction patterns of secondary female physical education teachers with high-skilled students and with low-skilled students differed significantly. Fifteen secondary female physical education teachers from northeastern Pennsylvania and central New York served as subjects. Ten students, five high-skilled and five low-skilled, were randomly selected from each class to participate in the study. All subjects were videotaped three times throughout the 1979-80 school year. The tapes made of each teacher were coded by an expert coder using the Dyadic Adaptation of Cheffers' Adaptation of Flanders' Interaction Analysis System (DAC). The data were transposed onto computer cards for analysis. A multivariate analysis of variance determined that teacher and student behaviors were significantly different between the two skill groups. Discriminant function analysis determined the percentage of contribution of each of the nine DAC variables to the between-group difference. Univariate analysis of variance showed significant differences on all nine DAC variables at the .05 level of significance. The high-skilled group had significantly higher scores on teacher praise, teacher acceptance of ideas, teacher questioning, teacher information giving, student interpretive response and student initiated behavior. The low-skilled group had significantly higher scores on teacher directions, teacher criticism, and student predictable behavior. These results led to the rejection of the null hypothesis which stated that there would be no significant difference in the teaching interaction patterns of secondary female physical education teachers with high-skilled students and with low-skilled students.

THE TEACHING INTERACTION PATTERNS OF SECONDARY FEMALE
PHYSICAL EDUCATION TEACHERS WITH HIGH-SKILLED
STUDENTS AND WITH LOW-SKILLED STUDENTS

A Thesis Presented to the Faculty of
the School of Health, Physical
Education and Recreation
Ithaca College

In Partial Fulfillment of the
Requirements for the Degree
Master of Science

by
Pamela J. Reisenweaver

September 1980

Ithaca College
School of Health, Physical Education and Recreation
Ithaca, New York

CERTIFICATE OF APPROVAL

MASTER OF SCIENCE THESIS

This is to certify that the Master of Science Thesis of

Pamela J. Reisenweaver

submitted in partial fulfillment of the requirements
for the degree of Master of Science in the School of
Health, Physical Education, and Recreation at Ithaca
College has been approved.

Thesis Advisor:

Committee Member:

Candidate:

Chairman, Graduate
Programs in Physical
Education: c

Dean of Graduate
Studies:

Date:

August 27, 1980

ACKNOWLEDGMENTS

This investigator would like to take this opportunity to thank the following people:

Dr. Victor H. Mancini, my advisor, who helped make this thesis become a reality through his endless hours of assistance and guidance.

Dr. Patricia A. Frye, my second reader, for her grammatical expertise and help with statistical procedures at all hours of the day.

Reverend Cone and Mrs. Cone, whose efficient typing made all of this look worthwhile.

Brian Streeter, for without his help and friendship, this thesis never would have been completed.

Jennifer "Oscar" Goss and Janice "Flame" Savitz, for making this year at Ithaca one that I will never forget.

Chris McNamara, Paulette Pinchbeck, and the I.C. Women's Swim Team, for giving me many pleasant memories of Ithaca.

DEDICATION

This thesis is dedicated to Ruth and Robert Reisenweaver, my parents, who have always given me their love, and the freedom to do and be what I choose, never asking for anything in return.

TABLE OF CONTENTS

	Page
ACKNOWLEDGMENTS	ii
DEDICATION	iii
LIST OF TABLES	vi
LIST OF FIGURES	vii
Chapter	
1. INTRODUCTION	1
Scope of Problem	3
Statement of Problem	3
Major Hypothesis	3
Assumptions of Study	3
Definition of Terms	4
Delimitations of Study	5
Limitations of Study	6
2. REVIEW OF RELATED LITERATURE	7
Teaching Behaviors with High-Skilled and Low-Skilled Students	7
Interaction Analysis and Dyadic Interaction in Education	9
Dyadic Interaction Analysis in Physical Education . . .	13
Summary	18
3. METHODS AND PROCEDURES	21
Selection of Subjects	21
Testing Instrument	21
Coder Reliability	22

Chapter	Page
Procedure	22
Method of Data Collection	23
Scoring of Data	23
Treatment of Data	23
Summary	23
4. ANALYSIS OF DATA	25
Coder Reliability	25
Analysis of Teachers' and Students' Behaviors	25
Summary	35
5. DISCUSSION OF RESULTS	39
Summary	44
6. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS FOR FURTHER STUDY	46
Summary	46
Conclusions	47
Recommendations for Further Study	48
APPENDICES	49
A. CODER'S RELIABILITY FOR SELECTED SUBJECTS USING SPEARMAN'S r_s	49
B. INFORMED CONSENT FORM--TEACHER COPY	51
C. INFORMED CONSENT FORM--STUDENT COPY	52
D. THE CATEGORIES OF CAFIAS	53
REFERENCES	59

LIST OF TABLES

Table		Page
1.	Coder Reliability	26
2.	Discriminant Function Analysis of Nine DAC Variables	28
3.	Univariate Analysis of Variance for the Nine DAC Variables	29
4.	Means and Standard Deviations of DAC Variables	31
5.	Summary of Most Frequent Interaction Patterns Among the Top 10 Cells of Physical Education Teachers	32

LIST OF FIGURES

Figure	Page
1. Mean percentages for DAC variables	36

Chapter 1

INTRODUCTION

Discussions concerning the [positive and negative outcomes of teachers' expectations on the development of their students have been ^{discussed} conducted by educational theorists throughout the 1900's (Crowe, 1979). Rist (1970) noted that within the classroom there emerge patterns of behavior, expectations of performance, and systems delineating those doing well from those doing poorly.

Rosenthal and Jacobson (1968) provided evidence that teachers give differential treatment to their pupils as a result of the expectations which are held by the teacher. They hypothesized that these expectations for student achievement function as a self-fulfilling prophecy. The self-fulfilling prophecy, as described by Martinek and Johnson (1979), is an expectation which initiates a series of events that causes the original prediction to come true. Accordingly, if a teacher expects a particular student to be a high achiever and begins acting toward that student in a certain manner, that student may live up to these expectations and behave as a high achiever. The same concept would be true of a student expected to be a low achiever; he would behave as he believes he is expected to. Research done by Rosenthal and Jacobson (1968) indicate that a teacher's expectation of his pupil's academic performance may actually influence the performance of that child. After reviewing more than 60 studies dealing with the issue of teacher expectancy effects, Brophy and Good (1970) also concluded that the work done by a large number of investigators supported the self-fulfilling prophecy.

Throughout the past 50 years researchers in education have been investigating interaction patterns between teachers and their students (Allard, 1979). Allard (1979) noted that most observational systems gather information on the entire class thereby overlooking the different teaching behaviors directed at individual students. He recommended the need for research in physical education to focus on teacher interactions with individual students. Teacher-student relationships and interactions are far from uniform. Rist (1970) noted that variations occur for every child in the amount of success, failure, praise, criticism, freedom, and creativity that he/she receives. Brophy and Good (1970) have found that many positive and negative teacher behaviors are directed at individual pupils rather than the entire class. For these reasons this study will focus on dyadic interactions between the teacher and individual students.

Relatively few studies have investigated dyadic teacher-student interactions in physical education. Martinek and Johnson (1979) examined the effects of teacher expectations on specific teacher-student behaviors and the development of students' self-concepts in elementary physical education classes. They found that high expectancy students received more encouragement and acceptance of ideas and had higher self-concepts than low achievers.

Up until this time no study using CAFIAS has focused on the interactions of secondary female physical education teachers with students of different ability levels. This investigation will be based on the findings of expectancy effects provided by the previous studies. An attempt will be made to answer the following question: Do different patterns of teacher-pupil interactions occur in the physical education classroom as a result of the teacher's expectancy of each student in her classroom?

Scope of Problem

This investigation was conducted to compare the teaching interaction patterns of secondary female physical education teachers with high-skilled and with low-skilled students. Fifteen secondary physical education teachers, grades seven through 12, from northeastern Pennsylvania and central New York served as subjects for this study.

Each instructor ranked her students from low skill ability to high skill ability prior to the taping of the first class. The top 33% of the class was identified as high-skilled, and the bottom 33% was identified as low-skilled. Ten students from each class were randomly selected to participate in the study, five from each of the two categories. These students were requested to wear pinnies while the class was videotaped.

Each subject was videotaped three times during the 1979-1980 school year. The three tapes made of each subject were coded using the Dyadic Adaptation of Cheffers' Adaptation of Flanders' Interaction Analysis System (DAC).

Statement of Problem

This investigation was conducted to compare the teaching behavior patterns of secondary female physical education teachers in their interactions with high-skilled students and with low-skilled students.

Major Hypothesis

The teaching interaction patterns of secondary female physical education teachers with high-skilled students will not differ significantly from their interaction patterns with low-skilled students.

Assumptions of Study

The following assumptions were made relative to this investigation:

1. The subjects were representative of the population of secondary

female physical education teachers in northeastern Pennsylvania and central New York.

2. The coding of three physical education classes using DAC was appropriate to yield valid data on the interaction behavior patterns of each teacher.

3. The teachers' rankings of their students provided valid data on the skill ability of their students.

4. It was assumed that there were high-skilled students and low-skilled students in each class.

Definition of Terms

The following terms were operationally defined for the purpose of this study:

1. Interaction analysis is an observational technique that records the frequency of teacher-pupil interpersonal behaviors (Amidon & Hough, 1967).

2. Flanders' Interaction Analysis System (FIAS) is a system designed to objectively analyze the verbal interaction between teachers and pupils as it occurs in the classroom (Amidon & Flanders, 1971).

3. Cheffers' Adaptation of Flanders' Interaction Analysis System (CAFIAS) is a validated extension of FIAS developed to measure verbal and nonverbal behaviors found predominantly in physical education classes (Cheffers, Amidon, & Rodgers, 1974).

4. The Dyadic Adaptation of CAFIAS (DAC) is a validated extension of CAFIAS that provides a method in which the interactions between a teacher and the single student, or a small group of no more than four students, can be recorded and analyzed in a physical education setting (Martinek & Mancini, 1979).

5. Verbal behaviors are "observable, audible human behaviors" (van der Mars, 1979).
6. Nonverbal behaviors are "expressions without words, generally through gestures, facial expressions, body posture, movement, and tone of voice" (Rankin, 1975).
7. Direct teaching behaviors are those types of teacher statements that restrict response by students (Cheffers, Amidon, & Rodgers, 1974).
8. Indirect teaching behaviors are those types of teacher statements that increase student freedom to respond (Cheffers, Amidon, & Rodgers, 1974).
9. High-skilled student is any student whose skill ability, as identified by his/her instructor, is ranked in the top 33% of the class.
10. Low-skilled student is any student whose skill ability, as identified by his/her instructor, is ranked in the bottom 33% of the class.
11. Secondary physical education teachers are individuals who are certified to teach physical education in grades seven through 12.
12. Interaction patterns are verbal and nonverbal behaviors which occur between two or more individuals in a classroom setting.
13. Observed teaching behavior is the conduct of the teacher exhibited in the classroom as recorded by DAC.

Delimitations of Study

The following were delimitations of this study:

1. The subjects were 15 secondary female physical education teachers who were employed by school districts in northeastern Pennsylvania and central New York during the 1979-80 school year.
2. DAC was the only instrument used to record the actual teaching interaction patterns.

3. The teachers' ranking of skill ability was the only procedure used in this study to classify students from low-skill ability to high-skill ability.

4. Each subject was videotaped three times while instructing her class.

5. Ten students, five high-skilled and five low-skilled, were selected from each class to participate in this study.

6. All students selected to be in this study were in grades seven through 12.

Limitations of Study

The following were limitations of this study:

1. The findings related to the teaching interaction patterns of secondary female physical education teachers with high-skilled and low-skilled students may be valid for comparisons only when DAC is used.

2. The findings of this investigation should not be generalized beyond the secondary female physical education teachers in northeastern Pennsylvania and central New York.

Chapter 2

REVIEW OF RELATED LITERATURE

The review of literature relevant to this investigation will focus on the following areas: (a) teaching behaviors with high- and low-skilled students, (b) interaction analysis and dyadic interaction in education, (c) dyadic interaction analysis in physical education, and (d) summary.

Teaching Behaviors with High-Skilled and Low-Skilled Students

Research has provided considerable evidence that teachers interact differently with students of different achievement levels. Brophy and Good (1970) noted that teachers do treat their students differently; students do not receive equal classroom opportunities or equal amounts of praise from their teachers.

Numerous studies (deGroat & Thompson, 1949; Heller & White, 1975; Hoehn, 1954; Horn, 1914; Lahaderne, 1967) have indicated that teachers tend to provide high-skilled and low-skilled students with unequal opportunities for academic responses in the classroom, direct more favorable comments to high-skilled students, and address less favorable comments to low-skilled students. Horn (1914) investigated the opportunity for students to recite in 229 classes. All teachers were requested to rank their students from high to low skill ability. The top 25% of the class was classified as highest in general skill ability and the bottom 25% as lowest. Results indicated that the high-skilled students did about 40% more reciting than the low-skilled students. Teachers' responses to the low-skilled pupils

were conflicting and dominating, whereas their comments to high-skilled students were more supportive. These findings indicate that some teachers allow the better skilled students to participate in classroom discussions more frequently than low-skilled students.

The findings of Hoehn (1954) were similar to those of Horn (1914). He also found that high achieving students received more supportive and promotive comments from their teachers, and that the teachers tended to dominate low achievers. Hoehn (1954) and Lahaderne (1967) suggested that the type of pupil-teacher interaction and frequency of these interactions differ according to the achievement level of the student. DeGroat and Thompson (1949) reported that sixth grade students who received the largest amount of teacher approval throughout the school year were also the best scholars in the class.

Heller and White (1975) conducted a study to examine the rates of teacher approval and disapproval with high and low ability classes. Ten junior high school teachers, five in mathematics and five in social studies, were observed teaching both high and low ability classes. The Teacher Approval-Disapproval Observational Record was used to analyze the data. Findings indicated that teachers voiced more disapproving comments in their low ability classes. Most of these comments were directed at controlling students' social behaviors. The rates of teacher approval did not differ significantly between the two ability groups. It was also noted that most approvals were directed at the academic behaviors of the pupils rather than their social behaviors.

The differences in teacher-pupil contacts with high-skilled and low-skilled students in the previous studies suggest that research should be conducted to investigate patterns of interaction between the teacher and

individual student. Good (1970) stated that if educators are to identify constructive behaviors associated with growth, attention must be focused on differences occurring within the classroom. Therefore, the unit of analysis in classroom life and teacher behavior should be the individual pupil rather than the class as a whole.

Interaction Analysis and Dyadic Interaction
in Education

For more than 50 years researchers in education have been examining teacher-student interactions in the classroom (Allard, 1979). Observational systems in education have been developed for purposes of identifying, classifying, quantifying, and analyzing specific classroom behaviors and interactions (Ober, Bentley, & Miller, 1971). Systematic observation has been defined by Ober et al. (1971) in the following manner:

Systematic observation is an accepted method of organizing observed teaching acts in a manner which allows any trained person who follows stated procedures to observe, record, and analyze interactions with the assurance that others viewing the same situation would agree, to a great extent, with this recorded sequence of behaviors. (p. 16)

These systems include carefully defined categories or items which enable observers to become skilled in identifying and recording brief codes to represent behaviors occurring in the classroom.

One type of systematic observation is entitled interaction analysis. Interaction analysis provides a method for the interactions between a teacher and his students to be categorized by an observer, therefore providing him with objective feedback about the behaviors which occurred throughout the class. Simon and Boyer (1967) stated that there are three

prerequisites which must be met for any interaction analysis system to be effective: (a) it must be descriptive rather than evaluative, (b) it must deal with what can be measured and categorized, and (c) it must deal with small behaviors or acts rather than concepts. These prerequisites were reemphasized later by Martinek and Mancini (1979).

Successful methods of analyzing classroom behaviors have been developed since the early 1900's (Amidon & Hunter, 1966; Dougherty, 1971; Flanders, 1960; Galloway, 1963; Love & Roderick, 1971; Mancuso, 1972; Melograno, 1971; Ober et al., 1971; Withall, 1949). However, educational research has provided relatively little information which teachers can apply in their daily interactions with students. Allard (1979) suggests one reason for this is that very little research has focused on the individual student. Observational systems already available were not designed to classify teacher and student behaviors in those situations where the teacher was dealing with an individual student. Brophy and Good (1970) developed a system to analyze how the child functions in the classroom and to provide information about how the teacher and individual student interact.

The Brophy-Good System was developed to code the interactions between teacher-student dyads. Their system contained the following specifications:

(a) the system is geared to dyadic teacher-student interactions in which the teacher is interacting with individual students, (b) it retains the sequence of action and reaction in each interchange so that the effects due to the behavior of the teacher can be separated from those due to the behavior of the student, (c) it is designed so that interactions can be coded by classroom observers as they occur without requiring videotape equipment, and (d) it is sensitive to the teachers' communication of their expectations for student performance.

(Brophy & Good, 1974b, pp. 88-90)

Good and Brophy (1970) hypothesized that teachers do treat their students differently and that many factors of classroom interaction can be more appropriately analyzed with the use of a dyadic interaction analysis system such as theirs. They noted the following benefits of this system: (a) it can show teachers which students receive little or no recognition and which receive primarily negative comments, (b) it can provide teachers with information about differential treatment toward minority groups, males, and females, and (c) it can provide supervisors with information that they can use in a positive manner to change teacher behavior (Brophy & Good, 1974a).

Brophy and Good (1970) used their dyadic system to examine the relationship between teacher expectancies and pupil achievement with first grade students. Results indicated that high achievers initiated more contacts with teachers, teachers demanded better performances from students designated as high achievers, and teachers were more likely to praise those children for whom they held higher expectations. When low expectation students could not answer questions, teachers either answered the question for them or called on someone else; with high expectation children they either repeated or rephrased the question. Numerous followup studies (Cornbleth, Davis, & Button, 1972; Good, Sikes, & Brophy, 1972; Jeter & Davis, 1972; Mendoza, Good, & Brophy, 1972) conducted at the junior high and high school levels supported the findings of the original study done by Brophy and Good (1970).

Evertson, Brophy, and Good (1972) replicated the initial study (Brophy & Good, 1970) with first grade students and also tested the relationship between teacher expectancies and pupil achievement. Results indicated that

teachers were consistently compensating for the tendency of high-expectancy students to demand more of their attention by seeking out low-expectancy pupils for contacts, and persistently explained the work to them. Overall, teachers showed no evidence of favoring highs or of treating them more appropriately than lows. Other studies (Brophy, Evertson, Harris, & Good, 1973; Evertson, Brophy, & Good, 1973) also conducted at the elementary level supported these results. The findings of Brophy et al. (1973) confirmed the hypothesis that as students get older, expectations are more likely to show up in quantitative rather than qualitative measures, even though the overall results of expectancy effects were negative.

Hillman and Elliot (1978) used the Brophy-Good System to analyze the verbal behavior patterns of teachers in integrated classrooms of the Detroit public schools. Teachers in desegregated schools were involved in an in-service program to provide equal instructional opportunity in each of the involved classrooms. Part of the program involved using the Brophy-Good System to collect data about teacher-student interactions in each teacher's classroom. The results indicated that teachers interacted more frequently with males than they did with females, and more often with black students than white students. White teachers were found to interact more frequently with their students than black teachers. Although female teachers had a higher rate of instructional activity than male teachers, it was found that both men and women acted in very similar ways with their students.

The mixed results of the studies employing the Brophy-Good System reflect the varied outcomes obtained in this field of research as a whole. Taken together, they provide evidence that the differences observed in the initial study of Brophy and Good (1970) and others since then are a part

of the process by which teacher expectancies operate. At the same time these mixed results indicate that interactions are not universal across teachers and that susceptibility to expectation effects is an individual difference variable.

Dyadic Interaction Analysis in Physical Education

Throughout the past decade researchers in physical education (Cheffers, 1972; Dougherty, 1971; Fishman, 1975; Hurwitz, 1975; Johnson, 1975; Laubach, 1974; Mancuso, 1972; Melograno, 1971) have used systematic observation instruments to record and analyze events which were happening in the gymnasium. The most widely used interaction analysis system in education was developed by Flanders (Charles, 1972). The Flanders Interaction Analysis System (FIAS) was designed to observe and code the verbal interaction and sequence of these interactions between a teacher and his students. Finding limitations with the use of FIAS, Cheffers (1972) further adapted the system for use in a physical education setting. Cheffers' Adaptation of Flanders' Interaction Analysis System (CAFIAS) included the following modifications: (a) teacher and student behaviors could now be categorized verbally, nonverbally, or both verbally and nonverbally, (b) the class structure could be broken down into whole or part, and (c) the teaching agent could be classified as teacher, student, or environment.

Previously, studies in physical education provided information about the interaction patterns of teachers which were directed at the entire class rather than individual students. As noted by Brophy and Good (1970), many of the interactions between the teacher and an individual pupil often go unnoticed. Considerable evidence has been found to support the belief that large intra-class variations in teacher-pupil interaction patterns

are the norm rather than the exception (Brophy & Good, 1970). In order to record differential treatment of students, observational systems must record teacher behaviors directed at the individual student. Allard (1979) notes that there are important differences in individual student behavior which may be attributed to the student's sex, race, socio-economic status or treatment that the student receives from his teacher. Consequently a more complete description of the interaction patterns between the teacher and a particular student can be obtained by studying the interactions of teacher-student dyads. The information obtained by using this type of system can provide the teacher with information that may make him more aware of student behaviors and individuality, as well as the manner in which he interacts with his students (Martinek & Mancini, 1979).

Martinek and Mancini (1979) further adapted CAFIAS with the development of the Dyadic Adaptation of Cheffers' Adaptation of Flanders' Interaction Analysis System (DAC). This system was designed to measure the dyadic interaction between the teacher and a particular student. The following procedures were added to those used in CAFIAS: (a) identification of each student must be done prior to the start of the class to be observed, (b) the only behavior to be coded is that between the teacher and the individual students or small groups of no more than four pupils, and (c) behavior tallies on the recording sheet are accompanied by a numbered subscript representing the individual student or small group of students to or from which the behavior was directed. When using DAC, coding can be done live or by use of videotape. Data analysis with this system allows for viewing of students' interactions independently or as a group. Martinek and Mancini (1979) stated that DAC was designed to provide pre- and in-service teachers with descriptive data regarding their teaching

behaviors directed to individual students.

Until recently relatively few studies in physical education have utilized dyadic interaction analysis systems. Four recent studies (Crowe, 1979; Devlin, 1979; Martinek & Johnson, 1979; Oien, 1979) have used modified observational instruments to investigate teacher behaviors which are directed at individual students in the physical education class.

Several researchers (Crowe, 1979; Martinek & Johnson, 1979; Oien, 1979) have used dyadic systems to investigate teacher expectation effects on students. These studies are based on evidence about expectation effects provided in Rosenthal and Jacobson's (1968) book, Pygmalion in the Classroom. They hypothesized that teachers give differential treatment to their pupils as a result of certain expectations which are held by the teacher. Furthermore, they predicted that these expectations for student achievement would function as a self-fulfilling prophecy. The self-fulfilling prophecy, as described by Martinek and Johnson (1979), is an expectation or prediction which initiates a series of events that cause the original expectation to come true. In other words, if a teacher expects a particular student to be a high achiever and begins acting toward that student in a certain manner, the student may live up to these expectations and behave as a high achiever. The same concept would also be true of a student expected to be a low achiever; he would also behave as he believes he is expected to.

Martinek (1979) points out that while teachers purport to focus on the total growth and development of every child in the class, in reality only a few children profit from the teaching process. He developed an instructional model with the following tenets to investigate the pygmalion effect in physical education classes:

(a) teachers form expectations of their students as a result of perceptions gained through previous contact with the student, or by the receiving of past information about the student's achievement potential, (b) expectations ultimately affect the quantity and quality of the interaction between the teacher and student, (c) teacher expectation, in conjunction with the quality of interaction, can influence specific behavior of the student, and (d) expectancy outcomes will subsequently reinforce those initial expectations formed by the teacher. (Martinek, 1979, p. 8)

The three major variables of his model were identified in the following manner: (a) the expectation source variable (student's age, sex, performance ability), (b) interactive variable (dyadic interaction between the teacher and student), and (c) expectancy outcome variable (student's self-concept, physical performance, expectations).

Martinek and Johnson (1979) utilized DAC to examine the effects of teacher expectations on specific teacher-student behaviors and the development of students' self-concepts in elementary physical education classes. They hypothesized that different patterns of teacher-student interaction take place as a result of certain expectations held by teachers for each student in their classes. Results indicated that the high expectancy group received significantly more encouragement, acceptance of ideas, and analytic-type questions. It was also found that males gave more rote responses than females and the expected high achievers had higher self-concepts than low achievers.

With the use of the Brophy-Good System for analysis of dyadic interaction, Crowe (1979) examined the effects of teacher expectations on five variables (climate, feedback, output, input, and touch) with low and

high expectancy junior high school students. Results indicated that students designated as high achievers were asked more questions, given more opportunities to respond, treated with more warmth, taught more new materials, given more attention, and given more affirmative comments when eliciting desired responses to questions. No significant differences were found in the frequency with which the teachers touched their students. The findings of Crowe (1979) and Martinek and Johnson (1979) imply that students are treated differently according to their teachers' expectations of them.

Oien (1979) conducted a study which used a modification of FIAS and CAFIAS to explore the quality and quantity of individualized teacher behavior based on student gender and teacher's perception of the student's in-class personality, skill performance level, and participation. The Individualized Teacher Behavior Analysis System (TBAS), developed by Dr. George Lewis, was used to collect and analyze the data from junior high school physical education classes. Results showed that boys were the recipients of more praise and encouragement, questions, lectures, directions, and criticisms than girls.

Devlin (1979) conducted a study to determine if disruptive elementary age children, who were taught specific contingency management skills, could alter their physical education teacher's behavior. She also wanted to determine what effects the learning of contingency management skills would have on the disruptive child's self-concept. The testing instruments for the investigation were DAC, which was used to assess teacher-student interactions, and the Martinek-Zaichkowsky Self-Concept Scale (MZSCS), which was used to measure the students' self-concepts. Findings indicated that teaching contingency management skills to disruptive students was

successful in altering physical education teachers' direct teaching behavior (lecture, directions, criticism) to indirect teaching behavior (praise, encouragement, use of students' ideas, and questioning). Students in the treatment group became more independent, initiated more positive behaviors, and responded with more interpretation to the indirect teaching of their teachers. The self-concepts of the disruptive students were favorably influenced through learning and practicing the contingency management skills.

The data gathered through the use of dyadic interaction analysis systems can be used to provide both educators and researchers with valuable information about teacher-pupil interactions occurring in a physical education setting. Allard (1979) noted that further investigations of this nature are needed because individual patterns of interaction are an important factor to consider when analyzing the performance of any group. The nature of differences in the individual's experiences are a necessary ingredient to fully understand the interaction between a teacher and his pupils. Most importantly, the knowledge gained through the use of these systems can be instrumental in improving teaching practices and enhance classroom functioning in the future.

Summary

It has been suggested that the type of teacher-pupil interactions and the frequency of these interactions differ according to the achievement level of the student (Hoehn, 1954; Lahaderne, 1967). Brophy and Good (1970) stated that teachers treat their students differently with respect to amount of praise and opportunities to respond in the classroom. Numerous studies (deGroat & Thompson, 1949; Heller & White, 1975, Hoehn, 1954; Horn, 1914; Lahaderne, 1967) indicated that teachers provide high- and low-skilled

students with unequal opportunities for response and direct more favorable comments to high-skilled students. Horn (1914) found that high-skilled students recited in class 40 percent more often than low-skilled students. Heller and White (1975) found that low-ability students received more negative comments from their teachers and most of these comments were directed at controlling their social behavior. The results of these studies suggest that educational research should focus on the dyadic interactions which occur between the teacher and an individual student.

Brophy and Good (1970) developed a dyadic interaction system to study teacher expectancies and pupil achievement within the classroom. They found that high achievers initiated more contacts with teachers, teachers demanded better performances from designated high achievers, and were more likely to praise those children for whom they held higher expectations. Numerous studies (Cornbleth et al., 1972; Good et al., 1972; Jeter & Davis, 1972; Mendoza et al., 1972) at the junior high and high school levels have supported these findings. Evertson et al. (1972) replicated the original study (Brophy & Good, 1970) with elementary students and found that teachers consistently compensated for the tendency of high-expectancy students to demand more of their attention by seeking out low-expectancy students for contact. Evertson et al. (1973) and Brophy et al. (1973) found similar results at the elementary level. Hillman and Elliot (1978) used the Teacher-Child Dyadic Interaction System to analyze the verbal behaviors of public school teachers and found that males and blacks received a greater rate of classroom interactions with the teachers. Although they found that female teachers had a higher rate of instructional activity in their classes, both men and women interacted in similar ways with their students.

Allard (1979) recommended the need for studying dyadic interactions in the physical education setting in order to achieve a more complete description of teacher-pupil interactions. He stated that teachers treat students differently according to their sex, socioeconomic status, and race. Crowe (1979), Martinek and Johnson (1979), and Oien (1979) modified observational systems to study dyadic interactions in the physical education classroom. Crowe (1979) and Martinek and Johnson (1979) found that elementary and junior high school students classified as high achievers received more encouragement, acceptance of ideas, and questions from their teachers than low achievers. Oien (1979) found that junior high boys received more praise, encouragement, questions, criticisms, lectures, and directions than girls. Devlin (1979) found that disruptive elementary school children trained in contingency management skills could alter their physical education teachers' behaviors from direct to indirect teaching. Allard (1979) stresses that further investigations of dyadic interactions are needed since individual patterns of interaction are an important factor to consider when analyzing the performance of any group.

Chapter 3

METHODS AND PROCEDURES

In this chapter the procedures, the selection of subjects and the testing instrument employed in this investigation are described. The establishment of coder reliability and statistical analysis applied to the data are also explained. In a final section the methods and procedures used in the study are summarized.

Selection of Subjects

The subjects for this investigation were 15 secondary female physical education teachers who were employed by school districts throughout northeastern Pennsylvania and central New York during the 1979-80 school year. Ten students, five high-skilled and five low-skilled, from each teacher's class were randomly selected by pulling names out of a hat to participate in the study.

Testing Instrument

The testing instrument used to measure the teaching behavior of the subjects was the Dyadic Adaptation of CAFIAS (DAC). This system was designed to provide pre- and in-service teachers with descriptive data regarding their teaching behaviors which they directed toward individual students (Martinek & Mancini, 1979). It provides a method in which the interactions between a teacher and a single student, or a small group of no more than four students, in a physical education setting can be recorded and analyzed. Teacher behaviors directed at the entire class are not recorded. The coding procedures and ground rules of DAC are the same as those used in CAFIAS. Verbal and nonverbal behaviors are recorded every

3 seconds, or as often as they change, whenever an interaction occurs between the teacher and specified students in the class.

Coder Reliability

Coder reliability was determined by the use of the Spearman rank-order correlational technique. Two videotaped classes of two subjects were randomly selected. These tapes were coded once by an expert coder trained in the use of DAC and then subjected to a repeated coding on a separate sitting by the same coder.

Procedure

The investigator contacted 15 secondary female physical education teachers to serve as subjects in this study. A class schedule was obtained from each subject, and a period was selected in which each subject would be videotaped. Each teacher was videotaped in the same class, for the entire period, on three different occasions. During this time all subjects were requested to wear a microphone which did not interfere with their teaching activities.

Ten students from each teacher's class were also selected to participate in this investigation. Prior to videotaping the first class, each teacher was required to rank her students from low-skill to high-skill ability. The top 33% of the class was designated as high-skilled and the bottom 33% as low-skilled. Ten students, five high-skilled and five low-skilled, were randomly selected to wear pinnies on the 3 days that the class was videotaped. The pinnies were numbered 0 through 9 in order to distinguish students throughout the data collection and analysis. Each student was required to wear the same number each day the class was videotaped.

Method of Data Collection

Data for the analysis were gathered from the three videotapes taken of each teacher. The videotapes were coded by an expert coder using DAC.

Scoring of Data

Data gathered from the codings of DAC were transferred to a recording sheet. A tally was placed in the appropriate cell across from the student's name and identification number. The data were then scored separately for each individual student in the following sequence: (a) each cell total was summed and recorded by writing over the tallies, (b) each student received a total number of tallies, (c) each cell received a percentage by dividing that cell total by the student's total score, and (d) verbal and nonverbal cells of each of the 20 CAFIAS behaviors were combined thus providing 10 percentages for each student. These percentages were transferred onto separate data cards for each student for computer analysis.

Treatment of Data

To determine whether differences in the teaching interaction behavior patterns of secondary female physical education teachers, as identified by DAC, occurred with high-skilled and low-skilled students, a multivariate analysis of variance was used. The results of this procedure were analyzed by discriminant function analysis to determine the DAC variables which accounted for a significant amount of between-group variance. Univariate analysis of variance was performed on each DAC variable to determine if the interaction with the two groups differed significantly on that variable considered by itself, or independent of the other eight variables. The .05 level of significance was set for all tests prior to data collection.

Summary

The subjects for this study were 15 secondary female physical education

teachers. All subjects ranked their students from low to high skill ability. Ten students, five high-skilled and five low-skilled, were randomly selected from each class to participate in the study. Each subject was videotaped in the same class on three different occasions for the entire class period.

Data on the interaction behavior patterns of the subjects and the specified students were gathered through the codings of an expert coder using DAC. The data from these codings were transferred to computer cards for analysis.

Multivariate analysis of variance was performed to determine if significant differences exist in the interaction patterns of the teacher with each of the two skill groups. Discriminant function analysis was used to determine which DAC variables accounted for a significant amount of the between-groups variance.

The .05 level of significance was set for all tests prior to the collection of data.

Chapter 4

ANALYSIS OF DATA

In this chapter are presented the results found when the teaching behaviors of secondary female physical education teachers with high-skilled and low-skilled students were compared. The Dyadic Adaptation of CAFIAS (DAC) was used to measure the behaviors of the teachers and students. All of the categories used in DAC were the same as those comprising the CAFIAS system (see Appendix D), and its variables will be referred to as DAC variables throughout this chapter. Coder reliability is also discussed and the chapter concludes with a summary of the investigation.

Coder Reliability

Reliability of the coder for this study was determined in the following manner. Two videotaped classes, one from each of two physical education teachers, were randomly selected by the investigator. Each tape was coded on two independent observations. A Spearman rank-order correlation was calculated for the top 10 cell concentrations for the two independent observations (see Appendix A). The mean score of the correlation was .9863; this was sufficient to indicate that the coder was reliable. Data from the correlations can be found on Table 1.

Analysis of Teachers' and Students' Behaviors

A multivariate analysis of variance (MANOVA) was performed on the scores of the nine DAC variables from both groups to determine if the teaching interaction patterns with the low-skilled group and the high-skilled group differed significantly. The multivariate difference between the skill groups for the nine variables was statistically significant,

Table 1
Coder Reliability*

Physical Education Teacher	<u>r_s</u>	<u>M</u>
Teacher 1	.9879	.9863
Teacher 2	.9848	

*Coder reliability determined by a Spearman rho comparison of the coding of teaching behaviors for the two independent observations.

$F(9,112) = 60.844, p < .05$. Therefore, the null hypothesis which stated that there would be no significant differences between the teaching interaction patterns of secondary female physical education teachers with high-skilled and with low-skilled students was rejected.

Discriminant function analysis was used to determine the contribution of each of the nine DAC variables to the significant multivariate difference. Table 2 indicates that the first three variables accounted for over 80% of the variance. Teacher acceptance contributed 47.10% to the discriminant function, followed by teacher praise which contributed 22.74%. Teacher criticism was third, contributing 10.26%. The remaining variables contributed less than 20% to the discriminant function.

Univariate analysis of variance was performed on each DAC variable to determine if that variable differed significantly when considered by itself, or independent of the other eight variables. The means and standard deviations of the DAC variables can be found on Table 4. Interactions with the high-skilled group included significantly more teacher praise, teacher acceptance of students' ideas and actions, teacher questioning, teacher information giving, student interpretive response, and student initiated behavior. Teacher directions, teacher criticism, and predictable student response showed a significantly greater percentage of occurrence with the low-skilled group.

The top 10 ranked cell frequencies of interaction patterns and their percentage of occurrence for both skill groups are illustrated on Table 5. A description of each interaction pattern can be found below the table. The density of tallies in the cells determined the predominant teachers' and students' behaviors and also the sequence of these behaviors. Of the 10 most frequent interaction patterns, six were common to both the high-skilled

Table 2
Discriminant Function Analysis of Nine DAC Variables

Ranked Variable	Standardized Discriminant Weights	Percentage of Contribution to Discriminant Function
Teacher Acceptance	.68633	47.10
Teacher Praise	.47691	22.74
Teacher Criticism	-.32030	10.26
Student Predictable Response	-.28474	8.11
Teacher Directions	-.19560	3.83
Teacher Questioning	.17615	3.10
Student Initiated Behavior	-.15937	2.54
Student Interpretive Behavior	.15094	2.28
Teacher Information Giving	-.01870	.03

Table 3
Univariate Analysis of Variance for the Nine DAC Variables

Source of Variation	Sum of Squares	df	Mean Square	F
Teacher Praise				
Group	1879.6691	1	1879.66910	71.840*
Teacher	3342.0944	14	238.72103	9.124*
Group x Teacher (GxT)	1474.8384	14	105.34560	4.026*
Error within G x T	3139.7720	120	26.16477	
Teacher Acceptance				
Group	2565.9744	1	2565.97440	139.628*
Teacher	1372.9364	14	98.06689	5.336*
Group x Teacher (GxT)	2650.1564	14	189.29688	10.301*
Error within G x T	2205.2610	120	18.37717	
Teacher Questioning				
Group	133.8971	1	133.89706	10.763*
Teacher	484.7734	14	34.62667	2.783*
Group x Teacher (GxT)	201.6707	14	14.40505	1.158
Error within G x T	1492.8473	120	12.44039	
Teacher Information Giving				
Group	328.4712	1	328.47124	7.021*
Teacher	2258.9068	14	161.35049	3.449*
Group x Teacher (GxT)	899.5816	14	64.25583	1.373
Error within G x T	5613.9266	120	46.78272	
Teacher Directions				
Group	10656.0260	1	10656.02600	192.547*
Teacher	18409.4690	14	957.81918	17.307*

Table 3 (continued)

Source of Variation	Sum of Squares	df	Mean Square	F
Group x Teacher (GxT)	6645.0730	14	460.36236	8.318*
Error within G x T	6641.0852	120	55.34238	
Teacher Criticism				
Group	240.3628	1	240.35275	16.001*
Teacher	379.0986	14	27.07847	1.803*
Group x Teacher (GxT)	410.5910	14	29.32793	1.952*
Error within G x T	1802.5889	120	15.02157	
Student Predictable Response				
Group	5329.1929	1	5329.19290	152.822*
Teacher	5583.1411	14	398.79508	11.436*
Group x Teacher (GxT)	4048.1984	14	289.15703	8.292*
Error within G x T	4184.6189	120	34.87182	
Student Interpretive Response				
Group	2074.3469	1	2074.34690	77.219*
Teacher	6525.7077	14	466.12198	17.352*
Group x Teacher (GxT)	1832.5806	14	130.89862	4.873*
Error within G x T	3223.5760	120	26.86313	
Student Initiated Response				
Group	135.4510	1	135.45099	6.123*
Teacher	695.7924	14	49.69946	2.247*
Group x Teacher (GxT)	561.0173	14	40.07267	1.811*
Error within G x T	2654.5851	120	22.12154	

* $p < .05$.

Table 4
Means and Standard Deviations of DAC Variables

Variable	Low-skilled		High-skilled	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
Teacher Praise	4.775	6.310	11.855	8.229
Teacher Acceptance	4.268	6.598	12.540	6.374
Teacher Questioning	2.520	3.631	4.410	4.033
Teacher Information Giving	13.798	8.731	16.757	6.506
Teacher Directions	29.913	14.334	13.056	12.353
Teacher Criticism	4.210	5.076	1.678	3.045
Student Predictable Response	27.870	9.157	15.949	10.142
Student Interpretive Response	7.228	8.907	14.665	8.785
Student Initiated Behavior	3.475	4.970	5.376	5.306

Table 5
 Summary of Most Frequent Interaction Patterns Among
 the Top 10 Cells of Physical Education Teachers

Low Skill		High Skill	
Interaction Patterns	Percentage of Occurrence	Interaction Patterns	Percentage of Occurrence
6-8	18.81	8\3	6.96
8-6	9.71	6-8	6.87
5-6	6.58	8\2	5.22
8-5	5.05	3-5	4.68
5-5	4.65	5-8\	4.54
8-3	4.25	2-5	4.14
6-8\	3.06	5-6	3.96
5-8	2.98	8-3	3.70
3-5	2.48	5-5	3.30
3-6	2.07	6-8\	3.04

6-8	teacher directions followed by student predictable response
8-6	student predictable response followed by teacher directions
5-6	teacher information giving followed by teacher directions
8-5	student predictable response followed by teacher information giving
5-5	extended teacher information giving
8-3	student predictable response followed by teacher acceptance of students' ideas and actions
6-8\	teacher directions followed by student interpretive response
5-8	teacher information giving followed by student predictable response

Table 5 (continued)

- 3-5 teacher acceptance of student ideas and actions followed by teacher information giving
- 3-6 teacher acceptance of student ideas and actions followed by teacher directions
- 8\3 student interpretive response followed by teacher acceptance of student ideas and actions
- 8\2 student interpretive response followed by teacher praise
- 5-8\ teacher information giving followed by student interpretive response
- 2-5 teacher praise followed by teacher information giving

group and low-skilled group.

The patterns of behavior for the low-skilled group were dominated by teacher directions, followed by a predictable student response (6-8). The teachers gave more information and directions to this group (5-6). The students then reacted with predictable behaviors which were accepted by the teacher (8-3). The teachers continued to give more information for an extended period of time (5-5), and the sequence continued with predictable student behavior (5-8).

The following sequence of behaviors occurred between the teachers and the high-skilled students: interpretive student behavior was followed by teacher acceptance of student actions and ideas (8\3). This was followed by teacher directions which initiated predictable student behavior (6-8). The sequence continued with student interpretive behavior to which the teacher reacted with praise (8\2). This was followed by teacher information giving and directions (5-6) to which the students responded with predictable behavior that was accepted by the teachers (8-3). The sequence continued with interpretive student response followed by teacher information giving (8\5).

The interaction patterns of teacher directions followed by predictable student response (6-8) and teacher information giving followed by teacher directions (5-6) occurred as 18.81% of the behavior with the low-skilled students as compared to 3.04% with the high-skilled students. On the other hand the high-skilled group was found to have a greater percentage of occurrence (4.68%) of teacher acceptance of student ideas and actions followed by teacher information giving (3-5) than the low-skilled group (2.48%). The percentage of occurrence of teacher directions followed by student interpretive response (6-8\) was approximately the

same for both groups.

The following interaction patterns occurred as predominant patterns only with the low-skilled group: student predictable response followed by teacher directions (8-6) and teacher information giving (8-5); teacher information giving followed by student predictable response (5-8); and teacher acceptance of student ideas and actions followed by teacher information giving (3-5). Interactions found as predominant patterns with only the high-skilled students included student interpretive behavior followed by acceptance (8\3) and praise (8\2); teacher information giving followed by student interpretive response (5-8\); and teacher praise followed by teacher information giving (2-5).

Figure 1 illustrates the behavioral differences between the teachers' interaction patterns with the two skill groups on each of the nine DAC variables. Mean percentages of the verbal and nonverbal variables for both groups are compared on a bar graph. The high-skilled group received more praise, acceptance of ideas and actions, questions, and information from their teachers. They also exhibited a broader interpretation of teachers' activities and more initiative than the low-skilled group. The low-skilled students received more directions and criticisms from their teachers which resulted in predictable student responses.

Data analysis also indicated that overall teachers interacted more frequently with high-skilled students than they did with the low-skilled students. The computer printout indicated 7062 tallies for the high-skilled group and 5032 tallies for the low-skilled group.

Summary

Coder reliability for this study was determined by randomly selecting one videotaped class session from two physical education teachers and

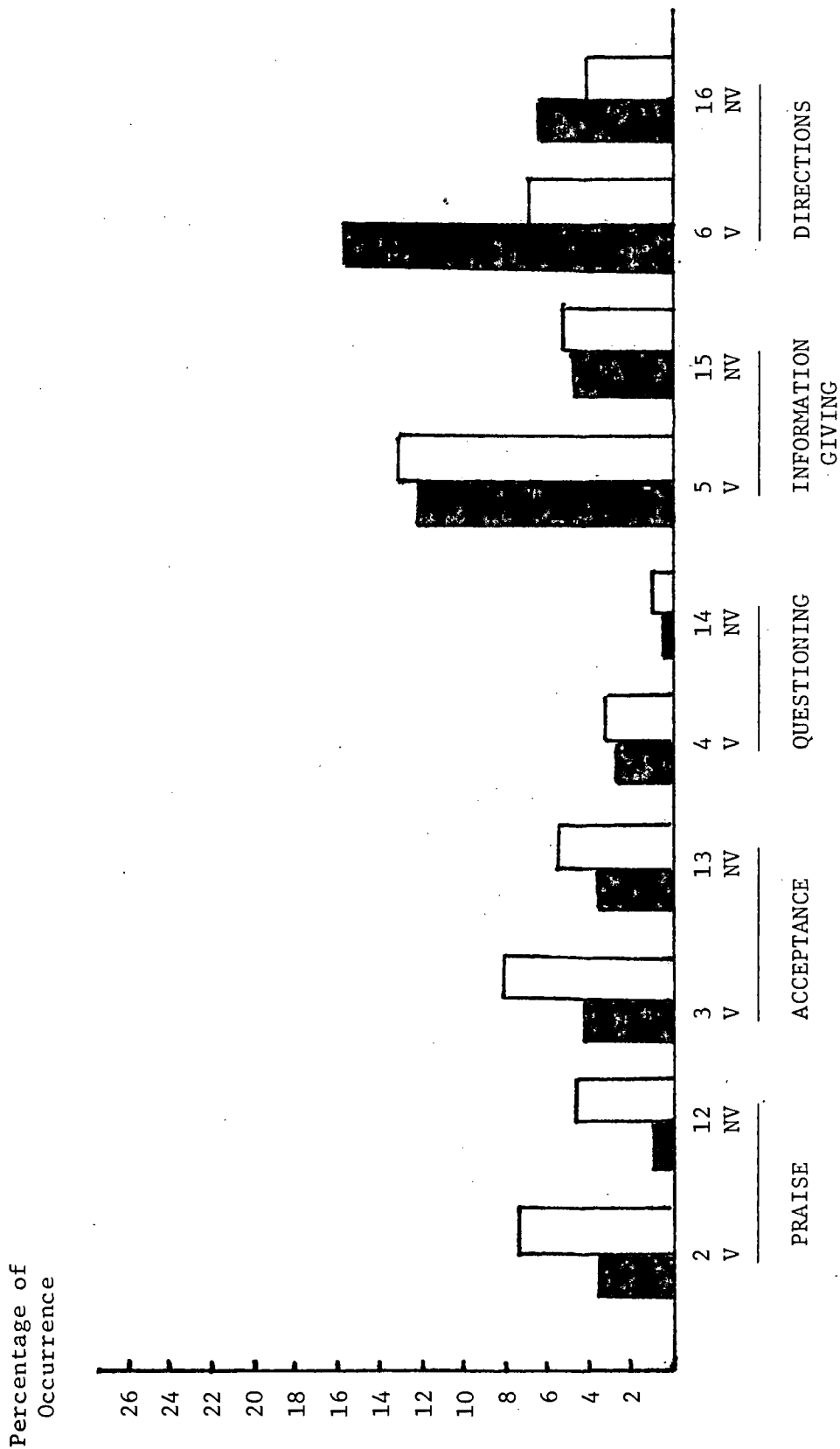


Figure 1. Mean percentages for DAC variables.

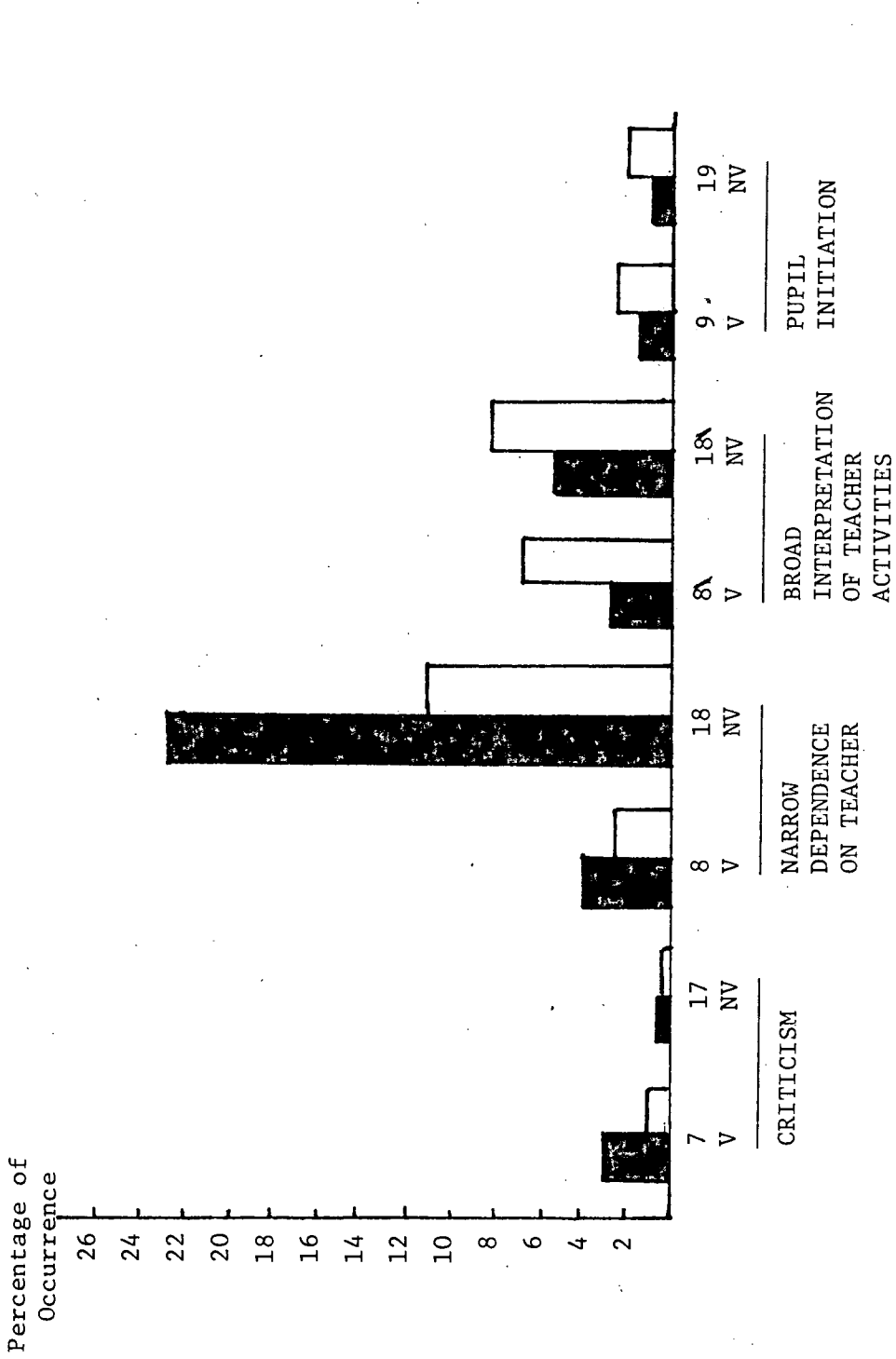


Figure 1. (continued)

subjecting them to two independent codings. A Spearman rank-order correlation was determined for the top 10 cell concentrations for the two independent observations (see Appendix B). A mean correlation of .9863 indicated that the coder in this investigation was reliable (see Table 1).

A multivariate analysis of variance (MANOVA) was run on the scores of the nine DAC variables to determine if the behaviors of the high-skilled and low-skilled groups were significantly different in teachers' and students' behaviors. The multivariate difference in behaviors between the skill groups for the DAC variables was statistically significant, $F(9, 112) = 60.844, p < .05$.

A discriminant function analysis (see Table 2) revealed that teacher acceptance of student ideas and actions, teacher praise, and teacher criticism contributed over 80% to the between-group variance. A univariate analysis was performed on each DAC variable to determine on which variables the groups differed significantly when each variable was considered independent of the other eight variables. The results of this analysis showed significant differences on all nine DAC variables at the .05 level of significance. The results of these tests and a comparison of the top 10 interaction patterns led to the rejection of the null hypothesis which stated that there would be no significant differences between the teaching interactions of secondary female physical education teachers with high-skilled and with low-skilled students.

Chapter 5

DISCUSSION OF RESULTS

This study is the first in physical education to utilize the Dyadic Adaptation of CAFIAS (DAC) to investigate the teaching interaction patterns of secondary female physical education teachers with high-skilled students and low-skilled students. It is similar to the study done by Martinek and Johnson (1979) which was conducted in elementary physical education classes to compare the interaction patterns of teachers with high- and low-achieving students. DAC was used in this study for the purpose of obtaining a closer look at the dyadic interactions which occurred between the physical education teacher and specified students in her class. Martinek and Johnson (1979) and Devlin (1979) are the only other researchers in physical education who have used DAC as an observational tool to investigate teacher-student interactions. This chapter will provide the reader with an overview of the statistical results with other investigations related to it.

Multivariate analysis of variance (MANOVA) was performed on the scores of the nine DAC variables. This revealed significant differences in interactions with the low-skilled group and the high-skilled group, $F(9, 112) = 60.844, p < .05$. These results led to the rejection of the null hypothesis which stated that no significant differences would occur in the teaching interaction patterns of secondary female physical education teachers with low-skilled and with high-skilled students.

Discriminant function analysis was used to determine the contribution of each of the nine DAC variables to the significant multivariate

difference. Teacher acceptance, teacher praise, and teacher criticism accounted for 80.10% of the between-group variance (see Table 2).

A univariate analysis of variance was performed on each DAC variable to determine if the groups differed significantly on that variable when considered by itself, or independent of the other eight variables. Results indicated significant differences on all nine variables at the .05 level of significance (see Table 3). Interactions with the high-skilled group included significantly more teacher praise, teacher acceptance of student ideas and actions, teacher questioning, teacher information giving, student interpretive response, and student initiated response. The remaining variables of teacher directions, teacher criticism, and predictable student response had significantly greater percentages of occurrence with the low-skilled group.

The top 10 ranked cell frequencies and their percentages of occurrence for both skill groups can be found on Table 5. A comparison of the interaction patterns indicated that seven of these patterns were common to both groups. These patterns included the following: teacher directions followed by student predictable response, teacher information giving followed by teacher directions, extended teacher information giving, student predictable response followed by teacher acceptance of student ideas and actions, teacher directions followed by student interpretive response, teacher information giving followed by predictable student response, and teacher acceptance of student ideas and actions followed by teacher information giving.

The results of this investigation are similar to those found by Martinek and Johnson (1979) in physical education and numerous researchers (Brophy & Good, 1970; deGroat & Thompson, 1949; Heller & White, 1975; Horn,

1914; Lahaderne, 1967) in education. As stated earlier, Martinek and Johnson (1979) conducted the only other study in physical education which utilized DAC to investigate teacher interactions with high-achieving and low-achieving students. The results of this study will be compared with theirs and others done in general education.

Several studies (Brophy & Good, 1970; deGroat & Thompson, 1949; Hoehn, 1954; Horn, 1914) have indicated that teachers direct more encouragement and acceptance to high-achieving students. Martinek and Johnson (1979) found evidence indicating that physical education teachers gave more praise to expected high achievers than expected low achievers. Brophy and Good (1970) noted that elementary teachers were more likely to praise those children for whom they held higher expectations. DeGroat and Thompson (1949) reported that the students who received the largest amount of teacher approval throughout the school year were also the best scholars. As stated earlier, results of the present study indicated teachers praised high-skilled students more often than low-skilled students. Findings of the previously mentioned studies coincide with this.

Conversely, the results of this investigation indicated that the low-skilled students received more criticism from their teachers than the high-skilled students. The findings of Heller and White (1975), Hoehn (1954), and Horn (1914) also indicated that teachers tended to dominate low achievers and voiced less favorable comments to the low-skilled students. Lahaderne (1967) suggested that the type of pupil-teacher interaction differed according to the achievement level of the student.

The findings of this investigation indicated that teachers directed more questions to high-skilled students than to low-skilled students. These results were supported by Brophy and Good (1970) and Martinek and

Johnson (1979). In the study by Brophy and Good (1970), when low-expectation students could not answer questions the teacher answered the question for them. When high-expectation students could not answer a question the teacher either repeated or rephrased the question. The results from Martinek and Johnson's (1979) study indicated that the high-expectancy group received more analytic-type questions than the low-expectancy group.

Results of the present study showed that the high-skilled students received more information from their teachers than low-skilled students. None of the previously mentioned studies discussed this variable. This finding is difficult to interpret. Perhaps it implies that teachers gave more information to the high-skilled students because they expected more from them. These pupils already possessed a basic understanding of the material which was being taught and their teachers possibly were trying to build upon that foundation.

This study indicated that the low-skilled students received more directions from their teachers than the high-skilled students. Martinek and Johnson (1979) found contrasting results in elementary physical education classes. It is possible that the teachers at the secondary level gave more detailed instructions to the low-skilled group in order to clarify what was expected of them. It is suggested that further studies be conducted to gather additional information about this variable.

The behavior of the low-skilled group was characterized by predictable student response, whereas the high-skilled group tended to respond with more interpretation. Similar results were reported by Brophy and Good (1970). In general, direct teaching behavior (i.e., lecture, directions, criticism) results in predictable student behavior. This would explain the behavior

of the low-skilled students. The behavior of the high-skilled students can be linked with the indirect teaching behavior (i.e., praise, acceptance, of student ideas and actions, questioning) and information directed to this group. Since the teachers offered the high-skilled students more opportunities to respond and followed up those responses with praise and acceptance, it is possible that this resulted in making these students feel less inhibited and threatened. This resulted in more give and take between the teacher and these students which was characterized by the high-skilled group asking more questions of their teachers and initiating more conversations with them.

Further results of the present study revealed that more interactions occurred between the teacher and high-skilled students than with low-skilled students. As noted earlier Lahaderne (1967) suggested that the frequency of teacher-pupil interaction is dependent on the achievement level of the student. Martinek and Johnson (1979) offered the following explanation: teachers approach expected high achievers more frequently than they do low achievers therefore giving the high achievers more opportunities to interact with the teacher. Brophy and Good (1970) found contrasting results with respect to the amount of teacher-pupil interaction occurring in the classroom. They indicated that differences in the interaction between the teacher and high- and low-achieving students were more qualitative than quantitative. There was little difference in the total number of contacts with teachers, but more of the contacts involving high-achieving students were response opportunities or private, work-related contacts initiated by the children themselves.

In conclusion, it is feasible to assume that high-skilled students in secondary physical education classes receive more positive reinforcement

and opportunities to respond from female teachers than low-skilled students. But what about the low-skilled student? Isn't this the person who needs more encouragement and acceptance from teachers in order to progress in class? It is hoped that the results of this study will help physical education teachers become more aware of the behaviors they direct to students of different skill levels and more sensitive to those interactions which bring about success and failure in children.

Summary

A MANOVA performed on the scores of the nine DAC variables found significant differences between the two skill groups, $F(9, 112) = 60.844$, $p < .05$. This led to the rejection of the null hypothesis which stated that there would be no significant differences between the teaching interaction patterns of secondary female physical education teachers with high-skilled and with low-skilled students. Discriminant function analysis found teacher acceptance of student ideas and actions, teacher praise and teacher criticism accounted for over 80% of the variance between groups. Univariate analysis of variance found significant differences on all nine variables at the .05 level of significance (Table 3). Interactions with the high-skilled group included significantly more praise, acceptance of student ideas and actions, teacher questioning, teacher information giving, student interpretive response and student initiated response. Interactions with the low-skilled group included significantly more teacher direction, teacher criticism, and predictable student response.

Table 5 illustrates the interaction patterns which occurred most frequently between the teacher and the two skill groups. The interaction pattern of teacher direction followed by predictable student response dominated the low-skilled group. The most predominant interaction pattern

with the high-skilled group was interpretive response from students which required some measure of evaluation and synthesis. This was followed by teacher acceptance of student ideas and actions.

The results of this investigation are similar to those found by Martinek and Johnson (1979) in physical education and numerous researchers (Brophy & Good, 1970; deGroat & Thompson, 1949; Heller & White, 1975; Hoehn, 1954; Horn, 1914; Lahaderne, 1967) in general education.

Numerous studies conducted in general education have found that teachers provide high-skilled and low-skilled students with unequal opportunities for academic response, direct more favorable comments to high-skilled students, and direct less favorable comments to low-skilled students. Brophy and Good (1970) found that high achievers initiated more contacts with teachers, teachers demanded better performances from students designated as high achievers, and teachers were more likely to praise students for whom they held higher expectations.

Martinek and Johnson (1979) conducted the only study in physical education which utilized DAC to investigate teacher interactions with high- and low-achieving students. The results of their investigation showed that the high-expectancy group received more encouragement, acceptance of ideas, analytic-type questions and directions from teachers.

It is hoped that the results of this study will help physical education teachers become more aware of the behaviors they direct toward students of different skill levels and that they also become more sensitive to those interactions which bring about success and failure in children.

Chapter 6

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS FOR FURTHER STUDY

Summary

This investigation was conducted to determine if secondary female physical education teachers exhibited the same interaction patterns with high-skilled and with low-skilled students. All of the students chosen to participate in this study were identified as high-skilled or low-skilled by their respective physical education teachers. Ten students were randomly selected to participate from each class. A total of 150 students and 15 secondary physical education teachers from school systems throughout northeastern Pennsylvania and central New York participated in the study.

Data were collected with videotape equipment and analyzed with the Dyadic Adaptation of CAFIAS to assess teacher-student interactions. Multivariate analysis of variance was used to determine if the teaching interaction with the high-skilled students and with the low-skilled students differed significantly. The multivariate analysis of variance between the skill groups for the nine DAC variables was statistically significant. This led to the rejection of the null hypothesis which stated there would be no significant difference in the teaching interaction patterns of secondary female physical education teachers with high-skilled and with low-skilled students.

Discriminant function analysis indicated that teacher acceptance of student ideas and actions, teacher praise, and teacher criticism accounted for over 80% of the between-group variance. Analyses of variance revealed

significant differences on all nine variables at the .05 level of significance. Interactions with the high-skilled group showed significantly more acceptance of student ideas and actions, teacher praise, teacher questioning, teacher information giving, student interpretive response, and student initiated response. Interactions with the low-skilled group showed significantly more teacher directions, teacher criticism, and predictable student response.

Conclusions

The results of this study yielded the following conclusions regarding the interaction patterns of the sample of secondary female physical education teachers:

1. The interaction patterns of secondary female physical education teachers were not the same with high-skilled students and with low-skilled students.
2. High-skilled students received significantly more praise, acceptance of ideas and actions, information, and questions than low-skilled students from secondary female physical education teachers.
3. High-skilled students initiated significantly more contacts than low-skilled students with secondary female physical education teachers.
4. High-skilled students exhibited significantly more interpretive responses than low-skilled students with secondary female physical education teachers.
5. Low-skilled students received significantly more directions and criticisms than high-skilled students from secondary female physical education teachers.
6. Low-skilled students exhibited significantly more predictable responses than high-skilled students with secondary female physical

education teachers.

Recommendations for Further Study

1. Conduct a similar study with teachers who have had the same amount of professional experience.
2. Conduct a similar study in classes dealing only with team sports.
3. Conduct a similar study in classes dealing only with individual sports.
4. Conduct a similar study comparing the interaction patterns of secondary female physical education teachers with female classes and with coed classes.
5. Replicate this study in physical education classes which all have approximately the same size enrollment.
6. Replicate this study comparing the interaction patterns of secondary female physical education teachers with high-skilled and with low-skilled female students.

Appendix A

CODER'S RELIABILITY FOR SELECTED SUBJECTS USING SPEARMAN'S r_s

Teacher 1*

Top 10 Cells	Rank Observation One	Rank Observation Two	<u>d</u>	<u>d</u> ²
5-5	1	1	.00	.00
8-3	2	2	.00	.00
6-8	3	4	1.00	1.00
3-5	4	3	1.00	1.00
5-8	5	5	.00	.00
5-9	6	6	.00	.00
9-7	7	7	.00	.00
4-8	8	8	.00	.00
10-8	9	9	.00	.00
8-10	10	10	.00	.00
Total				2.00

$$*r_s = .9879$$

Top 10 cells listed refer to the order of coder's numerical frequency.

Rank observation one and observation two refer to the origin of the coding.

d refers to the difference between the ranks of each cell for observation one and observation two.

d² refers to the d column squared.

Appendix A (continued)

CODER'S RELIABILITY FOR SELECTED SUBJECTS USING SPEARMAN'S r_s

Teacher 2*

Top 10 Cells	Rank Observation One	Rank Observation Two	<u>d</u>	<u>d</u> ²
8\3	1	1	.00	.00
5-8\	2	2	.00	.00
2-5	3	3	.00	.00
8-2	4	4	.00	.00
6-8	5	5	.00	.00
3-8	7	6	1.00	1.00
8-3	7	7	.00	.00
2-8\	7	8	1.00	1.00
3-8\	9.5	9	.50	.25
8-3	9.5	10	.50	.25
Total				2.50

$$*r_s = .9848.$$

Top 10 Cells listed refer to the order of coder's numerical frequency.

Rank observation one and observation two refer to the origin of the coding.

d refers to the differences between the ranks of each cell for observation one and observation two.

d² refers to the d column squared.

Appendix B
INFORMED CONSENT FORM
TEACHER COPY

The study in which you are asked to participate is looking at the interaction behavior patterns of female secondary physical education instructors with their students.

The following procedures will be used: you will be videotaped on three days. The period that you will be videotaped will be 30 minutes in length. During those periods you will be wearing a microphone which should not interfere with your teaching activities. You will be asked to fill out a questionnaire prior to the taping of the first class. The questionnaire will be a ranking of students from high-skill to low-skill ability. The time needed to fill out the questionnaire will be approximately 10 minutes. Ten students, from the results of your rankings, will be asked to wear a pinnie for the purpose of identification on the videotape.

It is assured that all information about you will be kept strictly confidential. If you do not have any questions, and if you are willing to participate in the study, please sign your name on the line below.

Name: _____

Date: _____

Appendix C
INFORMED CONSENT FORM
STUDENT COPY

The study in which you are asked to participate is looking at the interaction behavior patterns of female secondary physical education instructors with their students.

The following procedures will be used: you will be videotaped on three days. The period that you are videotaped will be 30 minutes in length. During this time you will be wearing a numbered pinnie for purpose of identification on the videotape. The pinnie will be given to you by your instructor.

It is assured that all the information about you will be kept strictly confidential. Your name will not be known by the researcher. If you do not have any questions, and if you are willing to participate in this study, please sign your name below.

Name: _____

Date: _____

Appendix D

THE CATEGORIES OF CAFIAS¹

Coding Symbols	Categories 2-17	Teacher Behaviors
Teacher	"	8-19 Student Behaviors
Student (S)	"	10 Confusion
Environment (E)	"	20 Silence

Categories	Verbal	Relevant Behaviors	Nonverbal
2-12	(A positive value assessment)	Face: Smiles, nods with smile, (energetic) winks, laughs. Posture: Applause through clapping hands, congratulatory pats on shoulder, head, etc., wrings student's hand, embraces joyfully, laughs to encourage.	

2

12

Appendix D (continued)

Categories	Verbal	Relevant Behaviors	Nonverbal
3-13	(No value implied) Accepts, clarifies, uses, and develops suggestions and feelings by the learner.	(Elevates student performance onto a par with teacher performance) Face: Nods without smiling, tilts head in empathetic reflection, sighs empathetically. Posture: Shakes hands, embraces sympathetically, places arm around shoulder or waist, catches an implement thrown by student, accepts facilitation from students, takes part in game with students, supports child during activity, spotting in gymnastics.	13
4-14	Asks questions requiring student answer.	Face: Wrinkles brow, opens mouth, turns head with quizzical look. Posture: Places hands in air quizzically to expect answer, stares awaiting answer, scratches head, cups hand to ear, stands still half-turned toward person, awaits answer.	14

Appendix D (continued)

Relevant Behaviors		Nonverbal
Categories	Verbal	
		15
5-15	Gives facts, opinions, expresses ideas or asks rhetorical questions.	Whispers words inaudibly, sings or whistles. Gesticulates, draws, writes, demonstrates activities, points.
		16
6-16	Gives directions or orders which will result in immediate observable student response.	Points with head, beckons with head, yells at using language other than recognizable words. Points finger, blows whistle, holds body erect while barking commands, pushes a child in a given direction.

Appendix D (continued)

Relevant

Categories	Verbal	Behaviors	Nonverbal
			17
7-17	(A negative value assessment) Criticizes, expresses anger or distrust, sarcastic or extreme self-reference.	Face: Grimaces, growls, frowns, drops head, throws head back in derisive laughter, rolls eyes, bites, spits, butts with head, shakes head. Posture: Hits, pushes away, pinches, grapples with, pushes hands at student, drops hands in disgust, bangs table, damages equipment, throws things down.	
			18
8-18	Student response that is entirely predictable, such as obedience to orders and responses not requiring thinking beyond the comprehension phase of knowledge (after Bloom).	Face: Poker-face response, nods, shakes, gives small grunts, quick smile. Posture: Moves mechanically to questions or directions, responds to any action with minimal nervous activity, robot-like, practices drills, waits in line, etc., student responds by putting hand up in answering teacher direction.	

Appendix D (continued)

Relevant Behaviors		Nonverbal
Categories	Verbal	
	Eine (8\)	Eineteen (18\)
8\ - 18\	<p>Predictable student responses Face: Look of thinking eyes, pensive formal expressions.</p> <p>that require some measure Posture: Interprets movements, tries to show some arrangement of evaluation, synthesis, that requires interpretive thinking, e.g., works on and interpretation from the gymnastic routine, test taking, interpretation of student but must remain task cards, all game playing. Student puts hands in within the province of air in order to give answer to teacher question.</p> <p>predictability. The initial behavior was in response to teacher initiation. Student interpretation from teacher in discussed activity. A student questioning when related strictly to topic under discussion.</p>	

Appendix D (continued)

Categories	Relevant	
	Verbal	Nonverbal
	9	19
9-19	Pupil-initiated talk that is purely the result of their own initiative and which could not be predicted (either positive or negative behavior).	<p>Face: Makes interrupting sounds, gasps, sighs.</p> <p>Posture: Puts hands up in air to ask (unsolicited) question of teacher, gets up and walks around without provocation, begins creative movement education, makes up own games, makes up own movements, shows initiative in supportive movement, introduces new movements into games not predictable in the rules of the games.</p>
	10	20
10-20	Stands for confusion, chaos, disorder, noise.	Silence, children sitting doing nothing, noiselessly awaiting teacher just prior to teacher entry, etc.

¹Cited from Cheffers et al. (~~1974~~) (1972).

REFERENCES

- Allard, R. A need to look at dyadic interaction. In R. H. Cox (Ed.), Symposium papers: Teaching behavior and women in sport. Washington, D.C.: AAHPER, 1979.
- Amidon, E. J., & Flanders, N. A. The role of the teacher in the classroom: A manual for understanding and improving teacher classroom behavior. Minneapolis: Association for Productive Teaching, 1971.
- Amidon, E. J., & Hough, J. B. Interaction analysis: Theory, research, and application. Reading, Ma.: Addison-Wesley, 1967.
- Amidon, E., & Hunter, E. Improving teaching: The analysis of classroom verbal interaction. New York: Holt, Rinehart, & Winston, 1966.
- Anderson, W. G., & Barrette, G. T. (Eds.). What's going on in the gym: Descriptive studies of physical education classes. Newtown, Ct.: Motor Skills: Theory into Practice, 1978.
- Brophy, J., Evertson, C., Harris, T., & Good, T. Communication of teacher expectations: Fifth grade. Report No. 93, Research and Development Center for Teacher Education, The University of Texas at Austin, 1973.
- Brophy, J. E., & Good, T. L. Teachers' communication of differential expectations for children's classroom performance: Some behavioral data. Journal of Educational Psychology, 1970, 61, 365-374.
- Brophy, J. E., & Good, T. L. Teacher-child dyadic interaction. In A. Simon & E. G. Boyer (Eds.), Mirrors for behavior III: An anthology of observation instruments. Wynote, Pa.: Communication Materials Center, 1974. (a)
- Brophy, J. E., & Good, T. L. Teacher-student relationships: Causes and Consequences. New York: Holt, Rinehart, & Winston, 1974. (b)

- Charles, C. Educational psychology: The instructional endeavor.
St. Louis: C. V. Mosby, 1972.
- Cheffers, J. T. F. The validation of an instrument designed to expand the Flanders system of interaction analysis to describe nonverbal interaction, different varieties of teacher behavior, and pupil response.
Unpublished doctoral dissertation, Temple University, 1972.
- Cheffers, J. T. F. Developing interaction analysis instruments in physical education. In R. H. Cox (Ed.), Symposium papers: Teaching behavior and women in sport. Washington, D.C.: AAHPER, 1979.
- Cheffers, J. T. F., Amidon, E. J., & Rodgers, K. D. Interaction analysis: An application to nonverbal activity. Minneapolis: Association for Productive Teaching, 1974.
- Cornbleth, C., Davis, O., & Button, C. Teacher-pupil interaction and teacher expectations for pupil achievement in secondary school social studies classes. Paper presented at the annual meeting of the American Educational Research Association, Washington, D.C., 1972.
- Crane, P. L. A study of elementary teacher verbal behavior of high and low ability groups. Unpublished doctoral dissertation, University of Georgia, 1967.
- Crawford, J., Brophy, J. E., Evertson, C. M., & Coulter, C. L. Classroom dyadic interaction: Factor structure of process variables and achievement correlates. Journal of Educational Psychology, 1977, 69, 761-772.
- Crowe, P. B. An observational study of teachers' expectancy effects and their mediating mechanisms on students in physical education activity classes. Unpublished doctoral dissertation, University of North Carolina, 1977.

- Crowe, P. B. An observational study of teachers' expectancy effects and their mediating mechanisms. In R. H. Cox (Ed.), Symposium papers: Teaching behavior and women in sport. Washington, D.C.: AAHPER, 1979.
- deGroat, A. F., & Thompson, G. G. A study of the distribution of teacher approval among sixth grade pupils. Journal of Experimental Education, 1949, 18, 57-75.
- Devlin, G. L. The effects of teaching contingency management skills to elementary students on the students' self-concepts and physical educators' behaviors. Unpublished master's thesis, Ithaca College, 1979.
- Dougherty, N. J. A plan for the analysis of teacher-pupil interaction in physical education classes. Quest, 1971, 15, 39-50.
- Evertson, C., Brophy, J., & Good, T. Communication of teacher expectation: First Grade. Report No. 91, Research and Development for Teacher Education, The University of Texas at Austin, 1972.
- Evertson, C., Brophy, J., & Good, T. Communication of teacher expectations: Second grade. Report No. 92, Research and Development Center for Teacher Education, The University of Texas at Austin, 1973.
- Finklestein, D. E. The effect of conceptual tempo on teacher-student dyadic interaction in the classroom. Unpublished doctoral dissertation, University of Southern California, 1976. (Abstract)
- Fishman, S. E. A procedure for recording augmented feedback in physical education classes. Paper presented at the meeting of the AAHPER Eastern District Mini-Convention 11, Baltimore, February, 1975.
- Flanders, N. A. Interaction analysis in the classroom: A manual for observers. Minneapolis: University of Minnesota, 1960.
- Galloway, C. M. Nonverbal communication. Theory into Practice, 1968, 7, 172-175.

- Good, T. L. Which pupils do teachers call on? Elementary School Journal, 1970, 70, 190-197.
- Good, T. L., & Brophy, J. E. Teacher-child dyadic interactions: A new method of classroom observation. Journal of School Psychology, 1970, 8, 131-138.
- Good, T. L., & Brophy, J. E. Analyzing classroom interaction: A more powerful alternative. Educational Technology, 1971, 11, 36-41.
- Good, T., Sikes, J., & Brophy, J. Effects of teacher sex, student sex, and student achievement on classroom interaction. Technical Report No. 61, Center for Research in Social Behavior, University of Missouri at Columbia, 1972.
- Heller, M. S., & White, M. A. Rates of teacher approval and disapproval to higher and lower ability classes. Journal of Educational Psychology, 1975, 67(6), 796-800.
- Hillman, S. B., & Elliot, B. Verbal behavior patterns of teachers in integrated classrooms. Paper presented at the annual convention of the American Psychological Association 86, Toronto, August, 1978.
- Hoehn, A. J. A study of social status differentiation in the classroom behavior of 19 third grade teachers. Journal of Social Psychology, 1954, 39, 269-292.
- Horn, E. Distribution of opportunity for participation among the various pupils in classroom recitations. New York: Columbia University, 1914.
- Hurwitz, D. The Tri-Lasp System. Paper presented at the meeting of the AAHPER Eastern District Mini-Convention 11, Baltimore, February, 1975.
- Jeter, J., & Davis, O. Elementary school teachers' differential classroom interaction with children as a function of differential expectations of pupil achievement. Paper presented at the annual meeting of the American Educational Research Association, Washington, D.C., 1972.

- Johnson, T. W. H. How to use FOTOP. Paper presented at the meeting of the AAHPER Eastern District Mini-Convention 11, Baltimore, February, 1975.
- Kraemer, H. C., & Jacklin, C. N. Statistical analysis of dyadic social behavior. Psychological Bulletin, 1979, 86, 217-224.
- Kranz, P., Weber, W., & Fishall, B. The relationships between teacher perception of pupils and teacher behavior toward those pupils. Paper presented at the meeting of the American Educational Research Association, Washington, D.C., 1970.
- Lahaderne, H. M. Adaptation to school settings: A study of children's attitudes and classroom behavior. Unpublished doctoral dissertation, University of Chicago, 1967.
- Laubach, S. The development of a system for coding student behavior in physical education classes. Unpublished doctoral dissertation, Columbia University, 1974.
- Love, A. M., & Roderick, J. A. Teacher nonverbal communication: The development and field testing of an awareness unit. Theory into Practice, 1971, 10, 295-299.
- Mancuso, J. T. The verbal and nonverbal interaction between secondary school physical education student teachers and their pupils. Unpublished doctoral dissertation, University of Illinois, 1972.
- Martin, R., & Keller, A. Teacher awareness of classroom dyadic behavior. Journal of School Psychology, 1976, 14, 47-55.
- Martinek, T. J. A model for the study of pygmalion effects in physical education. In R. H. Cox (Ed.), Symposium papers: Teaching behavior and women in sport. Washington, D.C.: AAHPER, 1979.

- Martinek, T. J., & Johnson, S. Teacher expectations: Effects on dyadic interactions and self-concept in elementary age children. Research Quarterly, 1979, 50, 60-70.
- Martinek, T. J., & Mancini, V. H. CAFIAS: Observing dyadic interaction between teacher and student. Journal of Classroom Interaction, 1979, 14(2), 18-23.
- Melograno, V. J. Effects of teacher personality, teacher choice of educational objectives, and teacher behavior on student achievement. Unpublished doctoral dissertation, Temple University, 1971.
- Mendoza, S., Good, T., & Brophy, J. Who talked in junior high classrooms? Report Series No. 68, Research and Development Center for Teacher Education, University of Texas at Austin, 1972.
- Ober, K. L., Bentley, E. D., & Miller, E. Systematic observation of teaching. Englewood Cliffs, N.J.: Prentice-Hall, 1971.
- Oien, F. M. Teacher directed behavior toward individual students. In R. H. Cox (Ed.), Symposium papers: Teaching behavior and women in sport. Washington, D.C.: AAHPER, 1979.
- Rankin, K. D. Verbal and nonverbal interaction analysis of student teachers in elementary physical education. Unpublished master's thesis, University of Kansas, 1975.
- Rist, R. C. Student social class and teacher expectations: The self-fulfilling prophecy in ghetto education. Harvard Educational Review, 1970, 40, 411-451.
- Rosenthal, R. The pygmalion effect lives. Psychology Today, September 1973, pp. 57-65.
- Rosenthal, T., & Jacobson, L. Pygmalion in the classroom. New York: Holt, Rinehart, & Winston, 1968.

Simon, A., & Boyer, E. G. (Eds.). Mirrors for behavior III: An anthology of observation instruments. Wynote, Pa.: Communication Materials Center, 1974.

van der Mars, H. The effects of instruction in and supervision through interaction analysis on the relationship between perceived and observed teaching behaviors of pre-service physical education teachers.

Unpublished master's thesis, Ithaca College, 1979.

Withall, J. The development of a technique for the measurement of social-emotional climate in classrooms. Journal of Experimental Education, 1949, 17, 347-361.