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Analysis of teaching behaviors of a male and female physical education instructor at the secondary level during a basketball unit

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ANALYSIS OF TEACHING BEHAVIORS OF A MALE AND FEMALE PHYSICAL
EDUCATION INSTRUCTOR AT THE SECONDARY LEVEL
DURING A BASKETBALL UNIT

by

Timothy T. Pendergast

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 1986

Thesis Advisor: Dr. Victor H. Mancini

ABSTRACT

This study was conducted to compare the observed teaching behaviors of a male physical education teacher and a female physical education teacher on a day-to-day basis for an entire unit of basketball. The subjects were both from the central New York area. Each teacher wore a wireless microphone while being videotaped during eight successive classes. The interaction patterns between the teachers and their students were coded using Cheffers' Adaptation of Flanders' Interaction Analysis System (CAFIAS). Visual analysis of the data revealed several differences in teaching behaviors between the male and female teachers. The female teacher gave more information to her students than did the male teacher. Additionally, the female teacher demonstrated more teacher contribution than the male teacher. The female teacher's class spent more time as one unit than did the male teacher's class, which spent more time in groups than the female teacher's class. The male teacher's class spent more time in student-to-student interaction. Additionally, the male teacher gave more directions, and his students showed more predictable responses and more interpretive responses. Day-to-day results showed a good deal of variation in the teachers' and students' behaviors. The differences found between the male physical education teacher and the female physical education teacher led to rejection of the null hypothesis that stated there would be no significant differences, over time, in the teaching behaviors of a male and a female physical education teacher while teaching the same activity.

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DURING A BASKETBALL UNIT

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
Timothy T. Pendergast
September 1986

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

Timothy T. Pendergast

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:

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Dean of Graduate
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DEDICATION

This thesis is dedicated to my parents without whose love, patience, guidance, and encouragement this thesis would never have been completed. They have not asked for anything in return for all they have done for me. For this, I say, "Thank you and I love you."

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Chapter 1

INTRODUCTION

The study of teacher behavior has generated an enormous amount of interest in the past 2 decades. Most of the studies completed in this area have dealt with large numbers of teachers, students, or both. Lately, however, there has been a shift of interest, with attention focused on a small group or a single subject ($N = 1$). Large group studies have been utilized mainly so conclusions could be generalized to the population. On the other hand, small group studies have been viewed as lacking the ability to generalize to the population, and thus have received little attention from researchers. But in 1978, Guralnick stated that generalization may in fact be easier from small group studies because of the opportunity for more precise control over the study and more accurate data collection. It is for this reason that small group studies should be used within the field of education and specifically for observing teacher behavior.

Individual predictability may also be an outcome of small group studies. In other words, through the study of a small group or $N = 1$ may come the ability to predict teacher or student behaviors, given a situation or setting that had been observed earlier. This, in turn, may be a beneficial agent toward the betterment of the teaching-learning environment. For example, a student's unwanted behavior may be reduced through the elimination of some act generated by the teacher. Researchers, therefore, may be able to not only generalize to the population, but also predict individual behaviors through a small group study.

Three areas that have utilized small group studies quite effectively have been in the study of learning disabled children, within the field of clinical psychology, and in psychiatry. Miller and Warner (1975) have stated that many in the field of counseling (including teachers) "tend to operate out of a blind allegiance to group experimental procedures" (p. 130). Further, they have noted that much of the completed research was designed to fit a group model rather than the individual needs upon which their (the counselors') objectives were centered. Frey (1978) also felt strongly about the value of small group studies, stating that large group research simply cannot answer many of our current questions.

To be able to get a full understanding of an individual teacher's behavior, a longitudinal approach must be incorporated into a small group or $N = 1$ study. A longitudinal study simply requires the observation of an individual or a group over time. A longitudinal study need not take on a "womb-to-tomb" style, as Sontag (1971) suggests. In other words, a study of this type may include observing the behavior of individuals over a short period of time, not necessarily over years. Walton (1972) reported, "If case studies are to be effective, they must contain longitudinal data from each of several phases; contain a vigorous description of process, especially during the intervention phase; and conceptualize and theorize about the process itself" (p. 76).

While few physical education studies have taken an $N = 1$ approach, even fewer have attempted to compare males and females in similar teaching/coaching environments over an extended period of time. Faulkner (1976) studied preservice physical educators and agreed with Nygaard's (1971) findings that males tend to lecture more often than females and have different interaction patterns. Yet in a larger study, Cheffers and

Mancini (1978) found no difference between male and female teachers at the secondary level. Therefore, the real value of studying teachers over an extended period of time lies in the fact that to do so enables any researcher to present an accurate analysis of what occurs in the classroom.

It was the contention of the investigator that studies attempting to utilize a small group or $N = 1$ approach need to be considered for future work. The investigator, in comparing a male and female secondary physical educator, attempted to describe the behavioral characteristics of each teacher, over time, using systematic observational techniques.

Scope of Problem

This study was conducted to determine if any differences in teaching behavior existed between one male and one female physical education teacher at the secondary school level. One ninth grade class taught by each teacher was observed. Classes were not coed and were taught by the like-sex teacher. Data were collected through the use of videotape. Each teacher was taped for a total of eight classes during an entire basketball unit. Each class was videotaped for its entire duration of 45 minutes. Interaction behaviors were identified with the use of Cheffers' Adaptation of Flanders' Interaction Analysis System (CAFIAS) (Cheffers, 1972).

Statement of Problem

This investigation was conducted to determine if any differences in teacher behavior existed between a male and a female secondary physical educator. The teachers, working with non-coed classes, were involved in the same unit (basketball), over the same period of time (eight classes).

Null Hypothesis

There will be no significant differences, over time, in the teaching behaviors of a male and a female secondary physical education teacher while teaching the same activity.

Assumptions of Study

For the purpose of this study, the following assumptions were made:

1. The codings obtained from 16 physical education classes (eight each of the male and the female) yielded enough data to test the hypothesis.
2. The classes represented typical non-coed secondary physical education classes.

Definition of Terms

The following terms were operationally defined for the purposes of this investigation:

1. FIAS—Flanders' Interaction Analysis System. It is a systematic observational technique that is objective in nature and analyzes verbal interactions between teachers and students (Flanders, 1970).
2. CAFIAS—Cheffers' Adaptation of Flanders' Interaction Analysis System. It is a simple expansion of FIAS developed to include and describe both verbal and nonverbal behaviors of teacher and student in physical education classes (Cheffers & Mancini, 1978).
3. 17 Parameters of CAFIAS—The following terms describe the 17 parameters of CAFIAS (Cheffers, Amidon, & Rodgers, 1974).
 - a. Total Teacher Contribution (TTC) includes the verbal and non-verbal behaviors that are made by each teacher during class time (including praise, acceptance, questions, lecturing, directions, criticism, and empathy).
 - b. Total Student Contribution (TSC) refers to the verbal and

nonverbal behaviors that are made by each student during class time (including predictable responses, evaluative responses, and unpredictable responses).

c. Total Silence and/or Confusion (SC) includes any 3-second time period in which there is silence, noise, or student-to-student interaction.

d. Total Teacher Use of Questioning (TTQR) refers to the amount of questioning, both verbal and nonverbal, used by the teacher in relation to the amount of verbal and nonverbal lecturing.

e. Total Teacher Use of Acceptance and Praise (TTAPR) refers to the amount of praise, encouragement, acceptance, and empathy used by the teacher in relation to the amount of direction and/or criticism.

f. Total Student Initiation, Teacher-Suggested (TSIRSR) is a ratio of any evaluative or predictable responses made by the students compared to all student behavior.

g. Total Student Initiation, Student-Suggested (TSISSR) compares any unpredictable student behavior to all student behaviors.

h. Content Emphases, Teacher Input (CETI) defines the total amount of time in each class that a teacher spends on subject matter.

i. Teacher as Teacher (TT) refers to the total amount of time in each class that a teacher does the teaching.

j. Students as Teacher (ST) refers to the total amount of time in each class that a student or students do the teaching.

k. Environment as Teacher (ET) refers to the total amount of time in each class that some part of the environment (including film-strips and loops, overhead projectors, task cards, etc.) does the teaching.

l. Verbal Emphasis (VE) includes any observed behavior expressed

orally during class.

m. Nonverbal Emphasis (NE) includes any observed behavior not expressed orally during class.

n. Class Structure as One Unit (W) defines the amount of time in each class in which the students are operating in one large group.

o. Class Structure as Individuals or Groups (P) defines the amount of time in each class in which the students are operating alone as individuals or in small groups.

p. Class Structure with No Teacher Influence (I) defines the amount of time in which there is no teacher influence.

q. Teacher Empathy to Student Emotions (TE) measures the percentage of times that a teacher was empathetic to student behaviors.

4. Interaction Analysis refers to a systematic observational technique that records the amount of teacher-to-student interaction.

5. Secondary Physical Education Teacher refers to a teacher who has successfully completed a professional preparation program at an accredited institution, is legally able to teach physical education at the secondary (grades 9-12) level, and is actively engaged in the profession.

6. Direct Teacher Behavior refers to any behavior by the teacher that inhibits student behavior (information- and direction-giving and criticism).

7. Indirect Teacher Behavior refers to any behavior by the teacher that promotes student behavior (praise, encouragement, questions, etc.).

8. Case Study refers to a single unit ($\underline{N} = 1$) or small group ($\underline{N} = 2$ or 3) study of the aspects and characteristics of a person(s), institution(s), community(ies), or any group considered as a unit (Good & Scates, 1954).

9. Longitudinal Study refers to any investigation of a group(s) or unit(s) over a certain period of time, generally three or more observations.

10. Unit refers to the eight observed classes of each teacher and class in this study.

Delimitations of Study

The following were the delimitations of the study:

1. This study utilized CAFIAS as the only systematic observational technique to describe the behaviors of teachers and students.
2. Only eight classes per teacher were used, and classes lasted only 45 minutes per class session.
3. Each teacher involved taught only like-sex students.
4. The teachers and students involved were from the central New York area.

Limitations of Study

The following were the limitations of this study:

1. The results may only hold true if CAFIAS is used as the systematic observational technique.
2. The results may only hold true for secondary physical education teachers similar to those in the investigation.

Chapter 2

REVIEW OF RELATED LITERATURE

The review of related literature for this study focused specifically on the following areas: systematic observational techniques, systematic observational techniques in physical education and coaching, case studies in research and education, and case studies in physical education and coaching. A summary is provided.

Systematic Observational Techniques

The use of systematic observational techniques in the field of education and other fields is not new. During the past few decades there has been a rise in the development and use of systems that describe the behavior of both teachers and students. Kasson (1974) indicated that the use of systematic observational techniques that describe the classroom help to provide information concerning actual teaching and learning events that occur.

Researchers and educators have developed observational systems for numerous reasons. One of the most important reasons for their development was to help teachers become more aware of their behaviors and, therefore, become more efficient in their work. Murray (1970) stated:

The systematic observation movement provides the in-service or pre-service teacher with a self-analysis technique for identifying, observing, classifying, and/or quantifying specific behaviors in the classroom teaching-learning situation (p. 3).

A further description was provided by Adler (1972) who indicated that the observation of classroom transactions is the most direct approach for

researchers and educators to study teaching behaviors. The observation of classroom transactions of which Adler (1972) speaks comes about with the aid of an observer trained to use the specific system involved. The observer then relates to the teacher and/or student involved the behaviors or characteristics that are evident.

Systematic observations may be classified as being either descriptive or statistical (Soar, 1970). Soar (1970) stated that a descriptive technique simply answers the question, "What are classrooms like, examined in a systematic approach?" (p. 116) A statistical technique answers the question, "What are the relations between measures of classroom behavior while studying teachers, students, or both? (Soar, 1970, p. 117)

In their book, The Language of the Classroom, Bellack, Kliebard, Hyman, and Smith (1966) further defined descriptive systematic observational techniques. The authors implied that descriptive systems illustrate, in detail, an account of the teaching-learning process. Their work is considered by many to be a "seminal approach" to the description and analysis of linguistic behavior of teachers and students. The book itself was devoted to a large group descriptive study at the secondary level. The main purpose of the study by Bellack et al. (1966) was to describe the teaching-learning process in terms of meaning conveyed in language.

There are other types of systematic observational systems. One of these is known as interaction analysis or IA. Daugherty (1971) described IA as an objective method of recording the verbal interactions that occur between teachers and students, but IA need not describe only verbal behaviors. Cheffers (1972) indicated that IA may also seek to describe nonverbal behaviors objectively. Cheffers and Mancini (1978) reported that IA systematically records each behavior between the teacher and students

and does so with a limited or minimal degree of observer bias. Fey (1969) stated IA observational systems are positive, useful tools in studies in which teacher behavior is the main variable.

Early descriptive systems tended to use rating scales as opposed to category systems. However, the problem with rating scales in the classroom was that they failed to capture the events (such as confusion, activity, etc.) that occurred. It was through the efforts of researchers such as Lewin, Lippitt, and White (1939) and Anderson (1971) that the category systems, similar to those of today, began to be utilized. In one of the earliest descriptive studies using a categorical approach, Lewin et al. (1939) observed and described the group lives of 10-year-old boys while they were placed under different leadership styles or roles. Because of early works such as this one, the use of rating scales, which tended to be biased and thus faulty, was supplanted by the use of category systems, which limited observer bias and were able to describe behaviors more accurately.

Flanders (1970) capitalized on the works of these early investigators to develop "the most widely known and frequently used system for describing and analyzing interaction between the teacher and his students" (Cheffers, Amidon, & Rodgers, 1974, p. 1). Flanders' Interaction Analysis System, or FIAS, can easily be used to objectively study and compare the behaviors of males and females within the classroom setting. Direct teacher behavior, which may tend to restrict or hinder student development, as well as indirect teacher behavior, which may encourage or enhance student development, may be observed, coded, and compared.

Amidon and Hunter (1967) also studied verbal behavior by modifying FIAS and expanding it from 10 to 17 teacher-pupil categories. This

system known as the Verbal Interaction Category System (VICS) could also be easily used to compare male and female teaching behaviors.

Amidon and Flanders (1971) have reported that FIAS is only concerned with verbal behaviors primarily because they could be observed with greater reliability than could nonverbal behaviors. Many researchers have thought, however, that FIAS lacks the ability to capture many moment-to-moment behaviors or events. In many instances, the nonverbal behaviors that are missed through the use of FIAS lead to future behaviors, both verbal and nonverbal, by teachers and students.

Kurth (1969) investigated teacher-student behaviors of student teachers within elementary physical education classes. Kurth (1969) found that FIAS was limited because it did not provide for nonverbal moment-to-moment behaviors. Melograno (1971) and Daugherty (1971) both agreed with Kurth (1969). Daugherty (1971) stated that FIAS was a good observational system, yet needed changes in order to be able to capture all behaviors, both verbal and nonverbal. Daugherty (1971) added a minor modification to the verbal categories of FIAS while investigating three teaching styles. He inserted another category (11) in order to record and describe meaningful nonverbal behavior that was not simple confusion or silence. Daugherty (1971) also felt a need to be able to subdivide teachers' interactions with students into group or individual situations. Daugherty's (1971) investigation included 150 male freshmen at Temple University. Daugherty (1971) found that the traditional command method achieved greater gains involving fitness activities than did other teaching styles. Yet in motor skills learning, task and individualized styles were superior. Mancuso (1972) also concurred with the above researchers; she believed that there was a need to describe more than just verbal behavior

within the physical education setting. Consequently, Mancuso (1972) also developed an adaptation of FIAS to describe nonverbal behaviors.

Cheffers (1972) logically assumed that nonverbal interaction could be coded in the same way as verbal. Therefore, Cheffers (1972) added a nonverbal category that corresponded to each verbal category. He also established a method for recording with whom the teacher was talking: the whole class, small groups, or individuals. Cheffers' adaptation of FIAS is known as CAFIAS.

There are numerous other systems which have described teacher behaviors. The investigator was able to find no systems that were exclusively developed to compare male and female behaviors. Any system that has been found to be a valid tool for the recording of behaviors can be used to determine differences in teaching styles between males and females.

Systematic Observational Techniques in Physical Education and Coaching

As early as 1971, Anderson (1971) spoke of the lack of descriptive studies and interaction analysis occurring in physical education. But there has been a noticeable increase in studies employing these techniques in the past few years (Lombardo, 1979).

In early attempts to systematically observe and record interaction in physical education classes, researchers were forced to use existing observation systems that were often deemed inadequate. Many attempts were made to utilize FIAS in physical education classes in order to describe interaction patterns. For example, Nygaard (1971) observed 40 physical education classes at four levels of teaching. Using FIAS, Nygaard (1971) reported that

1. For the total sample, there were differences in the use of categories by sex,
2. Different interaction patterns existed for male and female teachers,
3. Females used much more praise, directions, commands, and criticism,
4. Females used more extended direct behaviors,
5. Males lectured more often, and
6. Males used more extended indirect behaviors.

Several researchers in the field of physical education had noticed a need to expand FIAS in order to capture many moment-to-moment behaviors that were not observed using only verbal recordings. Galloway (1968), for example, supported the claim that nonverbal acts of teachers were as important as verbal. Kurth (1969), Daugherty (1971), Melograno (1971), and Mancuso (1972) all agreed that FIAS alone could not accurately describe physical education classes. Daugherty (1971), for example, realized a need to capture nonverbal activity, and thus used a slightly modified version of FIAS to code his classes. Daugherty (1971) added an 11th category in order to describe meaningful teacher or student nonverbal activity. Daugherty (1971) also made use of a system to code teacher talk categories as occurring with the entire group or with individuals. Mancuso (1972) fused together the Love-Roderick nonverbal categories and FIAS and then added a useful motor activity category. This instrument was used to record both verbal and nonverbal behavior by physical educators. Mancuso (1972) studied a relatively small population ($N = 10$) and concluded her instrument was reliable and valid.

Kasson (1974) further adapted Mancuso's Adaptation for Verbal and Nonverbal Behavior to study the behavior of a small group population ($N = 3$

teachers and 3 coaches). Data collection periods included 3 hours of teaching and 3 hours of coaching. Kasson (1974) found that there was more direct than indirect behavior in both settings.

As mentioned earlier, Cheffers (1972) developed a system that was able to code both verbal and nonverbal behaviors. Designed to be used in the physical activity setting, Cheffers' Adaptation of Flanders' Interaction Analysis System, CAFIAS, can also be used quite effectively in other academic areas (Cheffers & Mancini, 1978). Cheffers developed this system to overcome the three major limitations of FIAS:

1. FIAS was only concerned with verbal behavior,
2. FIAS viewed the teacher as the sole teaching agent, and
3. FIAS allowed only for the coding of the class structure as a whole.

Cheffers (1972) modified FIAS into a system that could describe physical education classes with a greater degree of sensitivity. CAFIAS incorporated the following modifications:

1. Teacher and student behaviors could be classified as either verbal or nonverbal,
2. The class structure could be broken down into whole or part, and
3. The teaching agent could be classified as teacher, student, or environment.

Lombardo (1979) has pointed out that CAFIAS has been utilized in several different ways in various studies. CAFIAS has been used to describe teachers' and students' behaviors, gather information to provide teachers with feedback about their teaching, assess the effects of various interventions on teachers' behaviors, and verify different treatment approaches. Other researchers have found that instruction in interaction analysis, specifically CAFIAS, was important and useful in the preparation

of pre-service physical educators.

Mancini (1974) used CAFIAS to compare the interaction patterns of students and teachers in an elementary school human movement class. Two decision-making models were used. In one model, the teacher made all the decisions, while in the other students were encouraged to take part in decision-making. Results indicated more positive attitudes toward physical education and greater interaction for the children who shared in the decision-making.

Few researchers have used systematic observation instruments to describe differences in the teaching behavior of male and female physical educators. Faulkner (1976) used CAFIAS to study the differences in teaching behaviors between pre-service male and female physical education teachers. The subjects were 40 male and 40 female physical education majors at Ithaca College. Three micro-peer teaching situations for each subject were videotaped, and CAFIAS was used to code the behaviors. A Friedman two-way analysis of variance by ranks was used to determine if significant differences existed. Faulkner's (1976) major hypothesis of no differences existing between male and female pre-service physical educators was accepted.

Bain (1974) developed the Implicit Values Instrument for Physical Education (IVI-PE). This tool was developed to measure value dimensions and behaviors. A relatively small group of six males and six females was studied. All were physical educators in public high schools in the Chicago area. The IVI-PE contained two parts. Part I required the classification of verbal behavior by the teacher, and Part II involved the recording of particular aspects of classroom organization. Each subject was observed three times and was scored on six value dimensions:

achievement, autonomy, orderliness, privacy, specificity, and universalism. Bain (1974) incorporated a two-way analysis of variance to examine differences due to sex or location (urban or suburban). Results of Bain's (1974) study showed that

1. Female-taught classes scored higher on the privacy dimension,
2. Female-taught classes scored higher on the specificity dimension,
3. Male-taught classes did not score higher on achievement as had been predicted,
4. Female-taught classes did not score higher on orderliness as had been predicted, and
5. No significant differences existed between male-taught and female-taught classes on the autonomy, achievement, orderliness, or universalism dimensions.

Stewart (1978) conducted a study to observe and record the behaviors of 12 male and 12 female physical education teachers in a natural environment. The subjects represented primary, intermediate, junior high, and senior high school levels. Stewart (1978) developed a system that incorporated behavioral categories from a number of systems, including CAFIAS, The Ohio State University Rating Scale, and Tharp and Gallimore's descriptive system. This system included a total of 25 teacher behavior categories and four climate categories. Results of this study indicated that male physical education teachers demonstrated a higher mean percentage of positive behavior and a lower mean percentage of negative behaviors than females. Also, female physical education teachers spent noticeably more time in the management climate than in other classification areas.

Siedentop, Birdwell, and Metzler (1979) have indicated that in order to study teacher effectiveness, student achievement must be measured. One

measure of achievement, albeit indirect, that could be used is the amount of time students spent on-task, successfully engaged in relevant motor activity. To measure time-on-task in the physical education setting, Siedentop et al. (1979) modified a systematic observation instrument developed through work at the Far West Laboratory in California. This observation instrument, ALT-PE or Academic Learning Time-Physical Education, was designed to measure student time-on-task in any setting and provide an indicator of student achievement. ALT-PE has been used to effectively observe the teaching behaviors of males and females, and it has been used to study small group settings.

Small Group and $N = 1$ Studies

As Dukes (1965) has reported, between 1939 and 1963 there were over 200 $N = 1$ case studies performed in the field of psychology. Yet until recently, few studies had been performed in the field of education, specifically in the observation of teacher behavior. Edgington (1967) agreed with Dukes (1965) in stating that even though there has been a proven value for small group and $N = 1$ studies, very few studies using this approach have been attempted.

There have been many complaints directed toward experiments utilizing the small group and $N = 1$ approach. Edgar and Billingsley (1974) have summarized the three major complaints:

1. There were no internal controls,
2. Inferential statistics were not appropriate for $N = 1$ designs, and
3. Generalizations cannot be drawn from a single subject.

In defense of $N = 1$ studies, Rife and Dodds (1978) have reported, Although generalization of results to other populations cannot be made automatically in single subject designs, the primary

intent is to focus on behavior changes only in the subjects themselves, since a major advantage of this trade-off with group designs is the intensive focus possible on specific subjects in specific settings. (p. 47)

Chasson (1960) has reported the advantages of intensive statistical study of individual subjects in a paper dealing with the design of clinical studies in hospitals. Shine (1973) reported that when a single subject or small group is known to be typical or average or when the subject(s) represents a unique case, generalizations may be made relatively precisely.

Shine (1973) presented a paper attempting to combine the ideas of ANOVA with those of certain repeated measures in order to produce a highly flexible design with the precision of the single subject approach and the generalizability of the large group approach. His ability to accomplish this task has led to an increase in the number of reports of this type. Frey (1978) has reported that the disparity between important questions and the sense that present tools can no longer work in many cases has caused some to explore the usefulness of other research procedures such as single subject studies. Frey (1978) stated that the small group or single subject study's most important advantage is that of concentrated focus, allowing the researchers to take time to carefully and minutely study the "systems that are found within systems and consequently those systems that are within the higher systems" (p. 265).

As was indicated previously, there have been a number of small group/single subject studies performed outside of the study of teacher behavior. Mayer and Kozlow (1980) have reported on the development and evaluation of an intensive single-subject time series design for the study of learning concepts. The researchers' study focused upon two important questions:

1. Is it possible to devise procedures for measuring concept learning on a daily basis that will interfere little with the normal classroom routine and take only a minimum of time away from instruction?, and
2. Can such procedures yield valid information on the learning of a science concept?

Two entire eighth grade earth science classes were chosen for the study. Both classes were taught by the same teacher. Each class was observed daily for 26 days. Results demonstrated that data-collection procedures could be developed for the use of measuring concept understanding during intensive single-subject time-series designs. The single subject approach took minimal class time, proved to result in no class disturbance, and provided valid measurement of learning the concepts involved (Mayer & Kozlow, 1980).

Generally, a small group or $N = 1$ study cannot be accomplished with only one observational period. Thus, there is a need to extend periods of observation over longer time spans or a greater number of observations. Beckman (1971) called a case study or longitudinal study a description of a specific incident or a specific situation over time. Herron (1975) reported that case studies or longitudinal studies are generally written in the form of a short, descriptive story, focusing on a single subject, problem, or situation.

There is a need, when utilizing the case study approach to small group observation, to employ the same measure or measures of statistically and sometimes causally related characteristics on two or more occasions on the same subject (Sontag, 1971). Further, Sontag (1971) has reported that the longitudinal approach is very essential in studies of prediction over time, individual differences, and individual patterns of development, such as the

observation of teacher behavior. Walton (1972) has indicated the reason for the lack of case study use in education:

The case study has long been a standard methodology of anthropology and clinical psychology, but has not played a major role in other disciplines of the behavioral sciences, in large part because of the emphasis on verification and the assumption that only quantitative data contribute to verification. (p. 74)

Further, Walton (1972) has reported that the primary advantage of a case study is that it includes sensitive material about particular human beings.

Small Group and $N = 1$ Studies in Physical

Education and Coaching

The use of systematic observational techniques to study small group and $N = 1$ environments is relatively new, as compared with large group studies. Newer yet is the fact that in the past decade, studies that have been of a small group nature have begun to focus on physical education settings. In the past 10 years, a small number of studies have come from The Ohio State University (O.S.U.) that have dealt with the observation of teachers/coaches in physical activity or related areas and have observed small groups (or $N = 1$).

Hughley (1973) observed the outcome of direct feedback on the behaviors of physical education student teachers. The subjects involved were four O.S.U. physical education majors who were participating in their teaching field experience. The subjects included two males and two females. Hughley (1973) developed a teacher behavior scale, basing it on the Behavior Observation Schedule for Pupils and Teachers and on Pollack's behavior categories. Results showed that feedback can change the behaviors of student teachers. An important note is that two of the student

teachers found the presence of an observer to be bothersome.

A year later, Boehm (1975) focused his attention upon the effects of a competency-based form of student teaching at the junior high school level. Boehm (1975) used eight O.S.U. physical education majors as subjects. The cooperating teachers and the investigator developed an observational system that recorded specific teacher and student behaviors. Boehm (1975) compared behavior rates, behavior percentages, and management time during baseline and intervention by means of a multiple baseline design. Eight categories of teacher behavior were defined, and event recording was utilized. Results similar to Hughley's (1973) were found. These included feedback and reinforcement as effective methods of changing behavior in junior high school physical education teachers.

In 1975, Dessecker (1976) investigated a different form of supervisory observation of the student teaching experience and tried to determine differences among several categories of verbal interaction behaviors of physical education student teachers. Included in the study were two females and one male from Mount Union College, all majoring in physical education. Normal placement procedures found one teacher at each of the secondary and middle school levels, and one at both. Teacher behaviors were recorded on videotape for each lesson. Each student teacher coded his/her videotape after each lesson. Also, supervisors coded the tapes for objectivity and reliability. Data were analyzed by means of a single subject across behaviors, multiple baseline design.

Cramer (1978) analyzed the effects of training cooperating teachers in applied behavior analysis on the performance of selected teacher behaviors of student teachers in physical education at the secondary level. Subjects were five physical education student teachers and their

cooperating teachers. Cooperating teachers observed and recorded data for the student teacher, one class per day, for the entire student teaching term. To determine results, a control and a treatment group were randomly selected. The two groups, when compared, helped to determine if changes in behavior which occur during normal student teaching experiences (control group) were similar to changes during the study (treatment group). Results indicated that the cooperating teachers, following a training period of 6 weeks, were able to successfully use applied techniques of behavior analysis in changing selected teacher behaviors of their student teachers.

Another early study, emanating from Wisconsin State University, was completed by Kurth in 1969. In that study the teacher-student behaviors in elementary physical education classes were investigated. During 11 total class sessions, four student teachers were observed. FIAS was used to record behaviors (verbal) for 10 minutes each class.

A descriptive study employing CAFIAS was done at Ithaca College by Stevens (1979), who observed four teachers, two of whom were assigned to a treatment group and two to a control group. Teachers in the treatment group received supervisory feedback using CAFIAS, and teachers in the control group received conventional supervisory feedback. Stevens (1979) attempted to locate differences in teaching behavior between the groups. Results indicated that changes in the teaching behavior of the treatment group were evident from the pretest to posttest observation periods, but only minimal changes were observed in the teaching behavior of the control group during that time. Also, student activity remained constant across all observational periods. The null hypothesis that there would be no significant differences between the teaching behaviors of teachers who

received instruction and supervision in CAFIAS and those who received conventional supervisory feedback was accepted.

A study by Kasson (1974), utilizing the Mancuso Adaptation for Verbal and Nonverbal Behavior, was undertaken to describe and compare the behaviors of three physical educators in the classroom and coaching environments. Three hours of teaching and coaching were used for data collection. Kasson (1974) found that coaches were no more direct in the coaching of athletes than in the teaching of physical education students.

Lombardo (1979) conducted an investigation that was designed to longitudinally study the behaviors and interaction patterns of physical educators. Four elementary physical educators were observed twice a day for 20 days. Along with studying the teaching behaviors and interaction patterns, Lombardo (1979) attempted to ascertain differences in teaching behaviors and interaction patterns between male and female teachers of physical education. Conclusions that were reached involving the comparison of the male and female behaviors included:

1. Individual differences among the four teachers were minimal,
2. Significant differences in 15 of 31 major CAFIAS parameters and 14 of 20 CAFIAS categories were found between the male and female teachers,
3. Male teachers contributed more verbally, nonverbally, and totally than did female teachers,
4. In classes conducted by females, students contributed more verbally and totally,
5. More silence was evident in male-directed classes,
6. In female-directed classes, pupil initiation, teacher suggested (verbal, nonverbal, and total) was significantly greater,

7. Nonverbal questioning was used in a greater degree by female teachers,

8. There was a greater incidence of pupil-initiated behavior (verbal and total) in male-directed classes,

9. More confusion was found in female-directed classes,

10. Females employed more teacher acceptance, both verbal and nonverbal,

11. Female-directed classes employed a greater usage of verbal questions,

12. Males used more directions,

13. Males used nonverbal criticism and information-giving to a greater degree,

14. In female-directed classes, there were more predictable student responses,

15. More student interpretive behavior, both verbal and nonverbal, was evident in female directed classes,

16. A significantly greater degree of student-initiated behavior, both verbal and nonverbal, was found in female-directed classes,

17. More confusion, disorder, and noise was found in female-directed classes, and

18. More silence was found in classes led by males.

The results reached by Lombardo (1979) were very similar to those found by Nygaard (1971). Specifically, Nygaard (1971) found males used significantly more lecture, while females used more praise, encouragement, direction, criticism, student-initiated talk, and silence/confusion (FIAS category 10). However, Keane (1976) and Mawdsley (1977) did not report similar findings.

Using CAFIAS, both researchers found only minor differences in teaching behaviors between male and female physical educators.

Summary

Studies that have used systematic observational techniques to analyze teaching behaviors have become increasingly prevalent in the 1960s and 1970s. These systems of observation have been developed for many reasons. Murray (1970) and Kasson (1974) have indicated that systems of observation help to provide information concerning the actual behaviors (teacher or student) which occur in the classroom. These observational systems have been classified as being either descriptive or statistical (Soar, 1970). Early observational systems, which were mostly descriptive, tended to use rating scales as opposed to category systems. Rating scales failed to recognize the multiplicity of events which occur in the classroom, however. Through the efforts of researchers such as Lewin et al. (1939) and Anderson (1971) category systems began to be utilized. Flanders (1970) was able to construct one of the most widely used systems of observation for analyzing teacher and student behaviors, Flanders' Interaction Analysis System (FIAS). This tool enabled researchers to study closely the verbal behaviors which take place in the classroom. However, FIAS is unable to capture nonverbal activity. Many researchers have modified FIAS in order to be able to study nonverbal as well as verbal behaviors (Cheffers, 1972; Daugherty, 1971; Mancuso, 1972).

The early attempts made at observing and analyzing physical educational settings were forced to utilize existing classroom observational systems (Kiemele, 1975; Nygaard, 1971). Adaptations of such systems as FIAS were attempted. Cheffers (1972) developed CAFIAS, which had the ability to capture the nonverbal element as well as the verbal in physical education

classes. CAFIAS has been utilized in a wide variety of studies (Lombardo, 1979; Mancini, 1974). CAFIAS has not been used to compare males and females in a small case study approach, but it has been used to study larger groups of males and females (Faulkner, 1976).

Small group and $N = 1$ studies have been reported in fields such as psychology (Dukes, 1965; Edgington, 1967). However, a few small group studies have been attempted in the educational field.

While there have been few small group studies attempted in the educational field, fewer have been attempted in the physical education field. The most research done to date has come from The Ohio State University (Boehm, 1975; Dessecker, 1976; Hughley, 1973). Studies by Kasson (1974), Kurth (1969), Lombardo (1979), and Stevens (1979) were all of the small group variety, although they did not come from O.S.U.

Chapter 3

METHODS AND PROCEDURES

In this chapter, the procedures and instruments that were employed in this study are outlined. The chapter centers on seven areas: (a) selection of subjects, (b) measuring instrument, (c) methods of data collection, (d) coder reliability, (e) scoring of data, (f) treatment of data, and (g) a summary.

Selection of Subjects

The subjects included in this study were certified secondary physical education teachers in the Central New York area. Both teachers, one male and one female, were personally contacted and granted the investigator permission to obtain data from each of eight classes during a similar unit. Prior to the first taping, the teachers were issued an informed consent form which they signed and returned to the investigator (see Appendix D).

Measuring Instrument

The instrument used in this study was Cheffers' Adaptation of Flanders' Interaction Analysis System (Cheffers, 1972). CAFIAS measures the verbal and nonverbal interaction and behavior patterns of classroom teaching-learning situations. Adapted by Cheffers (1972) from Flanders' Interaction Analysis System, or FIAS, CAFIAS is a systematic observational technique which is objective in nature and analyzes verbal interaction patterns. CAFIAS was designed to be used in physical education classes. Each 3 seconds, or at every behavior change, the investigator recorded the behavior that occurred. The categories of CAFIAS are described in Appendix B.

Method of Data Collection

The male and female physical educators were each videotaped during eight class meetings. The eight class meetings comprised one basketball unit for the 9th grade boys and one unit for the 9th grade girls. Each class was 45 minutes in length. After completing the videotaping, the tapes were coded by the investigator utilizing CAFIAS.

Coder Reliability

In order to establish coder reliability for this investigation, one class was randomly selected from the female teacher's classes and one from the male teacher's classes. Both of these classes were coded at two different sittings. The top 10 parent cells from each coding session for each tape were identified and then subjected to the Spearman rank-order correlation to establish coder reliability.

Scoring of Data

The data collected from the coding of CAFIAS were transferred onto computer cards for computer analysis. Data were then compiled to illustrate the 17 CAFIAS parameters. The computer printout listed interaction patterns, percentages of each behavior, and other characteristics of each subject.

Treatment of Data

Only descriptive statistics were utilized, due to the small number of subjects involved. Percentages and ratios for each of the 20 CAFIAS variables, the 17 CAFIAS parameters, and the top 10 interaction patterns were calculated. Then the data were visually compared to determine the differences between the male and the female secondary physical educators.

Summary

The two subjects in this study were certified secondary physical education teachers in the Central New York area. One subject from each sex participated in order to identify any teaching behavior differences that might exist between sexes.

The measuring instrument involved was CAFIAS, a tool which identifies both verbal and nonverbal behavior patterns. Each subject was videotaped and then coded using CAFIAS. A total of 16 tapes were coded, eight each for the male and the female.

Data were collected from the videotapes and placed upon computer cards, with numbers corresponding to behaviors. After a printout was developed, descriptive statistics were utilized to determine what, if any, differences existed between the two physical educators. The computer printout listed percentages and ratios for the 17 parameters, of which a visual comparison was made.

Chapter 4

ANALYSIS OF DATA

This chapter presents the results found when comparing the teaching behaviors of one male physical education teacher and one female physical education teacher during a basketball unit. The teachers' behaviors were compared on a day-to-day basis as they interacted with their non-coed, like-sex classes. Cheffers' Adaptation of Flanders' Interaction Analysis System (CAFIAS) was used to measure the behavioral differences between the two physical education teachers. This chapter consists of four sections. The first section deals with coder reliability. The second section focuses upon total CAFIAS results for each teacher. The third section looks at CAFIAS results on a day-to-day basis. Finally, a summary is provided.

Coder Reliability

In order to determine the reliability of the coder for this investigation, two videotaped classes, one of the male physical education teacher and one of the female physical education teacher, were randomly selected by Dr. Victor H. Mancini, an expert in the coding of CAFIAS. Both of the classes were coded during two different sittings. In determining coder reliability, the top 10 parent cells from each coding session for each tape were identified and subjected to the Spearman rank-order correlation. The mean of the correlations was .987, which was sufficient to indicate that the coder was reliable.

Total Male and Female CAFIAS Results

The use of the 16 selected CAFIAS parameters by each physical education teacher is summarized in Table 1. Visual comparisons indicated

Table 1
Use of Major CAFIAS Parameters

CAFIAS Parameters	Male Teacher Percentage	Female Teacher Percentage
Total Teacher Contribution (TTC)	41.79	55.41
Total Student Contribution (TSC)	39.28	34.09
Total Silence and/or Confusion (SC)	18.93	10.50
Total Teacher Use of Questions (TTUQ)	5.82	4.54
Total Teacher Use of Acceptance and Praise (TTAPR)	18.44	23.08
Total Student Initiation, Teacher Suggested (TSITS)	48.46	50.91
Content Emphasis, Teacher Input (CETI)	26.87	49.50
Teacher as Teacher (TT)	97.24	94.04
Other Student as Teacher (ST)	2.76	5.37
Environment as Teacher (ET)	.00	.59
Verbal Emphasis (VE)	59.14	61.53
Nonverbal Emphasis (NVE)	40.86	38.47
Class Structure as One Unit (W)	66.30	77.15
Class Structure as Groups or Individuals (P)	33.70	22.85
Class Structure with No Teacher Influence (I)	.00	.00

that differences existed between the male and female physical education teachers. The differences existed in the CAFIAS parameters of Total Teacher Contribution (TTC); Total Silence and/or Confusion (SC); Content Emphasis, Teacher Input (CETI); Class Structure as One Unit (W); and Class Structure as Groups or Individuals (P). The female teacher contributed more and gave more content-related information than the male teacher. The female teacher also kept the class together in one unit more than the male teacher, who broke his classes into groups and/or individuals more than the female teacher did. The male teacher's classes contained more student-to-student interaction than the female teacher's classes.

Figure 1 was used to compare the percentages of behavior in each of the CAFIAS categories between the male teacher and the female teacher. Visual comparisons revealed differences in teacher behavior between the male and female teachers. The female teacher gave more information, both verbal and nonverbal, to her classes than the male did, however the male gave more directions, both verbal and nonverbal, than the female did. The male's classes also contained more student-to-student interaction than the female's classes.

The most frequent interaction patterns and their percentages of occurrence for both the male and female physical education teachers are illustrated in Table 2. The predominant pattern for the male's classes was game play or student interpretive responses followed by student-to-student interaction (noise/confusion) and more interpretive responses (8\10-8\). After extended information-giving, the male teacher gave extended directions (5-5-6-6) that were followed by predictable responses by the students and more teacher directions (8-6). Following the teacher's directions, the students participated in drills (8-10-8). The students

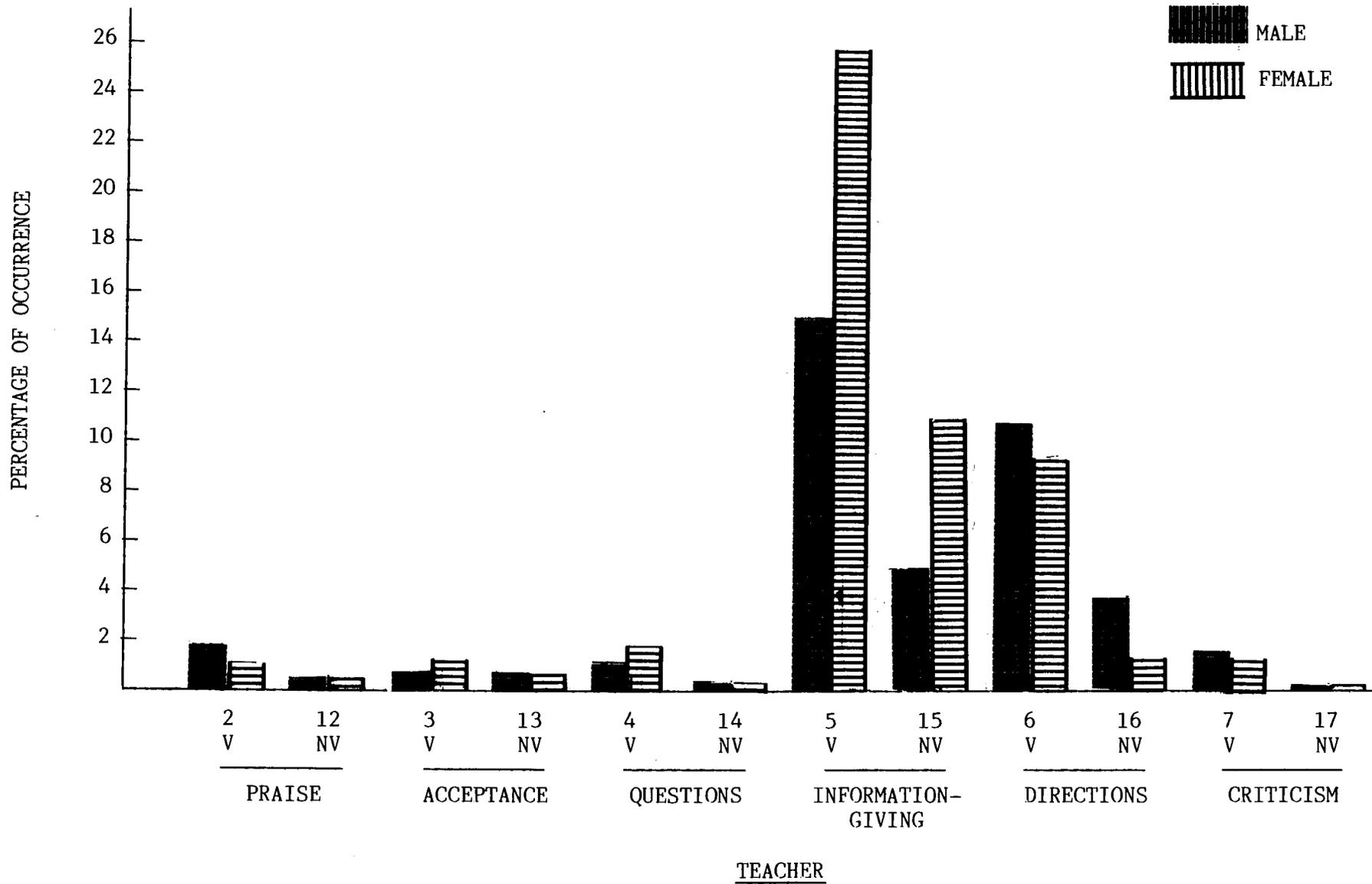


Figure 1. Percentage of behavior in each CAFIAS category.

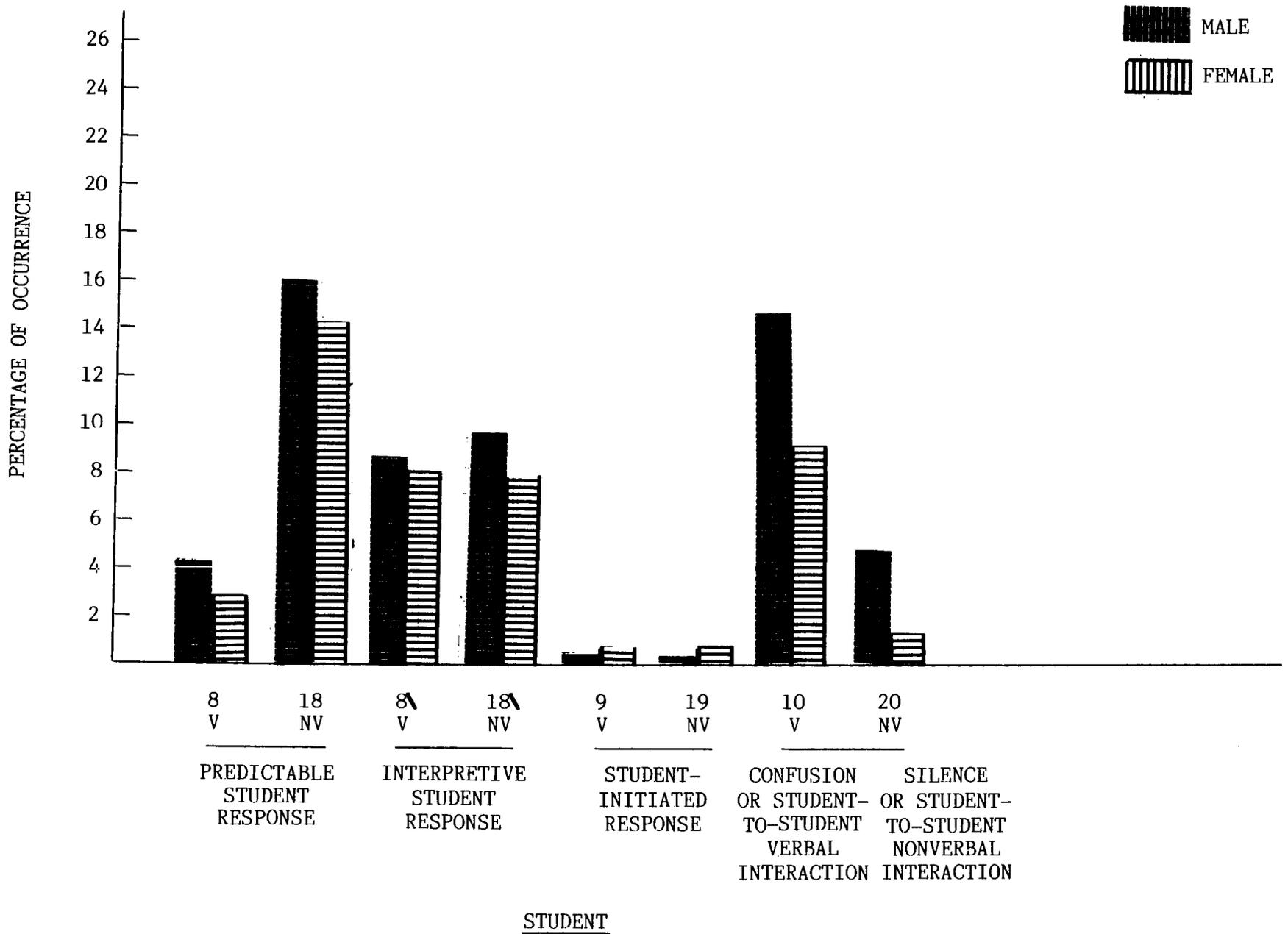


Figure 1. (continued).

Table 2
Most Frequent Interaction Patterns

Male Teacher		Female Teacher	
Interaction Patterns	Percentage of Occurrence	Interaction Patterns	Percentage of Occurrence
8\10-8\	24.82	5-5	27.72
5-5-6	18.35	8\10-8\	17.65
6-8-6	17.38	6-8-6	12.79
8-10-8	12.47	8-8-5-6	11.37
8\6-8\	6.44	8\5-8\	6.63

Interaction Pattern Description

8\10-8\	Student interpretive response followed by student-to-student interaction followed by more student interpretive response.
5-5-6	Extended teacher information-giving followed by teacher direction.
6-8-6	Teacher direction followed by predictable student response followed by more teacher direction.
8-10-8	Predictable student response (drilling) followed by student-to-student interaction followed by more predictable student response.
8\6-8\	Student interpretive response followed by teacher direction followed by more student interpretive response.
8-8-5-6	Extended predictable student response followed by teacher information-giving and teacher direction.
8\5-8\	Student interpretive response followed by teacher information-giving followed by more student interpretive response.

then exhibited interpretive behavior that was followed by directions from the teacher, which led to further interpretive responses (8\-6-8\).

In comparison, the female teacher demonstrated a greater degree of information-giving (5-5). Following teacher information, the students engaged in game play (8\-10-8\). Directions by the teacher were then followed by predictable student responses and more directions (6-8-6), which were again followed by extended predictable student responses (8-8). Information and directions given by the female teacher (5-6) were followed by interpretive student responses, more information, and further interpretive responses by the students (8\-5-8\).

Day-to-Day CAFIAS Results

This section is a summation of the CAFIAS parameters used in order to identify behavioral differences that may have existed between a male physical education teacher and a female physical education teacher on a day-to-day basis. Visual comparisons revealed that differences did exist. Although the amount of praise that was exhibited by the teachers was fairly constant throughout the basketball unit, the male teacher gave more praise to his classes than did the female teacher (see Figure 2). During the first four classes, the male teacher's use of praise remained relatively consistent, but the female teacher's praise toward her classes increased slightly. During these first four classes, the male teacher utilized more praise than did the female teacher. In the fifth class there was a slight increase in praise usage by the female teacher and a slight decrease by the male teacher. The female teacher used more praise during the fifth class than the male teacher used. During class number six, the male teacher demonstrated an increase in praise that was greater than the increase shown by the female teacher. Classes seven and eight showed a decline in praise

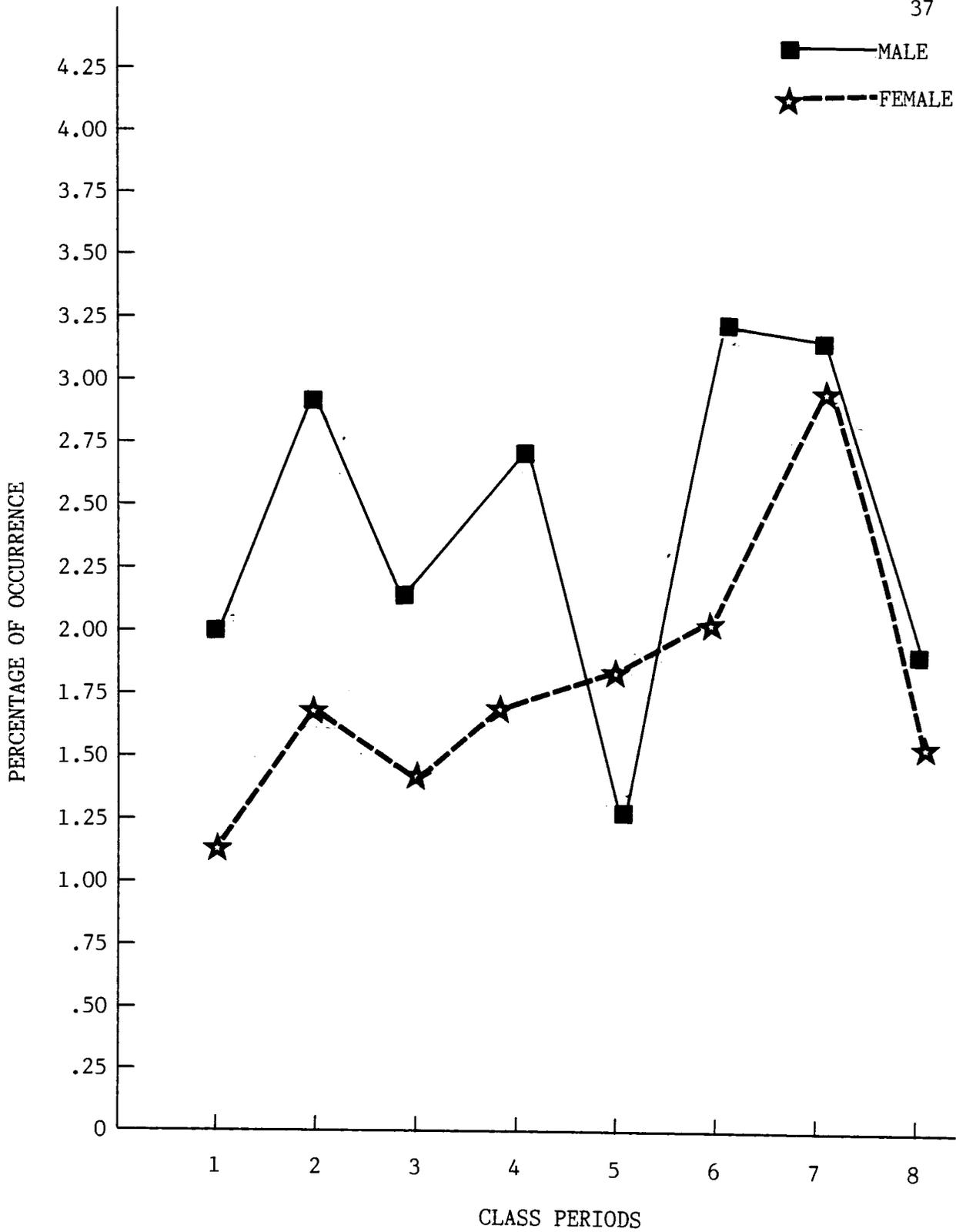


Figure 2. Use of praise on a day-to-day basis.

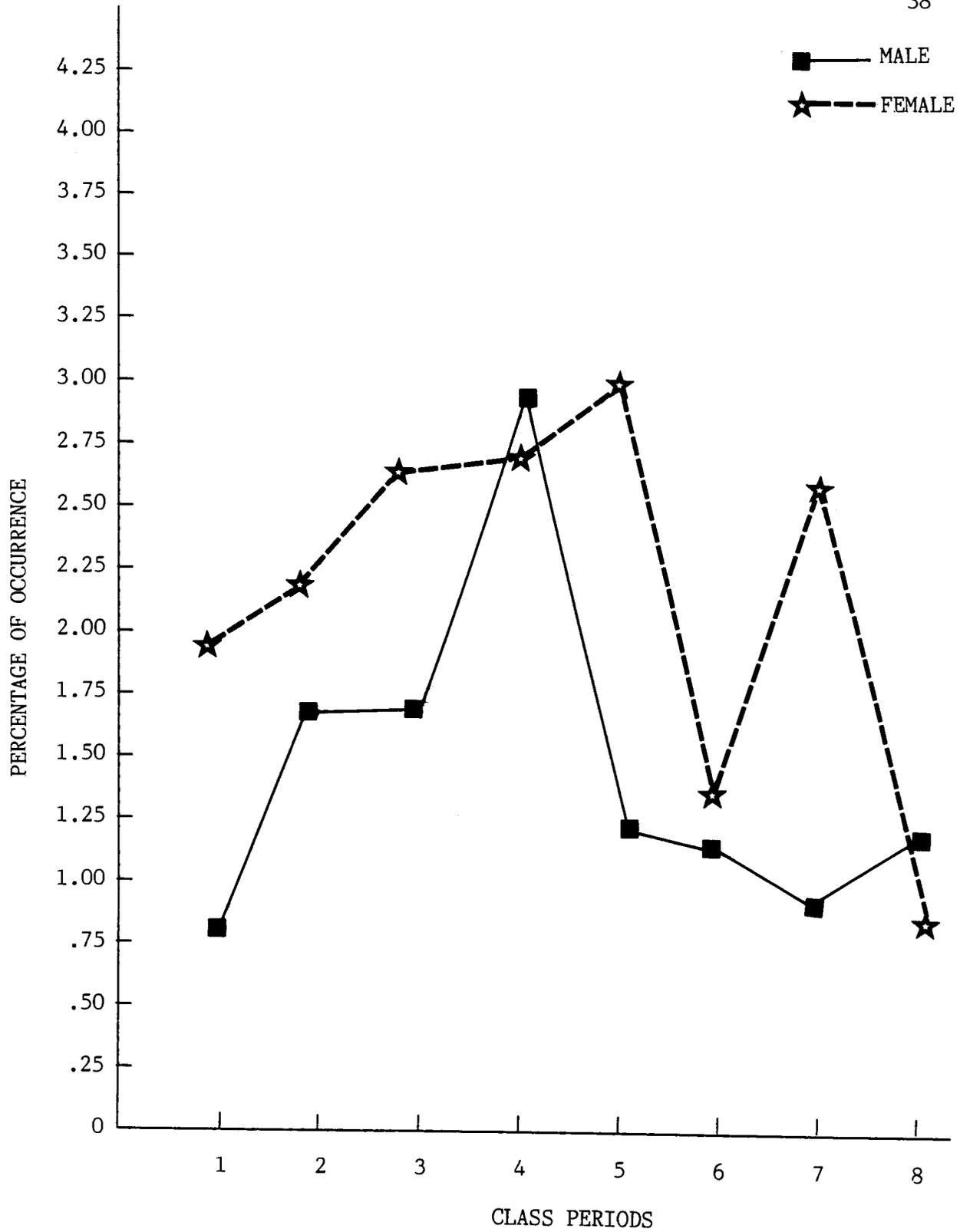


Figure 3. Use of acceptance on a day-to-day basis.

by the male teacher and a slight increase (class seven) followed by a slight decrease (class eight) for the female teacher.

Use of teacher acceptance was greater by the female teacher than it was by the male teacher for all class periods except class eight (see Figure 3). Over the first five classes, the female teacher showed a slight increase in acceptance, as did the male teacher until class five, when there was a decline in acceptance by the male teacher. Classes six through eight showed the female teacher was inconsistent in her use of acceptance; a decline in acceptance in class six was followed by an increase in class seven and a decrease on the final day of the unit. For the male teacher classes six through eight remained consistent with the fifth class in the amount of acceptance utilized.

In the use of teacher questions there was some variability between the male and female teachers (see Figure 4). The male teacher displayed a very consistent use of questioning, whereas, the female teacher's usage had more fluctuations. The female teacher utilized a greater percentage of questions during class two than during class one. In class three there was a decrease in this behavior, with an increase again in class four. In classes five and six there was a decline in the use of questions by the female teacher. The greatest increase in the use of questioning by the female was displayed during class seven, but then during the eighth class the students received fewer questions than in any other class during the unit.

The differences in the amount of information given by the two teachers was very evident (see Figure 5). Over the eight-class unit, the female teacher continually gave more information than did the male teacher. The male teacher's percentage of occurrence for information-giving dropped greatly between class number one and class number eight. Other than two

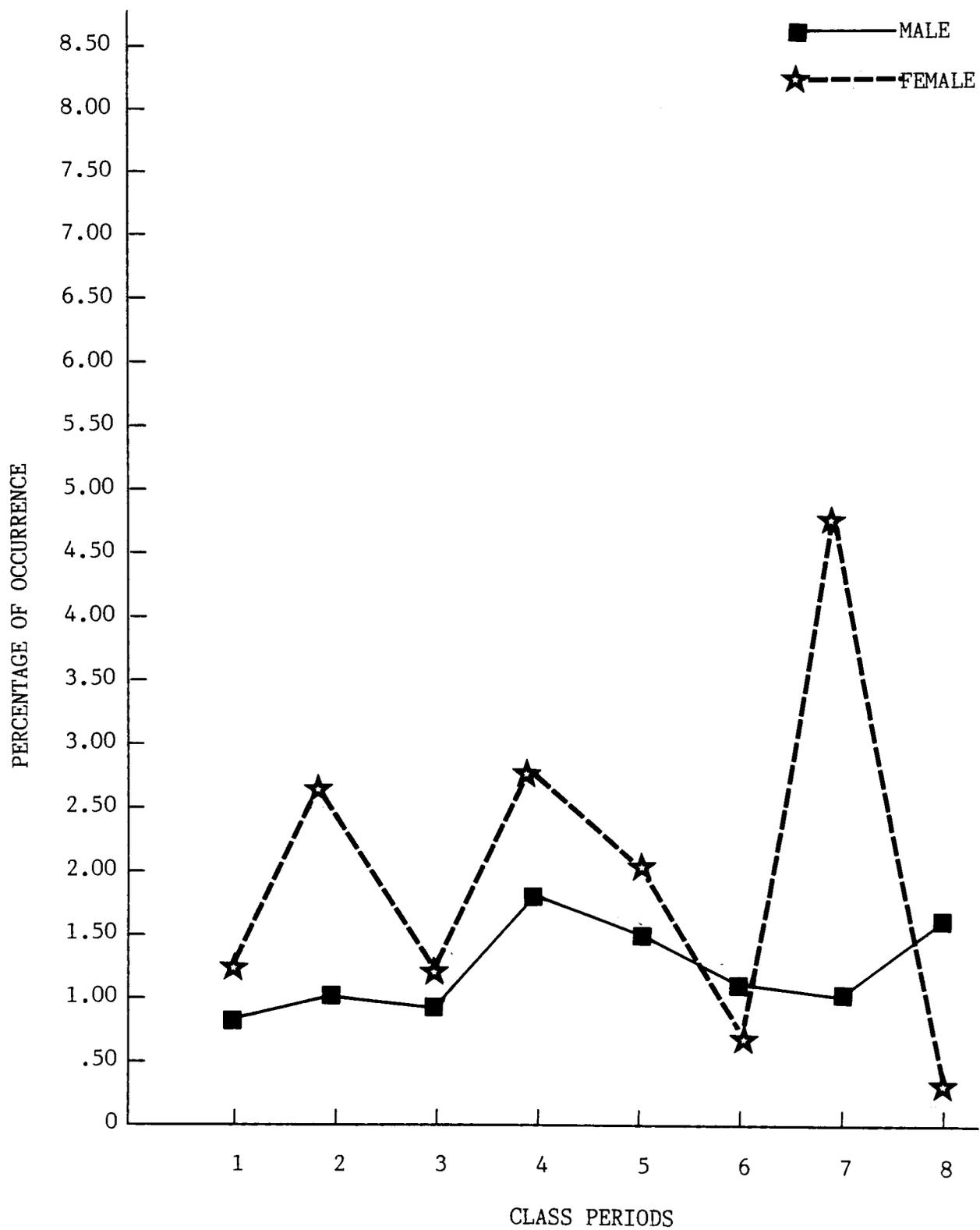


Figure 4. Use of questions on a day-to-day basis.

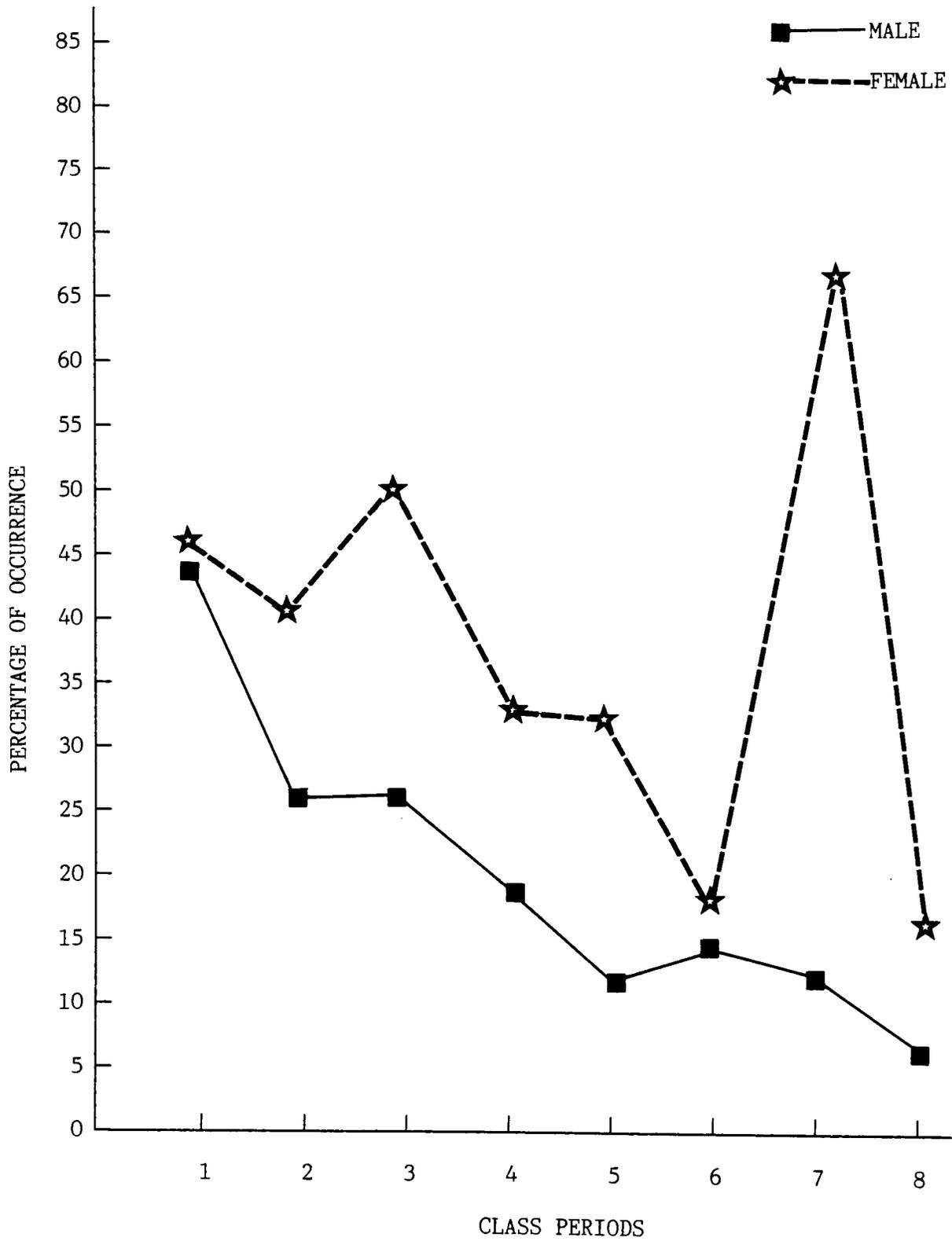


Figure 5. Teacher information-giving on a day-to-day basis.

slight increases in the percentage of occurrence in classes three and six, there was a consistent decrease in information given by the male teacher during successive classes. The greatest difference was between classes three and four, where the male's information to his class was reduced by approximately 50%. In contrast, the female teacher showed a great deal more variability in regard to the amount of information that she gave to her classes. In comparison to class one, in the second class there was a decrease in the amount of information the female gave to her students, whereas in class number three there was an increase in information by the female teacher. In class number four, similar to the second class, there was a decline in the amount of information given by the female teacher, and class five was very consistent with the fourth class. The greatest variation in regard to information-giving took place during classes six, seven, and eight. A sharp decrease in the amount of information given by the female teacher was in evidence in class six, followed by an even greater increase in class seven. The greatest change came during class number eight, where there was approximately a 75% decrease in the amount of information given by the female.

The use of directions by the male and female teachers during this unit was marked by the fact that the male teacher gave more directions to his classes than did the female teacher over the entire unit (see Figure 6). In the first four classes taught by the male teacher the students received a steady increase in the amount of teacher directions. With the exception of class number seven, in classes five through eight there was a more drastic decline in the amount of directions given than the increase which was seen in the first four classes. The female teacher's directions were more variable than the male teacher's. Classes one through four were

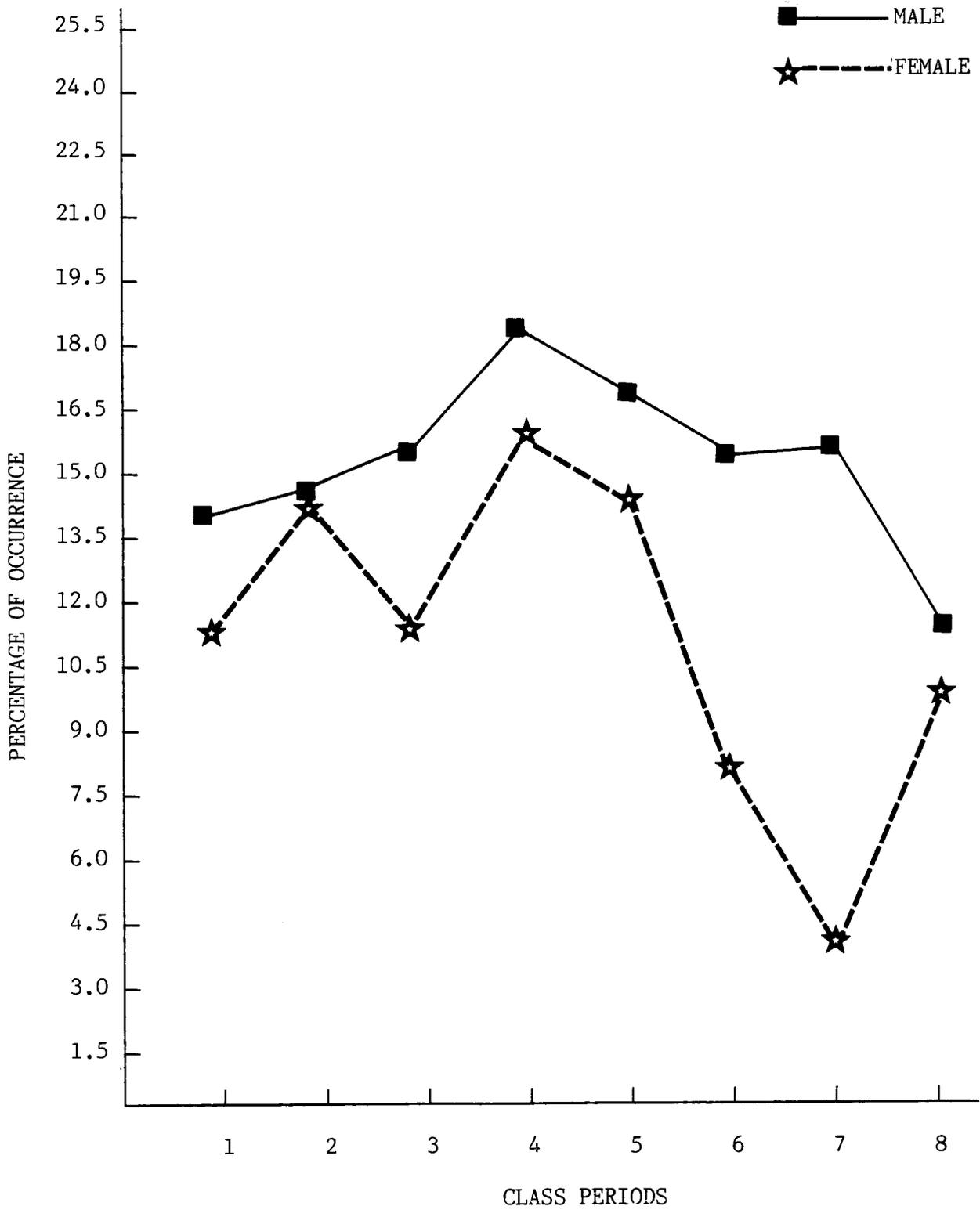


Figure 6. Teacher directions on a day-to-day basis.

marked by fairly consistent increases and decreases in succession. In classes five through seven there was a sharp decrease in the amount of directions given by the female teacher. By class eight there again was an increase in the percentage of directions given by the female teacher.

The amount of criticism utilized by each teacher toward the respective class was rather consistent (see Figure 7). During the early part of the unit (first four classes) the female teacher used criticism more than the male teacher, yet during the second part of the unit (last four classes), except the fifth, the male teacher utilized more criticism than the female teacher. The female teacher displayed a consistent use of criticism toward her class during the first four classes, with a slight increase between classes one and four. Similarly, the male teacher used criticism consistently throughout the first four classes, with a slight increase in criticism usage between classes three and four. In the fifth class the two teachers used the same amount of criticism. The last three classes found the female using less criticism toward her classes and remaining consistent until the end of the unit. The male teacher also remained consistent in his utilization of criticism during the end of the unit, after a slight increase in usage between classes five and six.

During the unit, the students in both classes responded with a varied degree of predictable responses (see Figure 8). The male students showed more predictability with their responses during the first three classes than at the end of the unit. After a steady increase in the percentage of student predictable responses in the male teacher's classes (during the first three), in classes four and five there were great decreases. In class six again there was an increase in the predictability of student responses in the male teacher's classes, followed by decreases in

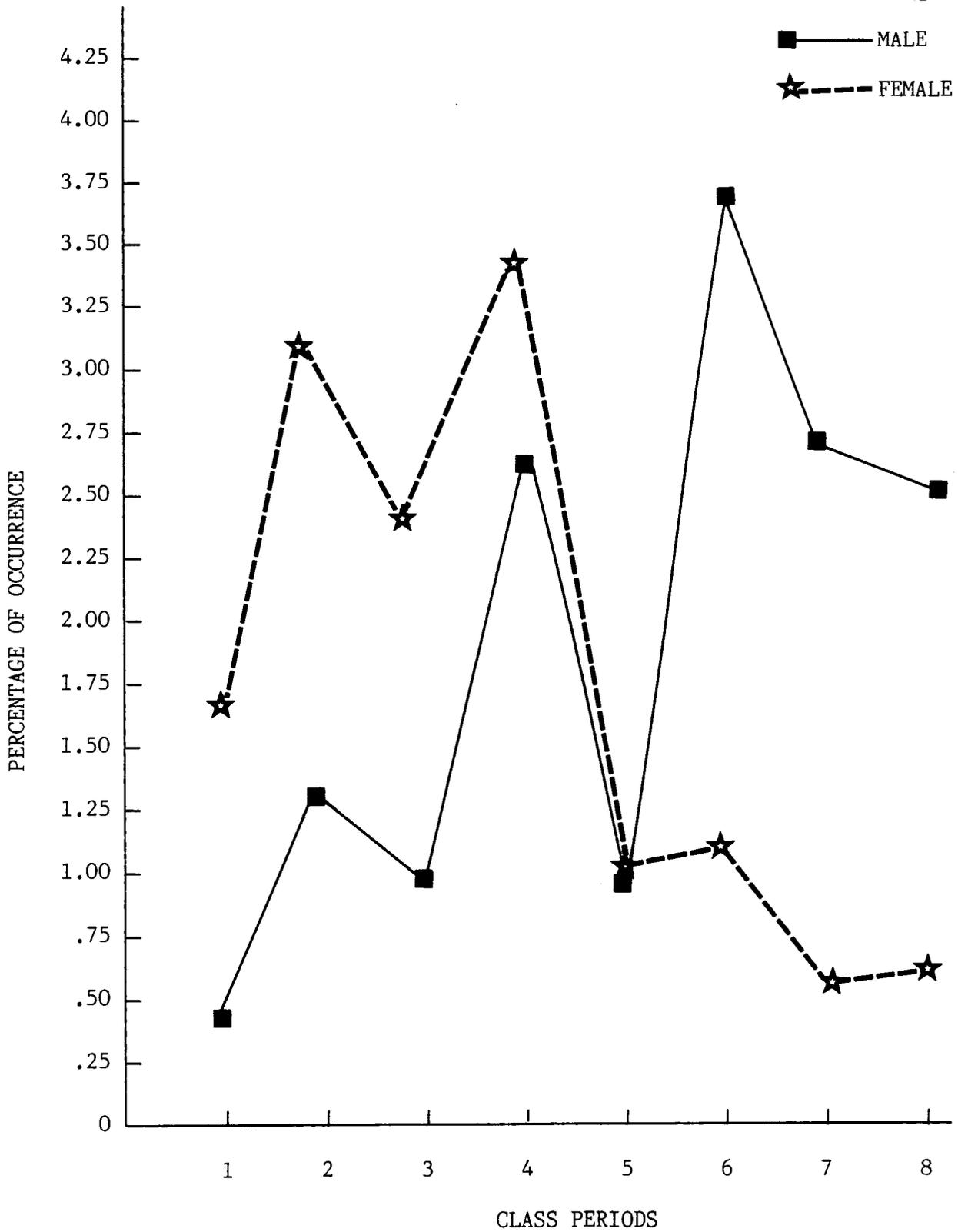


Figure 7. Teacher criticism on a day-to-day basis.

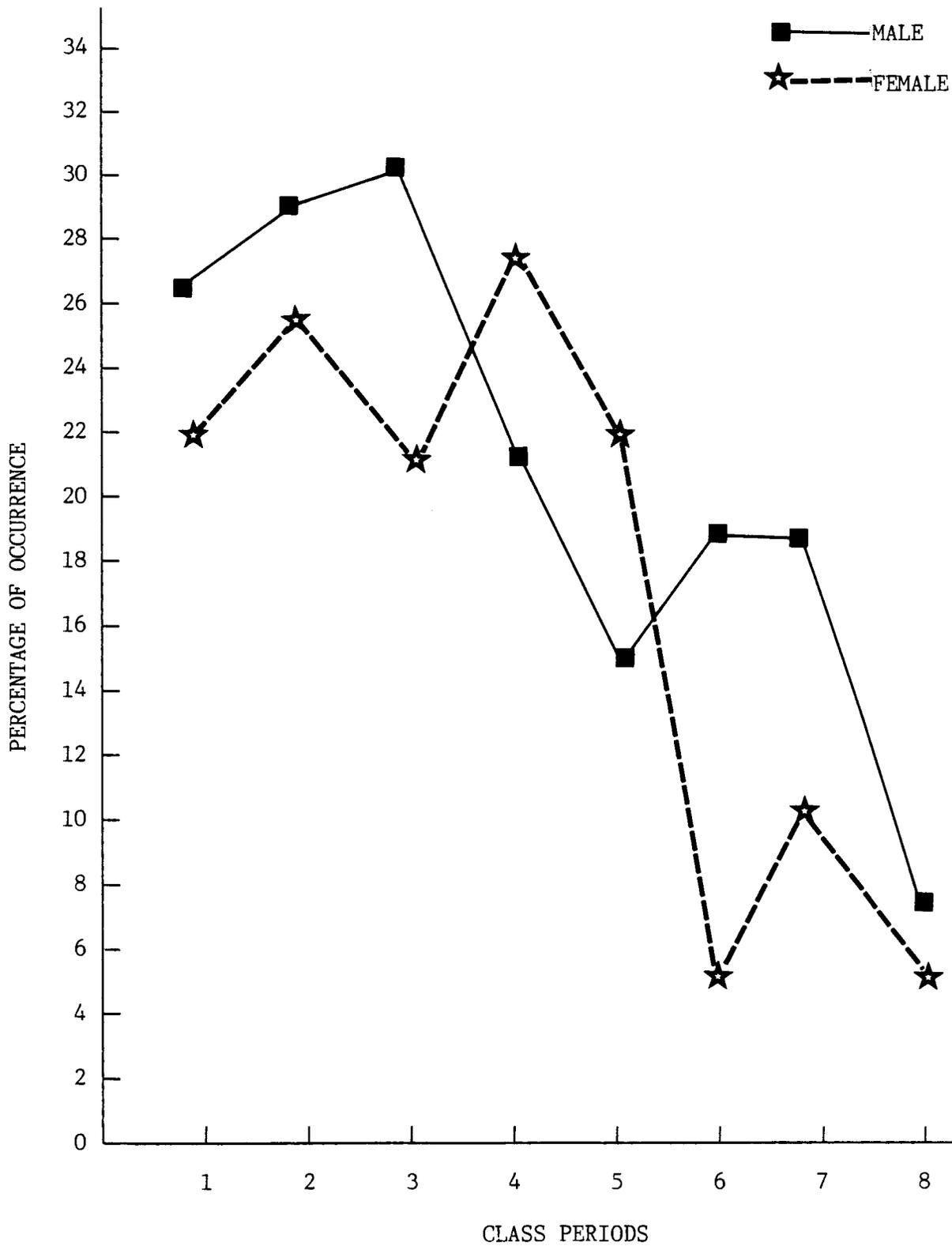


Figure 8. Student predictable responses on a day-to-day basis.

classes seven and eight. In the female teacher's classes the students' predictable responses increased and decreased in succession from the first class in the unit through the fifth. Between classes four and six, the amount of predictability in the students' responses dropped greatly. In class seven again there was an increase in predictable student responses, followed by a decrease during class eight.

The amount of student interpretive response was low for both the male and female classes during the first three classes (see Figure 9). The female teacher's students showed more interpretive behavior during the first class than the male teacher's students did. The female teacher's students showed a lesser amount of interpretive behavior in the next three classes. Other than in the third class, the students in the male teacher's classes demonstrated a dramatic increase in their interpretive behavior over the first five classes. In the fifth and sixth classes for the female teacher a dramatic increase in regard to the student's interpretive behavior was seen. The boys showed less interpretive behavior than the girls during the sixth class. A sharp decline in the amount of interpretive student responses in the female teacher's seventh class was followed by an even sharper increase during the eighth class. In class number seven the students in the male teacher's class used slightly more interpretive responses than in the previous class. In the final class for the male students an increase in their interpretive behavior was seen, but they still exhibited a lower percentage of interpretive behavior than the female students.

Student-initiated responses were fairly consistent (see Figure 10). The male teacher's classes remained at a very constant level throughout the entire unit. The female teacher's classes showed a greater variance

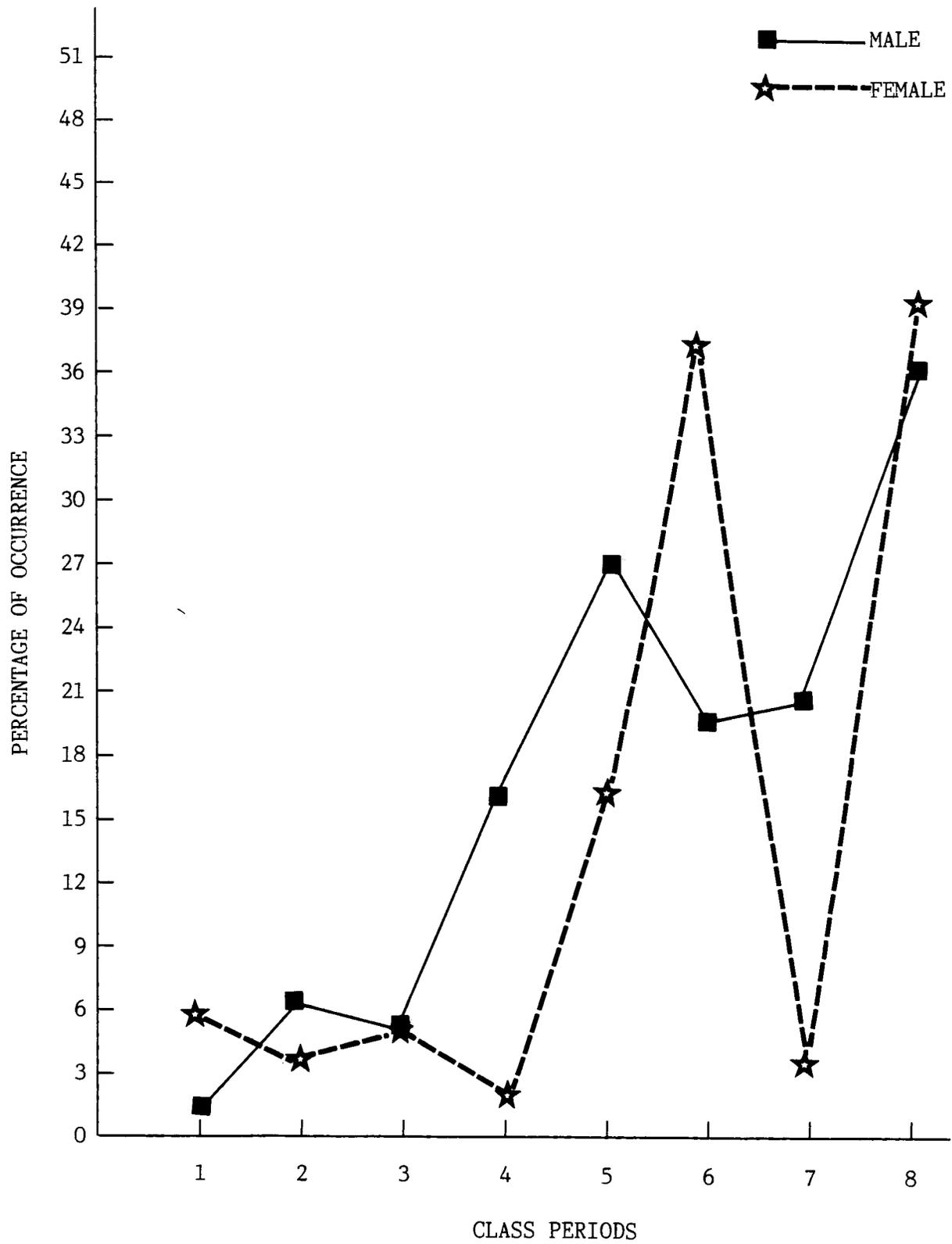


Figure 9. Student interpretive responses on a day-to-day basis.

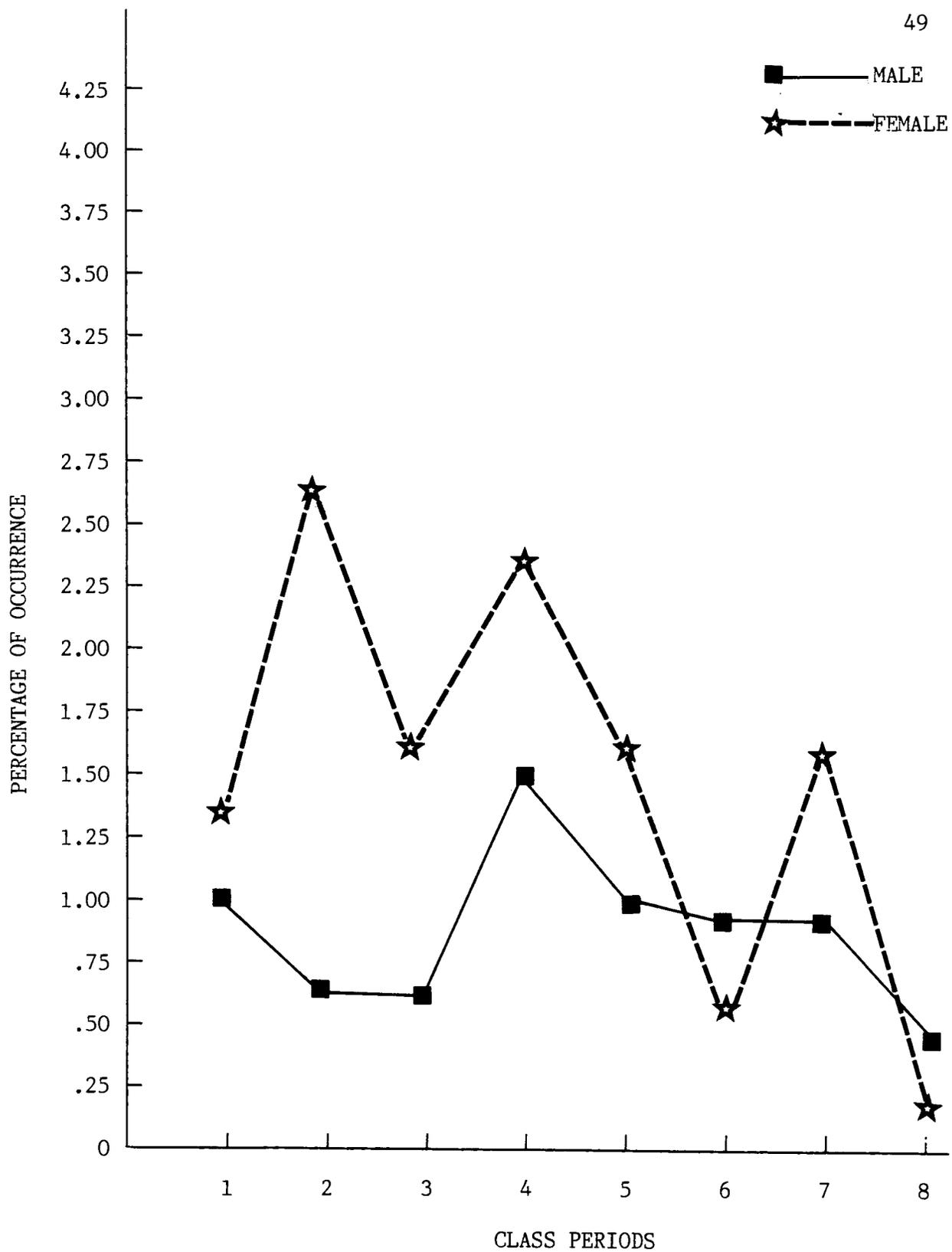


Figure 10. Student-initiated responses on a day-to-day basis.

through the first four classes. In classes five and six the girls displayed fewer student-initiated responses than in class four. The girls in class seven displayed a slight increase in student initiated behavior over class six, but decreased the behavior again in class eight.

Summary

Coder reliability was determined by randomly selecting two videotaped classes, one from the male teacher and one from the female teacher. The mean of the Spearman rank-order correlation on the top 10 parent cells from each of two codings was .987, which was sufficient to indicate coder reliability.

Visual comparisons using Table 1 and Figure 1 indicated that differences in the teaching behaviors of a male physical educator and a female physical educator did exist. Students in the female teacher's classes received more instruction than did the students in the male teacher's classes. Further, the female teacher was responsible for more content in her classes than was the male teacher. The students in the female teacher's classes were kept together as a large group more often than the students in the male teacher's classes. The male teacher's classes were distinguished by more silence and/or confusion and/or student-to-student interaction and were broken down into smaller groups or participated in the class as individuals more than students in the female teacher's classes.

Day-to-day results were also compared (Figures 2-10). For the behaviors of teacher praise, teacher acceptance, teacher questions, teacher criticism, and student-initiated responses few differences were found. On a day-to-day basis, the female gave more information to her classes than the male, yet the male gave more directions than the female. Additionally,

on a daily basis there were some large differences in the amount of both predictable and interpretive responses made by the students.

Overall, for all teacher behaviors, a fluctuating pattern was evident for both the male and female teacher. Teacher behaviors were not consistent day-to-day.

Chapter 5

DISCUSSION OF RESULTS

This investigation focused upon the teaching behaviors of a male physical education teacher and a female physical education teacher each teaching an eight-class basketball unit. Cheffers' Adaptation of Flanders' Interaction Analysis System (CAFIAS) was the observational tool utilized to compare and contrast the behaviors of the two teachers. CAFIAS has been used previously to study the differences in teaching behaviors between teachers, as they interacted with students (Faulkner, 1976). The researcher was unable to find other studies utilizing CAFIAS to compare teaching behaviors between one male and one female physical educator; therefore, conclusions and comparisons with other studies should be made cautiously.

Visual analysis of the CAFIAS results indicated that over the entire unit, differences in teaching behaviors between the male physical education teacher and the female physical education teacher did exist. The male teacher tended to give more directions to his students than did the female teacher to her students. Also, the students in the male teacher's classes were engaged in more student-to-student interaction than were the female students. The female teacher spent more time giving information or content-related material to her students than the male teacher.

The most frequent interaction patterns between the male teacher and his students and between the female teacher and her students were different. The male teacher's classes were marked by a great deal of student interpretive behavior (8\-10-8\). The best example of this type of behavior occurred when the boys were involved in game play. This was the

second most predominant interaction pattern for the female teacher's classes, again occurring as game play, although this behavior did not occur as often as in the male teacher's classes. For the female teacher and her students, the most common interaction pattern occurred as extended information-giving from the teacher to her students (5-5). An example of this was the female teacher lecturing to her students on the fundamentals of zone defense. The male teacher's second most predominant interaction pattern between himself and his students also occurred as extended information-giving, followed by directions (5-5-6). A typical example would find the male teacher talking to his students about the traveling violation and then instructing his students to "set up the ball catch drill, without traveling when you catch the ball." Teacher directions followed by predictable student response and more teacher directions was the third most predominant interaction pattern between both teachers and their students (6-8-6). An example of this type of interaction is the male teacher directing his students to "form two lines, one under each basket, and perform your full court lay-up drill," and the boys doing so; in response to the boys performing this drill, the male teacher might then direct the boys to "only dribble with your left hand." Likewise, the female teacher instructed her class to "form two lines, one on the baseline, and one at the foul line, directly across from a partner," and the girls would respond; next, the female teacher might say, "Now give only a bounce pass to your partner."

One additional interaction pattern that should be discussed was that of student interpretive behavior followed by directions from the teacher and more student interpretive behavior in the male teacher's classes (8\-6-8\), and student interpretive behavior followed by information from the teacher and more student interpretive behavior in the female teacher's

classes (8\5-8\). Although these two patterns occurred quite infrequently, it is important to note the type of response made by the respective teacher after a student interpretive response. For example, in the male teacher's classes, game play by the boys might have been followed by the teacher directing the boys to "now run only man-to-man defense," and the boys did so, in an interpretive manner. In the female teacher's classes, the same game play drill might elicit a response from the female to her students on the proper way to take the ball out of bounds after a basket by the opponent, after which the girls continued their drill.

On a day-to-day basis, minimal differences were found for the behaviors of teacher praise, teacher acceptance, teacher use of questions, teacher criticism, and student-initiated responses. These behaviors occurred quite infrequently, and when they did occur, they occurred with little or no variation. In other words these behaviors occurred quite infrequently yet at a fairly consistent level. On a day-to-day basis the female teacher gave more information to her students than the male teacher gave to his students. The giving of information by the male teacher declined throughout the unit. In other words, at the beginning of the unit the male teacher gave more information to his students than he did at the end of the unit. There was a similar pattern of decreasing information given by the female teacher over the unit, except for class number seven. For example, both teachers began their units with high amounts of information on the correct ways to perform various basketball skills. As the unit progressed and the amount of information for both teachers decreased, generally the amount of interpretive student response increased. Although there was a fluctuating pattern of interpretive responses made by the students, there were more of these responses at the end of the unit than at the beginning. As the

teachers spent less time giving information on the basic principles of basketball, the students had more time in which to perform the skills they were taught early in the unit. Drills and game play took up a greater percentage of time as the unit progressed. Note especially the seventh class taught by the female. During this class the amount of information-giving was at its peak, and the amount of interpretive response by her students was at its lowest. It was during this class that the female presented the major rules and regulations to her students, and the students were not involved in drills and game play as much as during other classes.

On a day-to-day basis the male teacher gave more directions to his students than the female teacher gave to her students. Generally, the amount of directions given by both teachers decreased as the unit progressed, as did the predictable response made by the students in both classes decreased. Although a fluctuating pattern of predictable responses is found, there were more predictable responses at the beginning of the unit than at the end of the unit. Therefore, it becomes evident that as teacher directions decrease, student predictable responses decrease likewise. As an example, in the beginning of the unit, both teachers lined up their respective students for rote drills. The male teacher might direct his students to "get into two lines of even numbers, facing a partner, and begin right-handed dribbling toward your partner." The teachers followed the typical progression for teaching an activity unit. At the start of the unit they provided students with a great deal of information and focused practice time on mastering the fundamentals of the game, as evidenced by the large amount of drilling resulting in predictable student behaviors. As the unit progressed, the teachers provided more opportunities for students to use their skills in scrimmages and game play, as evidenced by

an increasing amount of student interpretive behaviors.

The results of this study indicated that differences in teaching behavior did exist between the male physical educator and the female physical educator. These differences led to rejection of the null hypothesis.

Few researchers have investigated the teaching behavioral differences between male and female physical education teachers. Using Flanders' Interaction Analysis System (FIAS), Nygaard (1971) observed 40 different physical education classes at four different levels of teaching (elementary, middle, junior high, and senior high school). Nygaard (1971) found that males used significantly more lecture, while females used more praise, encouragement, criticism, and directions, and had more student-initiated talk and silence/confusion (FIAS category 10). Yet Keane (1976) and Mawdsley (1977), using CAFIAS, found only minor differences in teaching behaviors between males and females. Keane (1976) used CAFIAS to compare teachers of opposite sex and the interaction patterns they had with their students. He found significant differences in only one parameter, that of student-initiated activity. There were more student-initiated behaviors in the female-taught classes than in the male-taught classes. In Mawdsley's (1977) study, only minor differences in teaching behavior were found between the male teachers and the female teachers. Both Keane (1976) and Mawdsley (1977) found the teachers exhibiting the same amount of praise and acceptance.

When the findings of the three previously mentioned researchers are compared to this study a few differences are found. The major difference between the study performed by Nygaard (1971) and this study is found in the amount of lecture given by the male teacher(s) as opposed to the

female teacher(s). Nygaard found that male physical educators lecture more often than female physical educators, but the opposite was found in this study. One possible explanation for this is that in reaching his conclusions, Nygaard (1971) grouped together the results of his observations on all four teaching levels. This may have affected Nygaard's (1971) results because at any of the three levels not observed in this study (i.e., elementary, middle, and junior high school), there may have been considerably more amounts of lecture given by the male teachers studied, which could have skewed the final results. Another possible explanation is due to the fact that Nygaard (1971) studied 40 physical education classes and was able to collect more data than the current study, which observed 16 total classes.

Nygaard (1971) also found that females used more praise, directions, commands, and criticism, while the current study found little difference in the use of praise and criticism by the male and female teachers. Yet this study revealed that the male physical educator, unlike the male teachers in Nygaard's (1971) study, was more likely to give directions and commands. The male teacher involved his students in drills and game play earlier in his unit than did the female in her unit. Directions and commands by the male teacher were therefore more abundant in the current study than in Nygaard's (1971).

Stewart (1978) developed a system that incorporated behavioral categories from a number of systems and observed teachers at all four levels of instruction. Stewart (1978) studied the behaviors of 12 male and 12 female teachers in a natural environment. Stewart (1978) found that the male physical education teachers displayed a higher percentage of positive behavior toward his students and a lower percentage of negative

behavior toward his students than did the female teachers studied. In the current study, there was little or no difference in the amount of positive or negative feedback from either the male teacher or the female teacher to their students. Very little motivational feedback was evident in this study when compared with those results found by Stewart (1978).

Faulkner (1976) used CAFIAS in a manner similar to that used in this current study. She studied 40 male and 40 female pre-service physical education teachers in micro-peer teaching situations. The results of the investigation indicated no differences existed in the behaviors of the male and female teachers; this is contrary to the findings reported in this study. In contrast to the procedures in this study, Faulkner (1976) made use of only three observational periods for each pre-service teacher, but the current study utilized eight observational periods. Faulkner's (1976) study may not have utilized enough time to identify any behavioral differences that might be evident over a longer time period. Also, Faulkner (1976) observed the students in a micro-peer setting, which is actually a learning environment for the pre-service teachers as well as for the "students" they were teaching. In other words, unlike the current study, Faulkner's (1976) study did not take place in the school setting. These two very important facts could be possible explanations why Faulkner (1976) found no differences between the male and female teachers she observed.

Only one study to date has investigated the teaching behaviors of a small group ($N = 4$) of male and female physical education teachers. Lombardo (1979) performed a longitudinal study, observing the four teachers twice per day over a 20-day period. As did the current study, Lombardo (1979) found that the male teachers used more directions. In contrast to this study, Lombardo (1979) found that male teachers contributed more

information to their students. An explanation as to why this did not occur in the current study is that the female teacher in this study followed a different progression in the teaching of the basketball unit. The female teacher gave more information about basketball skills, techniques, and rules, whereas the male teacher progressed into skills, drills, and game play with his students more quickly. Lombardo (1979) also found that the female teachers employed more acceptance and use of questions with their students than did the male teachers. The current study found little difference between the male and female teachers in regard to these behaviors. Further, Lombardo (1979) found that the students in the female-taught classes displayed a greater amount of interpretive behavior, which was the opposite of the findings in the current study. Lombardo (1979) found more criticism and information-giving by the male teachers than did this study. It may be explained that the amount of criticism given to students as well as the amount of direct content-related information given the students might restrict the interpretive behaviors that students show. The current study found that there was little difference in the amount of criticism shown by the two teachers, yet the female teacher gave more information to her students than did the male teacher, and the amount of student interpretive responses was less in the female-taught classes than in the male-taught classes. In other words, it can be expected that the teacher who is more likely to give greater amounts of information can also expect that his/her students will be less likely to show interpretive behavior. In addition, the use of a large amount of information may limit the time available for interpretive behaviors.

In a practical sense, the current study might be helpful to the two teachers who served as subjects in this study. The major findings of this

study deal with the teaching progression and how each teacher taught basketball to his/her students as well as the amount and type of feedback from the teachers to their students after the students had made interpretive responses. The female teacher was more inclined to give information to her students than was the male teacher, who was more likely to give directions to his students than was the female teacher. The female teacher was concerned that her students learned the game of basketball in a cognitive manner as well as learning motor skills, whereas the male teacher was more concerned that his students learn the game through progression of skills, then drills, then game play.

There were also very few motivational tools employed by either teacher (e.g., the CAFIAS parameters of teacher praise, teacher acceptance, teacher questioning, and teacher criticism). The motivation or feedback from the teachers to their students took the form of information-giving and directions.

It is important that students be allowed to actively participate, be it cognitively or physically, in the classroom or gymnasium. This seems unlikely to occur in a classroom setting that is geared toward the teacher giving all or most of the cognitive information and directions. Further, a student who receives very little motivation or feedback has a tendency to react in a rote manner rather than by his/her self-initiated behavior.

Summary

The results of this study were obtained through visual analysis of the data based on several different comparisons. These results showed that differences in the teaching behaviors of the male and female teacher did exist.

Brief explanations and insights were given for differences and

likenesses between the behaviors of the teachers. Also included was a day-to-day comparison between the teachers and their students. Simply stated, the teaching progressions of the two teachers differed in regards to the environment in the gymnasium. The male teacher was more likely to allow his students to progress directly into skills, drills, and game play, whereas the female teacher was more involved with giving information to her students.

The results of this study were compared and contrasted to studies completed by Faulkner (1976), Keane (1976), Lombardo (1979), Mawdsley (1977), Nygaard (1971), and Stewart (1978).

Chapter 6

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS FOR FURTHER STUDY

Summary

The purpose of this investigation was to determine if teaching behavior differences existed between a male physical education teacher and a female physical education teacher on the secondary level. Both subjects were from the Central New York area. The teachers were videotaped for an entire basketball unit, consisting of eight successive classes during the 1980-81 academic year.

Data were obtained from the coding of the 16 videotapes and were compiled by computer analysis into percentages for the CAFIAS parameters and for the CAFIAS categories.

Visual comparisons of the male and female physical education teachers' behaviors determined that differences in teaching behavior did exist. The female teacher gave more content-related information than did the male teacher. Additionally, the female teacher demonstrated more teacher contribution than did her male counterpart. The female teacher's class spent more time as one unit than did the male teacher's class, which spent more time in groups than the female teacher's class did. The male teacher's class also spent more time in student-to-student interaction. The male teacher gave more directions, and his students showed more predictable responses and interpretive responses.

Both teachers demonstrated little difference in regard to the amount of praise, acceptance, questions, and criticism given to their students. In both classes, game play occurred frequently, as did predictable student responses followed by teacher directions. Both teachers

demonstrated periods of extended information-giving. The female teacher gave more information after interpretive student-responses, and the male teacher gave more directions following interpretive student responses.

Day-to-day results indicated a good deal of variability as evidenced by the fluctuating pattern of information-giving by the female teacher and the sharp decline in the amount of information-giving by the male teacher. The amount of directions given by each teacher also followed a fluctuating pattern. Responses made by the students (predictable and interpretive) also fluctuated on a daily basis.

Conclusions

The results of this study led to the following conclusions regarding the teaching behaviors of a male physical education teacher and a female physical education teacher on a day-to-day basis for an entire basketball unit:

1. The female teacher gave more information to her students overall as well as on a day-to-day basis than did the male teacher.
2. The male teacher gave more directions to his students overall and on a day-to-day basis than did the female teacher.
3. The male physical education teacher received more predictable responses from his students than did the female teacher. These differences were most evident on a day-to-day basis. It was also evident that these responses decreased in both classes as the unit progressed.
4. On a day-to-day basis differences were found between the students' interpretive responses. As the unit progressed, the male students demonstrated more interpretive responses than at the beginning of the unit. The female students demonstrated a great deal of fluctuation in regard to their interpretive responses. Overall, the male students demonstrated

more interpretive responses.

5. Both teachers exhibited a great deal of variability in their day-to-day teaching behaviors.

6. Minimal differences were detected in the teaching behaviors of a male physical educator and a female physical educator for the behaviors of praise, acceptance, questions, and criticism.

7. Minimal differences were found for student-initiated responses between male-directed and female-directed classes.

Recommendations for Further Study

The following recommendations are suggested for further study:

1. Replicate this study using a larger number of teachers and students.
2. Conduct a similar study at the primary level.
3. Conduct a similar study using like-gender teachers with different gender students.
4. Replicate this study using a unit of longer duration.

Appendix A
INFORMED CONSENT FORM
TEACHER'S COPY

The study in which you are asked to participate is looking at the interaction patterns of male and female teachers with students at the secondary level in physical education during a unit of instruction.

The following procedures will be used: You will be videotaped for eight classes throughout the unit. During that time you will be wearing a microphone which should not interfere with your teaching.

The videotape will be subjected to a widely used interaction analysis system. This interaction analysis system consists of 20 categories to describe verbal and nonverbal behaviors which occur between teachers and students.

All names and information in this study will be kept confidential. If you do not have any questions and agree to take part in this study, please sign your name in the space provided below.

Name _____

Date _____

REFERENCES

- Adler, A. Inclusion and exclusion in the secondary school physical education class. Unpublished doctoral dissertation, University of Wisconsin, 1972.
- Amidon, E. J., & Flanders, N. A. The role of the teacher in the classroom. Minneapolis: Association for Productive Teaching, 1971.
- Amidon, E. J., & Hunter, E. Verbal interaction in the classroom: The verbal interaction category system. In E. J. Amidon & J. B. Hough (Eds.), Interaction analysis: Theory, research, and application. Reading, Ma.: Addison-Wesley, 1967.
- Anderson, W. G. Descriptive-analytic research on teaching. Quest, 1971, 15, 1-8.
- Anderson, W. G., & Barrette, G. T. Teacher behavior. In W. G. Anderson & G. T. Barrette (Eds.), What's going on in gym: Descriptive studies of physical education classes (Monograph No. 1). Newton, Ct.: Motor Skills: Theory into Practice, 1978.
- Bain, L. L. Description and analysis of the hidden curriculum in physical education. Unpublished doctoral dissertation, University of Wisconsin, 1974.
- Beckman, M. D. Evaluating the case method. Educational Forum, 1971, 36, 489-497.
- Bellack, A. A., Kliebard, H. M., Hyman, R. T., & Smith, F. L. The language of the classroom. New York: Teachers College Press, 1966.
- Boehm, J. H. The effects of a competency-based teaching program on junior high school physical education teachers and their pupils (Doctoral dissertation, The Ohio State University, 1974). Dissertation Abstracts International, 1975, 35, 5085A-5086A. (University Microfilms No. 75-3013)

- Chasson, J. B. Statistical inference and the single case in clinical design. Psychiatry, 1960, 23, 173-184.
- Cheffers, J. T. F. The validation of an instrument designed to expand the Flanders System of Interaction Analysis to describe nonverbal interactions, different varieties, teacher behavior, and pupil responses. Unpublished doctoral dissertation, Temple University, 1972.
- Cheffers, J. T. F., Amidon, E. J., & Rodgers, K. D. Interaction analysis: An application to nonverbal activity. Minneapolis: Association for Productive Teaching, 1974.
- Cheffers, J. T. F., & Mancini, V. H. Teacher-student interaction. In W. G. Anderson & G. T. Barrette (Eds.), What's going on in gym: Descriptive studies of physical education classes (Monograph No. 1). Newtown, Ct.: Motor Skills: Theory into Practice, 1978, 39-50.
- Cramer, C. A. The effects of a cooperating student-teacher training program in applied behavior analysis on selected teacher behaviors of secondary physical education student teachers (Doctoral dissertation, The Ohio State University, 1977). Dissertation Abstracts International, 1978, 38, 4655A. (University Microfilms No. 77-31847)
- Daugherty, N. J. A plan for the analysis of teacher-pupil interaction in physical education. Quest, 1971, 15, 39-49.
- Dessecker, W. R. The effects of self-assessment via tape recorded lessons on the verbal interaction behavior of student teachers in physical education (Doctoral dissertation, The Ohio State University, 1975). Dissertation Abstracts International, 1976, 36, 7352A-7353A. (University Microfilms No. 76-9957)
- Dukes, W. F. N = 1. Psychological Bulletin, 1965, 64, 74-79.

- Edgar, E., & Billingsley, F. Believability when $N = 1$. The Psychological Record, 1974, 24, 147-160.
- Edgington, E. S. Statistical inference from $N = 1$ experiments. Journal of Psychology, 1967, 65, 195-199.
- Faulkner, M. E. A comparison of the teaching behavior of male and female pre-service secondary physical education teachers. Unpublished master's project, Ithaca College, 1976.
- Fey, J. T. Patterns of verbal communication in math classes (Doctoral dissertation, Columbia University, 1968). Dissertation Abstracts International, 1969, 29, 4326A. (University Microfilms No. 69-3063)
- Flanders, N. A. Analyzing teaching behavior. Reading, Ma.: Addison-Wesley, 1970.
- Frey, D. Science and the single case in counseling research. Personnel and Guidance Journal, 1978, 56, 263-268.
- Galloway, C. Nonverbal communication. Theory into Practice, 1968, 7(2), 5-12.
- Good, C. V., & Scates, D. E. Methods of research. New York: Appleton-Century-Crofts, 1954.
- Guralnick, M. J. The application of single-subject research designs to the field of learning disabilities. Journal of Learning Disabilities, 1978, 11, 415-421.
- Herron, J. D. The case study method. Journal of Chemical Education, 1975, 52, 460-461.
- Hughley, C., Jr. Modification of teaching behaviors in physical education. Unpublished doctoral dissertation, The Ohio State University, 1973.

- Kasson, P. L. Teaching and coaching behaviors of university physical educators. Unpublished doctoral dissertation, University of Wisconsin, 1974.
- Keane, F. J. The relationship of sex, teacher leadership style, and teacher leadership behavior in teacher-student interaction. Unpublished doctoral dissertation, Boston University, 1976.
- Kiemele, D. G. A comparison of perceived and actual verbal interaction in elementary school physical education classes. Unpublished master's thesis, University of Montana, 1975.
- Kurth, A. Interaction analysis applied to student teachers in elementary physical education. Unpublished master's thesis, Wisconsin State University, 1969.
- Lewin, K., Lippitt, R., & White, R. Patterns of aggressive behavior in experimentally created social climates. Journal of Social Psychology, 1939, 10, 271-299.
- Lombardo, B. J. The observation and description of the teaching behavior and interaction of selected physical education teachers. Unpublished doctoral dissertation, Boston University, 1979.
- Mancini, V. H. A comparison of two decision-making models in an elementary human movement program based on attitudes and interaction patterns. Unpublished doctoral dissertation, Boston University, 1974.
- 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.
- Mawdsley, R. Comparison of teacher behaviors in regular and adapted movement classes. Unpublished doctoral dissertation, Boston University, 1977.

- Mayer, V. E., & Kozlow, M. J. An evaluation of a time-series single-subject design used in an intensive study of concept understanding. Journal of Research in Science and Teaching, 1980, 17, 455-461.
- Melograno, V. J., Jr. Effects of teacher personality, teacher choice of educational objectives, and teacher behavior on student achievement. Unpublished doctoral dissertation, Temple University, 1971.
- Miller, E., & Warner, R. W., Jr. Single subject research and evaluation. Personnel and Guidance Journal, 1975, 54, 130-133.
- Murray, C. K. The systematic observation movement. Journal of Research and Development in Education, 1970, 4, 3-10.
- Nygaard, G. A. An analysis of verbal interaction in physical education classes. Unpublished doctoral dissertation, University of Oregon, 1971.
- Rife, F., & Dodds, P. Developing evidential bases for educational practice through the single subject research program. Motor Skills: Theory into Practice, 1978, 3, 40-48.
- Shine, L. C. A design combining the single-subject and multi-subject approaches to research. Educational and Psychological Measurement, 1973, 33, 763-766.
- Siedentop, D., Birdwell, D., & Metzler, M. A process approach to measuring teaching effectiveness in physical education. Paper presented at the American Alliance for Health, Physical Education, and Recreation National Convention, New Orleans, March 1979.
- Soar, R. S. Research findings from systematic observation. Journal of Research and Development in Education, 1970, 4, 116-122.
- Sontag, L. W. The history of longitudinal research: Implications for the future. Child Development, 1971, 42, 987-1002.

- Stevens, M. E. The effects of instruction and supervision in interaction analysis on the teaching behavior of selected physical education teachers. Unpublished master's thesis, Ithaca College, 1979.
- Stewart, M. J. A descriptive analysis to teaching behavior and its relationship to presage and context variables (Doctoral dissertation, The Ohio State University, 1977). Dissertation Abstracts International. 1978, 38, 4409A-5094A. (University Microfilms No. 77-31991)
- Walton, R. E. Advantages and attributes of the case study. Journal of Applied Behavioral Sciences, 1972, 8, 73-78.