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ACADEMIC LEARNING TIME AND TEACHER INTERACTION BEHAVIOR PATTERNS
IN AN ELEMENTARY PHYSICAL EDUCATION UNIT: COMPARISONS
AMONG HIGH-SKILLED, AVERAGE-SKILLED,
AND LOW-SKILLED STUDENTS

by

Michael Anthony Ryan

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 1983

Thesis Advisor: Dr. Victor H. Mancini

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ABSTRACT

The interaction behavior patterns of a physical education teacher with high-skilled, average-skilled, and low-skilled students and a comparison of the Academic Learning Time in Physical Education of the high-skilled, average-skilled, and low-skilled students on a day-to-day basis for an entire unit were investigated. The subject was a male physical education teacher from the Albany, New York area. The teacher was asked to classify his students as high-skilled, average-skilled, and low-skilled students. Six students, two high-skilled, two average-skilled, and two low-skilled were randomly selected to be observed for this study. The teacher wore a wireless microphone and was videotaped for an entire unit, 12 classes. The interaction patterns between the teacher and a specific group of students were coded using the Dyadic Adaptation of Cheffers' Adaptation of Flanders' Interaction Analysis System (DAC). The data obtained from these codings were transferred onto computer cards for computer analysis. Descriptive statistics were used to determine if differences existed in the teaching behavior patterns of the teacher with his high-skilled, average-skilled, and low-skilled students. The computer scoring of DAC yielded percentages for each of the 17 variables. Visual analysis of the DAC results indicated that the teacher gave more information and praise to and accepted the ideas and actions of the high-skilled students more than the average-skilled and low-skilled students. He also tended to criticize and give directions to the average-skilled and low-skilled students more than the high-skilled students. The high-skilled students were characterized by interpretive behavior, whereas the average-skilled and low-skilled students were characterized by predictable and self-initiated responses. This led to a rejection of the null hypothesis that no

✓

differences would exist in the interaction patterns of the teacher with high-skilled, average-skilled, and low-skilled students.

This study also compared the Academic Learning Time in Physical Education (ALT-PE) of high-skilled, average-skilled, and low-skilled students. The videotapes were coded using the Academic Learning Time in Physical Education (Siedentop, Tousignant, & Parker, 1982) instrument. The data collected were computed manually and were compiled into percentages and ratios for the ALT-PE parameters. Visual analysis of the ALT-PE data resulted in the high-skilled students spending more time in activity, game play, and skill practice than the average-skilled and low-skilled students. The average-skilled and low-skilled students were characterized by spending more time inactive and off-task than the high-skilled students. This led to the rejection of the null hypothesis that no significant difference would be found in the ALT-PE of high-skilled, average-skilled, and low-skilled students.

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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
Michael Anthony Ryan
September 1983

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

Michael Anthony Ryan

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.

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DEDICATION

This thesis is dedicated to my parents, Frank and Lena, two people who have given so much of themselves and asked for nothing in return. I thank them and love them most dearly.

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Chapter 1

INTRODUCTION

A topic of major concern among researchers has been to identify the positive and negative outcomes of teachers' expectations on the development of their students (Crowe, 1979). Within the classroom there emerge definite patterns of behavior, performance expectations, and systems separating those doing well from those doing poorly (Rist, 1970).

According to Rosenthal and Jacobson (1968), teachers vary their treatment toward students according to their expectations of those students. In their investigation, they tested the theory that teachers' expectations for student achievement function as a self-fulfilling prophecy. Martinek and Johnson (1979) defined self-fulfilling prophecy as an expectation which initiates a series of events that causes the original prediction to come true. Simply stated, students will behave as they feel they are expected to behave; they will live up or down to their teachers' expectations of them (Rosenthal, 1973). Thus, student behavior may be manifested in a positive or negative direction. Brophy and Good (1974) reviewed more than 60 studies investigating the question of teacher expectations. They concluded that the work done by a large number of investigators using a variety of methods supported the self-fulfilling prophecy.

Numerous interaction analysis systems have been used to investigate teacher-student interactions in the physical education setting. Allard (1979) stressed that in the majority of these studies information was collected on the entire class and observations failed to focus on the

interactions going on between the teacher and the individual student. Data collected through these systems have been too general to relay precise information about individual students in physical education (Allard, 1979). Brophy and Good (1970) noted that the teaching behaviors of praise, criticism, use of students' ideas, and acceptance of students' feelings are more commonly used when dealing with an individual student than with an entire class.

Martinek and Mancini (1979) developed the Dyadic Adaptation of CAFIAS (DAC), which provides a method of recording behaviors that occur between a teacher and an individual student or between a teacher and a small group of students. DAC has been used by researchers in various studies (Devlin, 1979; Martinek & Johnson, 1979; Reisenweaver, 1980; Streeter, 1980) to study the effects of teacher expectations in physical education settings. Reisenweaver (1980) and Streeter (1980) used DAC to compare the teaching behaviors of physical education teachers with high-skilled and low-skilled students. They found that high-skilled students received more praise, were asked more questions, were given more information, received more acceptance of ideas and actions, and exhibited more interpretive responses and student-initiated behavior than low-skilled students. Low-skilled students received more criticism and directions from their teachers and gave more predictable responses.

The concept that what teachers do relates to what students achieve has attracted widespread attention among physical education researchers and teacher educators (Locke, 1977). The search for a reliable measure of student performance in physical education has proven to be more difficult than in other classroom content areas such as mathematics and reading (Shute, Dodds, Placek, Silverman, & Rife, 1982). Shute et al. (1982)

stated that students in these and other academic areas provide permanent products (written responses) or (verbal responses) that can be classified to measure student performance. But in physical education, students are involved in movement patterns that are impermanent and very hard to evaluate.

Academic Learning Time in Physical Education (ALT-PE) was developed as an orderly procedure for studying teacher effectiveness and the amount of time a student is engaged in activity in the gymnasium and on the playing field (Siedentop, Birdwell, & Metzler, 1979). ALT-PE has been the basis for numerous studies (Birdwell, 1980; Metzler, 1979; Shute et al., 1982; Siedentop et al., 1979; Whaley, 1980). In these studies it was concluded that the ALT-PE instrument could be used to collect reliable data and give valid information about student achievement at the elementary and secondary levels.

Previous investigations using DAC have used a large number of teachers and/or coaches to study teacher-student or coach-athlete interactions. Instead of using a large group of teachers as previous studies have done, the purpose of this study will be to investigate one physical educator on a day-to-day basis with a single class to provide an in-depth study of a teacher's interaction patterns with individual elementary students. ALT-PE will be applied to describe the action of students during this particular unit of instruction.

Scope of Problem

This investigation was conducted to compare the teaching interaction patterns of a physical education teacher with high-skilled, average-skilled, and low-skilled students on a day-to-day basis for an entire unit of instruction. The subject was a male physical education teacher at

the elementary level from the Albany, New York area.

The teacher ranked his class according to skill level in the activity of this particular unit. The top 33% of the class was identified as high-skilled, the middle 33% of the class was identified as average-skilled, and the lower 33% of the class was identified as low-skilled students. Two students from each skill grouping were randomly selected for observation.

During the 1981-1982 school year the teacher was videotaped for an entire unit of 12 classes. The tapes were coded after the completion of the unit using the Dyadic Adaptation of Cheffers' Adaptation of Flanders' Interaction Analysis System (DAC) and the Academic Learning Time in Physical Education (ALT-PE).

Statement of Problem

The teaching behavior patterns of a male physical education teacher were examined to determine if his interactions differed among the three groups: high-skilled students, average-skilled students, and low-skilled students. The ALT-PE of high-skilled students, average-skilled students, and low-skilled students were investigated.

Null Hypotheses

The following null hypotheses were developed for this study:

1. There will be no significant differences in the interaction patterns of the elementary physical education teacher with high-skilled students, average skilled students, and low-skilled students.
2. There will be no significant differences in the Academic Learning Time in Physical Education (ALT-PE) of the high-skilled students, average-skilled students, and low-skilled students.

Assumptions of Study

The following assumptions were made for the purpose of this study:

1. The coding of 12 physical education classes using DAC would be sufficient to establish teaching behavior patterns.
2. The coding of 12 physical education classes would be sufficient to establish the ALT-PE of the students.
3. The teacher's rankings of his students provided valid data on the relative skill abilities of his students.

Definition of Terms

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

1. Certified elementary physical education teacher is a teacher who has successfully completed a professional preparation program, at an accredited college, in the field of physical education.
2. Interaction analysis is an observational technique which systematically records student-teacher interpersonal behavior (Amidon & Flanders, 1971).
3. Flanders' Interaction Analysis System (FIAS) is an observation system designed to objectively record the verbal interactions between teachers and students (Amidon & Flanders, 1971).
4. Cheffers' Adaptation of Flanders' Interaction Analysis System (CAFIAS) is a validated expansion of FIAS which analyzes and records verbal and nonverbal responses in physical education settings (Cheffers, Amidon, & Rodgers, 1974).
5. The Dyadic Adaptation of CAFIAS (DAC) is a validated modification of CAFIAS that provides a method for recording interactions between a teacher and an individual student or a small group of students (Martinek &

Mancini, 1979).

6. Academic Learning Time in Physical Education (ALT-PE) is an instrument used to measure how a student spends time in class (Siedentop, et al., 1979).

7. Unit is a prescribed subject or a particular activity taught in a physical education setting for a particular length of time.

8. Average-skilled student is any student whose skill ability, as perceived by his/her teacher, is ranked in the middle 33% of the class.

9. High-skilled student is any student whose skill ability, as perceived by his/her teacher, is ranked in the top 33% of the class.

10. Low-skilled student is any student whose skill ability, as perceived by his/her teacher, is ranked in the lowest 33% of the class.

Delimitations of Study

The following decisions served as delimitations of this investigation:

1. One elementary male physical education teacher from the Albany, New York area was used in the study.

2. DAC and ALT-PE were the only instruments used to record the actual interaction patterns.

3. The teacher's ranking of skill ability was the only procedure used in the study to classify students as high-skilled, average-skilled, and low-skilled ability.

4. The subject was videotaped for one entire unit of 12 classes.

5. Six elementary students from the same class, two high-skilled, two average-skilled, and two low-skilled, were randomly selected for this study.

Limitations of Study

The limitations of this study were as follows:

1. The findings related to teacher interaction patterns of elementary

physical education teachers with high-skilled, average-skilled, and low-skilled students may be valid for comparison only when using DAC to identify behaviors.

2. The findings related to the context levels and the learner involvement levels of high-skilled, average-skilled, and low-skilled elementary students may be valid for comparison only when the ALT-PE instrument is used to identify students' involvement.

3. Because only one male elementary physical education teacher was used in a single school, the findings may only be valid for the teacher at that school.

Chapter 2

REVIEW OF RELATED LITERATURE

The review of literature pertaining to this study focused on the following areas: systematic observation in physical education, dyadic interaction analysis systems, Academic Learning Time in Physical Education, small-N studies, and summary.

Systematic Observation in Physical Education

The observational instruments developed prior to 1970 did not do an adequate job of recording systematically the interactions in the physical education setting. Researchers realizing a need for new systems developed several through various research investigations (Anderson, 1975; Barrette, 1977; Costello, 1977; Fishman, 1975; Hurwitz, 1975; Johnson, 1975; Laubach, 1974; Morgenegg, 1978; Short, 1976; Siedentop & Hughley, 1975; Tobey, 1975).

Anderson (1975) and his associates developed a videotape databank in which videotapes of 83 elementary and secondary physical education classes from 60 schools were compiled. This project was started with the idea of developing descriptive-analytic observation systems to be used in physical education environments. A number of researchers used the databank to develop their systems. Anderson (1975) developed the Occurrence of Physical Activities. This system was developed to categorize the length and occurrence of physical education activities. Fishman (1975) developed an instrument to describe the augmented feedback given by teachers and the way it was given. Tobey (1975) modified the Fishman (1975) system to better analyze the occurrence of augmented feedback in physical education classes. It was found that teachers relied solely on verbal feedback and

that most often feedback was directed toward a single student, not toward a group. Laubach (1974) developed a system called the Behavior of Students in Physical Education (BESTPED) to monitor the behavior of individual students. Costello (1977) used the BESTPED to describe the behavior of 193 students in different physical education classes. Hurwitz (1975) developed the Teacher's Role in the Learning Activity Selection Process (Tri-Lasp) system, which describes the teacher's role in selecting the student's activities. Morgenegg (1978) used 40 of the databank videotapes to study pedagogical movements of teachers and students.

Numerous interaction analysis systems have been used by researchers to examine the teaching behaviors of elementary and secondary physical education teachers. Johnson (1975) developed the Flow of Teacher Operational Procedures (FOTOP). This instrument has been used primarily in teacher training to assist in the effectiveness of the teachers' instructional procedures. The Competency Indicator for Secondary Physical Educators (Short, 1976) was developed to be used by department heads to evaluate the competencies of secondary physical education teachers. Barrette (1977) used the Physical Education Teacher's Professional Functions system to analyze the occurrence, distribution, and duration of teacher behaviors in 40 elementary and secondary physical education settings.

One of the most widely used interaction analysis systems was developed by Flanders (1960). The Flanders Interaction Analysis System (FIAS) is used to analyze verbal behaviors that occur in the classroom. Nygaard (1975) used FIAS with physical education teachers at the elementary, secondary, and college levels to describe the verbal behavior recorded during interactions with their students. Nygaard (1975) concluded that

the most commonly occurring behavior was teacher talk. Kurth (1969) used FIAS with physical education student teachers at the elementary level and concluded that, if FIAS is to be effective in physical education classes, nonverbal behaviors must be recorded.

Modifications of FIAS have come about through many studies (Dougherty, 1971; Goldberger, 1970; Love & Barry, 1971; Mancuso, 1972; Melograno, 1971; Rankin, 1975). The most wide-ranging and refined adaptation of FIAS for use in physical education settings was designed by Cheffers (1972). Cheffers' Adaptation of Flanders' Interaction Analysis System (CAFIAS) allowed classification of verbal and nonverbal behaviors, the teaching agent, and the classroom structure (Cheffers, 1972). CAFIAS provided the validity and the reliability that had been lacking in most interaction analysis systems used for physical education classes.

CAFIAS has been used in various studies in physical education. Mancini (1974) used CAFIAS to study verbal and nonverbal interaction behaviors of students in two decision-making conditions. The data revealed that, when given the opportunity to share in the decision-making process of a human movement program, students exhibited increased enjoyment of the program, increased positive interactions with teachers, and increased initiative and contributions. Martinek (1976) used CAFIAS to confirm the validity of different teacher models dealing with the effects of horizontal and vertical models of teaching on the development of specific motor skills and self-concept in elementary students. Martinek (1976) found the vertical model of teaching to be teacher lecture and directions followed by predictable student responses. When children shared in the decision-making process, the teachers exhibited more information-giving and questions, and students exhibited increased

enjoyment, initiative, and contributions.

Lydon (1978) examined the effects of decision-making teaching models on the development of body-coordination and self-concept of elementary children. This study confirmed the findings of Mancini (1974) and Martinek (1976) on the self-concept of elementary children.

In an attempt to investigate two distinct teaching methods, Chertok (1975) used CAFIAS to analyze the effects of command and guided discovery teaching styles in the development of ball handling skills in third grade students. Chertok (1975) concluded that in the command style of teaching the interaction patterns were more lecture with directions followed by predictable student response. In the guided discovery teaching style the teacher used more information-giving behaviors followed by questions and praise. These students exhibited increased enjoyment and increased initiative and contributions toward the class.

CAFIAS has been used by researchers as part of the training program for the preparation of student teachers in physical education. Keilty (1975), Rochester (1976), Hendrickson (1975), and Getty (1977) concluded that teachers instructed and trained in CAFIAS characteristically showed more indirect teaching behaviors.

The interaction patterns and teaching behaviors of in-service physical education teachers at the elementary level were investigated by Lombardo (1979) and Stevens (1979). Lombardo (1979) studied the interaction patterns and teaching behaviors of four elementary physical education teachers. Each teacher was observed twice a day for 20 consecutive teaching days. CAFIAS was used to record and describe the teaching behaviors and interaction patterns. It was concluded that teaching

behaviors and interaction patterns changed slightly over 20 teaching days. Stevens (1979) investigated the effects of instruction and supervision in CAFIAS upon the teaching behaviors of four elementary physical education teachers. Each teacher was observed for 20 consecutive teaching days. It was found that classes of teachers instructed in CAFIAS exhibited more student involvement, increased teacher acceptance and praise, increased teacher questioning, and increased teacher acceptance of student's feelings than classes of those teachers not instructed in CAFIAS.

In several studies completed at The Ohio State University, the teaching behaviors of physical education teachers have been examined. Studies by Cramer (1978), Hutslar (1976), and Stewart (1978) have used the O.S.U. Teacher Behavior Rating Scale (Siedentop & Hughley, 1975) for research involving the modification of student teachers' behaviors.

Dyadic Interaction Analysis Systems

Much of the research done in the past 10 years has been concerned with teacher behavior directed at the entire class (Allard, 1979). These studies have provided valuable information in the area of teacher-student interaction patterns, but they have provided little information about individual students (Brophy & Good, 1974).

One of the first studies using dyadic systems in education was conducted by Brophy and Good (1970). They investigated the interactions of a teacher with an individual student and developed a system to sequentially code and analyze these behaviors.

The Teacher-Child Dyadic Interaction System was used by Brophy and Good (1970) to study relationships between teacher expectations and student achievement of first grade students. The researchers concluded that teachers demanded better performance from high achievers and were more

likely to praise these students. When low achievers could not answer a question, the teacher would either answer it or call on another student. Results of subsequent studies (Cornbleth, Davis, & Button, 1972; Good, Sikes, & Brophy, 1972; Jeter & Davis, 1972; Mendoza, Brophy, & Good, 1972) supported the conclusions of Brophy and Good (1970).

Only in recent years has dyadic interaction been used in studying the behavior patterns that occur in physical education settings. Numerous studies have recently been conducted using this form of observational system to investigate teacher behavior directed toward an individual student in the physical education setting (Crowe, 1979; Devlin, 1979; Martinek & Johnson, 1979; Oien, 1979; Reisenweaver, 1980; Streeter, 1980). Dyadic interaction systems have also been used to study coach-athlete interaction (Boyes, 1981; Hoffman, 1981).

Crowe (1979) investigated the expectations of teachers and student-teacher interactions through a modification of Rosenthal's Four-Factor Theory, which consisted of climate, feedback, input, and output. A fifth factor of touch was added to the Four-Factor Theory. The Brophy-Good Interaction Analysis System was used as the observational instrument during this study. The results showed that high achievers were asked more questions, then given more opportunity to respond, and were given more praise, attention, and information than low achievers. Crowe (1979) concluded teachers' expectations of students will determine how these students are treated during class.

Devlin (1979) used DAC to determine if training disruptive elementary children in contingency management skills could affect the behavior of their physical education teachers. This study also investigated the effect that contingency management skills would have on the students'

self-concepts, using the Martinek-Zaichkowsky Self-Concept Scale (MZSCS) as the criterion. Devlin (1979) concluded that training disruptive students in specific contingency management skills was successful in changing the teaching behavior of physical educators from direct behaviors to more indirect behaviors. The teachers exhibited more praise and acceptance, used more questions, and initiated more student response. Students in the treatment group exhibited more positive behaviors, became more independent, and had more interpretive responses. The self-concepts of these students also were favorably influenced.

Using a modification of FIAS and CAFIAS, Oien (1979) investigated individual teacher behaviors based on student gender and teachers' perception of the students' skill performance. The Individualized Teacher Behavior Analysis System (ITBAS) was used to collect data systematically on junior high students in physical education classes. Results showed that boys received more praise, encouragement, directions, and criticism than girls received.

The Dyadic Adaptation of CAFIAS (DAC) was used by Martinek and Johnson (1979) to investigate the dyadic interaction which took place between teachers and high expectancy students and teachers and low expectancy students in physical education. The results indicated that students identified as high expectancy students received more praise, greater acceptance of ideas, more investigative questions, and more directions from their teachers than low achievers.

In a more recent study Reisenweaver (1980) used DAC to compare the teaching behaviors of 15 female physical educators at the secondary level with 10 students: 5 high-skilled and 5 low-skilled. In a parallel study Streeter (1980) used 15 male physical educators at the secondary level.

In each study they found that high-skilled students received more praise, were asked more questions, were given more information, received more acceptance of ideas and actions, and initiated more responses than low-skilled students. Low-skilled students received more criticism and direction from teachers and gave more predictable responses.

DAC has also been used in the field of coaching. Hoffman (1981) used DAC to compare coaching behaviors of two collegiate lacrosse coaches, one male and one female, with high-skilled athletes and low-skilled athletes. Boyes (1981) used DAC to compare coaching behaviors of college football coaches with starting and non-starting athletes. In each study they found that the high-skilled athletes received more praise and acceptance of their ideas and actions and gave more athlete-initiated responses than low-skilled athletes. The low-skilled athletes received more criticism and directions from the coaches followed by predictable responses by the athletes.

Academic Learning Time in Physical Education

The idea that what teachers do relates to what students achieve has attracted much interest among researchers (Locke, 1977). In 1972 the Beginning Teacher Evaluation Studies (BTES) of the Far West Laboratory for Educational Research and Development began a multi-year project to study teaching in elementary reading and mathematics classrooms. The goal of the commission was to gather information about teacher classroom behavior and student achievement (Fisher, Filby, Marliave, Cahen, Dishaw, Moore, & Berliner, 1972). It was found that engaged time, allocated time, and student success rate were all very important in measuring student achievement. Within the BTES these three variables were combined and called Academic Learning Time (ALT). A series of studies supported the

BTES concept that ALT was significantly related to student achievement (Berliner, 1978; Filby & Cahen, 1977; Filby & Cahen, 1978; Marliave, Fisher, & Dishaw, 1977; 1978).

Siedentop, Birdwell, and Metzler (1979) introduced the idea of Academic Learning Time in Physical Education (ALT-PE). ALT-PE is an orderly procedure for recording teacher effectiveness and student participation in physical education settings (Siedentop et al., 1979). These researchers concluded that developing the ALT-PE instrument was necessary because, unlike academic subjects, there are few standardized physical education achievement tests. Siedentop et al. (1979) concluded that ALT-PE appears to be the best indicator for evaluating student achievement and teacher effectiveness in the physical education setting.

The value of the ALT-PE instrument in physical education classrooms has been researched in several studies. Metzler (1979) modified the BTES instrument for use in physical education settings and designed a recording system to measure ALT-PE by the use of an interval recording sheet. He concluded that reliable ALT information could be recorded at the elementary and secondary level. Birdwell (1980) was the first researcher to use behavior modification to examine the effect of these changes on the ALT-PE of elementary, junior high, and secondary physical education teachers. The results of this study led to the conclusion that desirable changes in teachers' behaviors were strongly related to improvements in ALT-PE. Whaley (1980) was another researcher who dealt with teacher behavior modification and its effect on ALT-PE. Whaley (1980) used Academic Learning Time in Physical Education with the Teacher Behavior Scale (ALT-PE-TBS) and had mixed results. The results were not conclusive that teacher behavior modification had an effect on ALT-PE.

Aufderheide, Olson, and Templin (1980) investigated the use of ALT-PE integrated with Observational System for Instructional Analysis in Physical Education (OSIA-PE) (Olson, 1979). They concluded that OSIA-ALT-PE is an observational instrument that can successfully provide feedback of teacher effectiveness and student achievement at the elementary, junior high, and secondary levels.

Shute, Dodds, Placek, Silverman, and Rife (1982) used ALT-PE as a descriptive-analytic procedure describing interactions of one elementary school's physical educator. This study investigated the ALT-PE of high-skilled, medium-skilled, and low-skilled students in movement education classes taught by a single physical education teacher. Shute et al. (1982) concluded that this teacher created learning environments in which all children found equal amounts of success, even though performing in a wide range of skill difficulty. The ALT-PE data from this study provided information about student actions as a learning-process measure, giving direct information about student achievement and successful performance of skills related to physical education (Shute et al., 1982). The researchers also concluded that the teacher was effective in her use of movement education approaches using indirect teaching behaviors (teacher questioning, praise, and information-giving) to provide students with opportunities to perform on their own (student unpredictable, self-initiated behavior). Shute et al. (1982) emphasized that the use of ALT-PE helps teachers to identify how well they are able to keep their students actively involved in their physical education class.

Small-N Studies

The single subject research design is an additional tool for researchers in physical education to use for evaluating and analyzing the

teaching-learning interactions for individual teachers, students, and classrooms (Rife & Dodds, 1978). The single subject research design has one purpose, to demonstrate control relative to the situation under investigation (Hersen & Barlow, 1976). Since $N = 1$ studies are not obstructed by demand to achieve a level of statistical significance, the researcher in these studies seeks clinical significance (Loovis, 1978). The issue of major importance concerning $N = 1$ research is the lack of generalization of the findings, but results from a single-case study in relation to other subjects, settings, and/or instructors are insignificant. Researchers must systematically replicate studies using different subjects, settings, and/or instructors in order to investigate to what extent identified functional relationships can be duplicated (Loovis, 1978).

Applied behavior analysis and small- N research designs have been used in several studies at The Ohio State University (Boehm, 1974; Darst, 1974; Dodds, 1975; Hamilton, 1979; Hughley, 1973; Hutslar, 1976; McKenzie, 1976; Rife, 1973). These researchers investigated behavior modification of student teachers in physical education.

Paterson (1975), in a single-case experimental design, compared teaching behaviors of experienced, novice, and pre-service physical educators using CAFIAS as the observational instrument. The results indicated no significant differences among these groups in the amount of time spent working in small groups, as a whole class, or as individuals.

The single subject research design is proving to be a useful addition to educational research in physical education for investigating and analyzing teacher-student interactions. Rife and Dodds (1978) expressed the idea that a single-subject research design can be used as a complement to statistically-oriented group investigations; thus concentration on a

particular subject is possible, and changes in particular behavior can be recorded directly. The single subject research design and its procedures provide for a stringent inquiry (Rife & Dodds, 1978).

Summary

In the past 20 years several interaction analysis systems have been developed to study teacher-student interactions in the physical education environment. The videotape databank has been the basis for a number of these systems (Anderson, 1971; Costello, 1977; Fishman, 1975; Hurwitz, 1975; Laubach, 1974; Morgeneegg, 1978; Tobey, 1975). The most widely used observational system for physical education has been CAFIAS, developed by Cheffers (1972). It has provided a systematic procedure to record and analyze verbal and nonverbal behavior patterns of teacher-student interactions in the physical education setting. CAFIAS has been used by many researchers (Chertok, 1975; Getty, 1977; Hendrickson, 1975; Keilty, 1975; Lombardo, 1979; Mancini, 1974; Martinek, 1976; Rochester, 1976; Stevens, 1979).

The Teacher-Child Dyadic Interaction System was developed by Brophy and Good (1970) to investigate the effect of teacher expectations on their students. The results of studies using the Brophy-Good (1970) system have not been conclusive, and further investigation into more scientific and systematic observation systems have been needed.

Martinek and Mancini (1979) developed the DAC system. This was an extension of CAFIAS that provided for a method for coding and analyzing interactions between a teacher and individual student or small group of students. DAC has been used by various researchers (Devlin, 1979; Martinek & Johnson, 1979; Reisenweaver, 1980; Streeter, 1980) to investigate teacher expectations in the physical education setting. The

results of these studies have indicated that students are treated differently according to teachers' expectations of them. Similar results were obtained by Crowe (1979) using the Brophy-Good system. DAC has been used more recently in the area of coaching. Researchers have used DAC to record the behaviors of coaches with high-skilled and low-skilled athletes (Boyes, 1981; Hoffman, 1981). The results indicated that high-skilled athletes were given more praise, were asked more questions, and received more acceptance of their ideas and actions than did low-skilled athletes.

Siedentop et al. (1979) introduced the idea of Academic Learning Time in Physical Education (ALT-PE). ALT-PE is an orderly procedure for recording teacher effectiveness and student participation in the physical education environment (Siedentop et al., 1979). ALT-PE has been used in several studies (Birdwell, 1980; Metzler, 1979; Shute et al., 1982; Whaley, 1980) to study teacher effectiveness and student achievement. Metzler (1979) developed the ALT-PE interval recording sheet to easily record the ALT-PE parameters. Birdwell (1980) and Whaley (1980) used ALT-PE as part of a behavior modification program at the elementary, junior high, and high school levels. The results indicated that desirable teacher behaviors were related to improvements in ALT-PE. Shute et al. (1982) used ALT-PE with a single physical educator with high-skilled, medium-skilled, and low-skilled students at the elementary level. Previous studies investigated groups; this study focused on an individual teacher and her interactions with elementary students in a human movement program. All results of the studies supported the idea that ALT-PE is a reliable and valid instrument for descriptive-analytical measurement of teacher effectiveness and student achievement.

The single subject research design and applied behavior analysis

techniques have been used recently by several researchers at The Ohio State University (Boehm, 1974; Darst, 1974; Dodds, 1975; Hamilton, 1979; Hughley, 1973; Hutslar, 1976; McKenzie, 1976; Rife, 1973). Rife and Dodds (1978) viewed the single subject research design as a useful addition to current educational research in physical education.

Chapter 3

METHODS AND PROCEDURES

In this chapter the selection of subjects, the testing instruments, establishment of coder reliability, scoring of data, treatment of data, and the procedures utilized in this investigation are discussed.

Selection of Subjects

The subject for this investigation was a male elementary physical education teacher in the Albany, New York area. The teacher was contacted by the investigator, and permission to videotape physical education classes was requested. The teacher was asked to sign an informed consent form (see Appendix A). A parent consent form was also sent to the parents of all children participating in this study (see Appendix B). The teacher was asked to classify his students as high-skilled students, average-skilled students, and low-skilled students. Six students, two high-skilled, two average-skilled, and two low-skilled, were randomly selected to be observed for this study.

Testing Instruments

The following testing instruments were used in this study:

1. The testing instrument used to measure the teaching behaviors of the subject was the Dyadic Adaptation of CAFIAS (DAC) (Martinek & Mancini, 1979). The DAC system provides a method in which interactions between a teacher and a single student, or a small group of students, may be recorded and analyzed. The ground rule and coding procedures for DAC are basically the same as those used in CAFIAS. However, rather than recording a behavior every 3 seconds, behaviors are recorded only when the

teacher is interacting with the specified student or students.

2. The ALT-PE instrument was used to measure the amount of time the six students were actively involved in a task. ALT-PE was developed as an orderly procedure for studying teacher effectiveness and the amount of time a student was engaged in activity (Siedentop, Birdwell, & Metzler, 1979). The observers watched a single child and the teacher for a 6-second interval, stopped the videotape machine, and recorded the behaviors. The observers turned the videotape machine back on and observed the next target child for 6 seconds, shut the machine off, and recorded the behaviors that were taking place between the teacher and this child.

Procedure

The teacher in this study was contacted by the investigator personally and was informed of the purpose and the procedures to be undertaken. The teacher was videotaped 12 times during the 1981-1982 school year. The teacher was equipped with a wireless microphone which did not interfere with his teaching actions.

At the completion of the particular unit the teacher was asked to rank his students as high-skilled, average-skilled, and low-skilled according to their ability in the particular unit. Two students from each skill group were randomly selected, and the interactions between the students and the instructor were recorded. The ALT-PE of these particular students was also investigated for the particular unit of instruction.

Data Collection

Data for final analysis were obtained from the 12 videotapes of the entire unit involving the instructor. The videotapes were coded by Dr. Victor H. Mancini, an expert coder trained in using DAC and ALT-PE.

Scoring of Data

The data collected from the coding of DAC were transferred to computer cards for computer analysis. The data were compiled into percentages and ratios for 20 variables identified by DAC. The data collected by ALT-PE were computed manually, and the data were compiled into percentages and ratios for the ALT-PE parameters.

Coder Reliability

In order to determine reliability of the investigator's DAC coding, one videotape was randomly selected to be coded using DAC on two independent observation sessions. The top 10 cells for each session were ranked, and the Spearman rank-order correlation was applied to the two sets of rankings (see Appendix C).

To determine the coders' reliability using the Academic Learning Time in Physical Education, the interobserver agreement method was used. Interobserver agreement (IOA) was computed by the scored-interval method (Hawkins & Dotson, 1975). Following training procedures for ALT-PE coding, IOA must have reached a criterion level of 90% in all categories for two consecutive practice videotapes before formal data collection (coding of videotapes) commenced. Training for coding of ALT-PE consisted of an introduction and thorough examination of the revised ALT-PE coding manual (Siedentop et al., 1982), learning of the ALT-PE categories and the method of using the coding sheet, and five practice coding sessions using videotapes.

Following the practice sessions, the two observers coded two videotapes, and IOA was calculated for each category on an interval-by-interval basis. IOA was computed by dividing the number of agreements by the number of disagreements and multiplying the results by 100

(Hersen & Barlow, 1976). The formula is given below:

$$\frac{\text{Agreements}}{\text{Agreements} + \text{Disagreements}} \times 100 = \% \text{ of agreement or IOA.}$$

The observers were determined to be in agreement when the two observers recorded the target behavior as occurring during the interval. The observers were in disagreement when one observer recorded the target behavior as occurring during the interval and one observer did not.

Coding of practice videotapes continued until IOA reached the criterion level (90%) for two consecutive videotapes. Following attainment of the criterion IOA, the observers commenced coding of the videotapes. To establish IOA for this investigation, two videotapes were randomly selected and coded by the two observers and IOA calculated.

Treatment of Data

Descriptive statistics were used to determine differences in teaching behaviors with the three different groups of students: the high-skilled, average-skilled, and low-skilled students. The percentages and ratios of the DAC and ALT-PE variables were visually compared to aid in making these decisions.

Summary

The subject for this study was a male elementary physical education teacher from the Albany, New York area. The instructor classified his students into high-skilled, average-skilled, and low-skilled ability groups according to the skills of the particular unit. The instructor was videotaped for an entire unit 12 times during the 1981-1982 school year.

The videotapes were coded by an investigator trained in using DAC and ALT-PE. The data collected through DAC were transferred onto computer cards for computer analysis. The computer scoring of DAC yielded

percentages for each of the 20 variables, which were compared by visual analysis. The data collected by ALT-PE were computed manually, and compiled into percentages and ratios for the ALT-PE parameters, which were compared by visual analysis. Descriptive statistics were used to determine differences in teaching behaviors, as identified by DAC and ALT-PE with the three groups: high-skilled, average-skilled, and low-skilled students.

Chapter 4

ANALYSIS OF DATA

The results found when comparing the teaching interaction patterns of an elementary physical education teacher with high-skilled, average-skilled, and low-skilled students on a day-to-day basis for an entire unit are presented in this chapter. The Dyadic Adaptation of CAFIAS (DAC) was used to measure the interaction behavior patterns between the teacher and the particular groups of students. All the categories used in DAC were the same as those comprising the CAFIAS system (see Appendix E) and will be referred to throughout this chapter as DAC. The revised Academic Learning Time in Physical Education (ALT-PE) instrument (Siedentop, Tousignant, & Parker, 1982) was used to identify how students spent their time in class (see Appendix F).

Coder Reliability

In order to establish coder reliability for this study, two videotapes were randomly selected to be coded using DAC on two independent observation sessions by Dr. Victor H. Mancini, an expert in the coding of DAC. The top interaction patterns for each session were ranked (see Appendix C). The mean correlation of .9854 that was found was sufficient to indicate that the coder was reliable.

In order to determine interobserver agreement for the ALT-PE coding, the scored-interval method as described by Hawkins and Dotson (1975) was used. Two randomly selected videotapes were coded simultaneously by the investigator and by Dr. Victor H. Mancini. Reliability was determined for each of the categories of the ALT-PE recording instrument by dividing the

number of agreements by agreements plus disagreements and multiplying by 100 (Hersen & Barlow, 1976). The interobserver agreement (IOA) ranged from 85.7% to 100% (see Appendix D).

Phase One: Total DAC Results

The use of the 17 DAC parameters by the physical education teacher with high-skilled, average-skilled, and low-skilled students is summarized in Table 1. Visual comparisons indicated that differences existed in the behaviors of the teacher as he interacted with the three groups of students. The high-skilled students received more acceptance and praise and exhibited more initiated response, both teacher-suggested and student-suggested, than the low-skilled and average-skilled students. There were more interactions exhibited both verbally and nonverbally toward the high-skilled students than toward the low-skilled students. Total teacher use of questions was also significantly higher for the high-skilled students.

The percentages of behaviors in each DAC category for the high-skilled, average-skilled, and low-skilled students are shown in Figure 1. Visual comparisons revealed differences in the behaviors of the teacher toward high-skilled, average-skilled, and low-skilled students. In comparison to the low- and average-skilled students, the high-skilled students received more praise, acceptance, and information while exhibiting more interpretive responses. The average-skilled and low-skilled students received more directions and criticism, and exhibited more predictable behavior than did the high-skilled students. The average-skilled and low-skilled students also exhibited more student-initiated responses than the high-skilled students, with the average-skilled students exhibiting the most of the three groups.

The top ranked cell frequencies of interaction patterns and their

Table 1
Use of Major DAC Parameters by the Teacher

DAC Parameters	Low- skilled Percentage	Average- skilled Percentage	High- skilled Percentage
Total Teacher Contribution (TTC)	60.24	61.23	62.36
Total Student Contribution (TSC)	38.36	37.63	36.52
Total Silence and/or Confusion (SC)	1.40	1.13	1.12
Total Teacher Use of Questions (TTUQ)	5.50	6.00	15.90
Total Teacher Use of Acceptance and Praise (TTAPR)	16.00	16.50	22.90
Total Student Initiation (TSI) <i>TS</i>	61.70	54.33	66.91
Total Student Initiation, Student Suggested (TSISS)	33.45	33.60	45.30
Content Emphasis, Teacher Input (CETI)	29.01	29.37	29.40
Teacher as Teacher (TT)	100.00	100.00	99.90
Other Student as Teacher (ST)	.00	.00	.03
Environment as Teacher (ET)	.00	.00	.00
Verbal Emphasis (VE)	31.40	35.98	54.23
Nonverbal Emphasis (NVE)	48.70	48.54	68.03
Class Structure as One (W)	100.00	100.00	100.00
Class Structure as Part (P)	.00	.00	.00

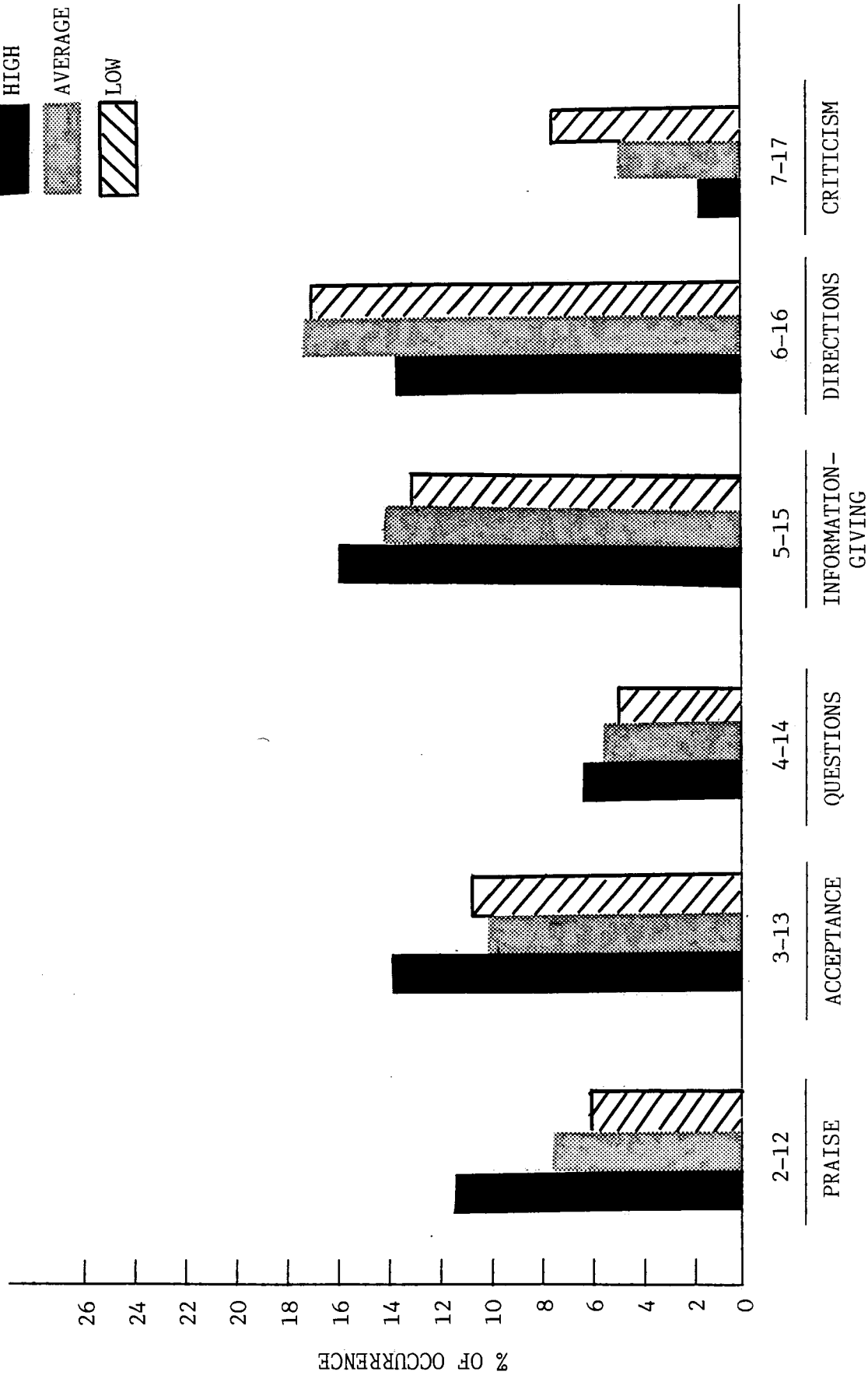
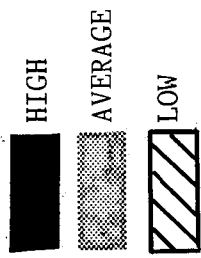


Figure 1. Mean percentages for DAC variables for high-, average-, and low-skilled students.

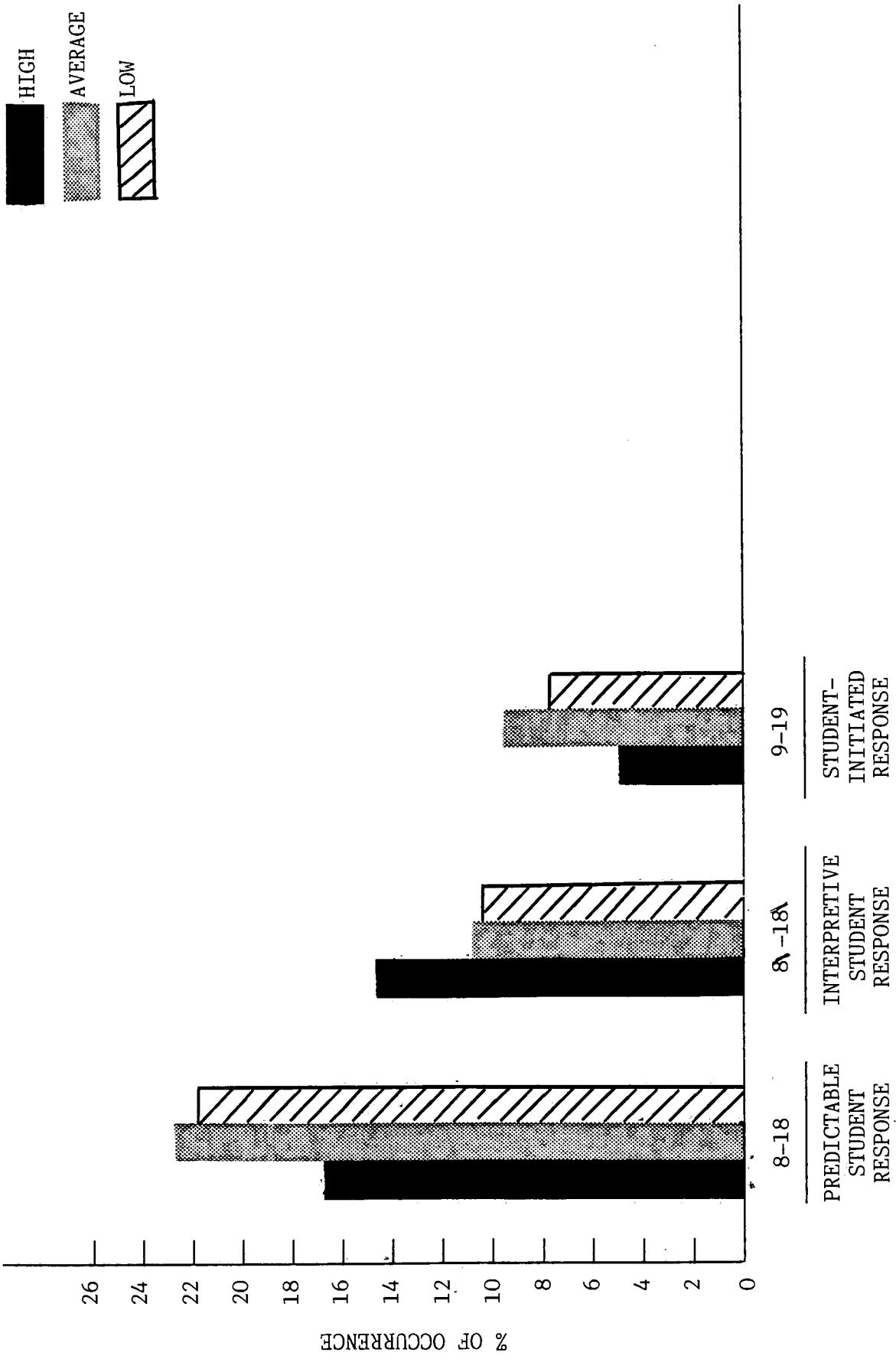


Figure 1. (continued)

percentages of occurrence for the high-skilled, average-skilled, and low-skilled students are presented in Table 2. The interaction patterns of the physical educator with the high-skilled students were characterized by teacher directions followed by extended predictable student response and teacher acceptance (6-8-8-3). This led to student interpretive response and teacher acceptance followed by teacher information and directions (8-3-5-6). The high-skilled students' interpretive behavior during class was followed by teacher praise and information-giving requiring a student interpretive response which led to more information-giving by the teacher (8-2-5-8-5).

The interaction patterns of the physical education teacher with average-skilled students were characterized by teacher directions followed by extended predictable student responses and teacher acceptance (6-8-8-3). This led to teacher use of questions followed by student predictable response and more directions by the teacher (4-8-8-6). The average-skilled student's predictable behavior during class was followed by extended information giving, which led to more student predictable response followed by directions by the teacher (8-5-5-8-6).

The interaction patterns of the physical education teacher with low-skilled students were characterized by teacher directions followed by extended predictable student response and teacher acceptance (6-8-8-3). Following the student's predictable response, the teacher gave more directions and asked questions which led to a predictable student response (8-6-4-8). While participating in class, the low-skilled students demonstrated student-initiated responses which led to teacher criticism which was followed by teacher information and directions (9-7-5-6).

Table 2

Summary of the Most Frequent Interaction Patterns and Percentage of Occurrence
Among the Top 10 Cells for the Three Groups

Interaction Patterns	High-skilled		Average-skilled		Low-skilled	
	Percentage of Occurrence	Interaction Patterns	Percentage of Occurrence	Interaction Patterns	Percentage of Occurrence	Interaction Patterns
6-8	9.20	6-8	12.78	6-8	13.94	6-8
8-3	6.12	8-3	5.43	8-3	5.46	8-3
8-3	5.11	4-8	4.69	8-6	4.92	8-6
5-6	4.09	8-6	4.69	4-8	4.24	4-8
2-5	3.89	8-5	4.22	9-7	4.06	9-7
8-5	3.82	5-6	4.06	5-6	3.97	5-6
5-8	3.69	8-5	3.60	8-5	3.43	8-5
4-8	3.42	9-7	3.05	3-6	3.43	3-6
3-2	3.25	5-8	2.74	5-9	3.34	5-9
3-5	3.11	3-5	2.77	8-3	3.02	8-3

6-8 Teacher's directions followed by predictable student response.

8-3 Predictable student response followed by teacher acceptance.

Table 2 (continued)

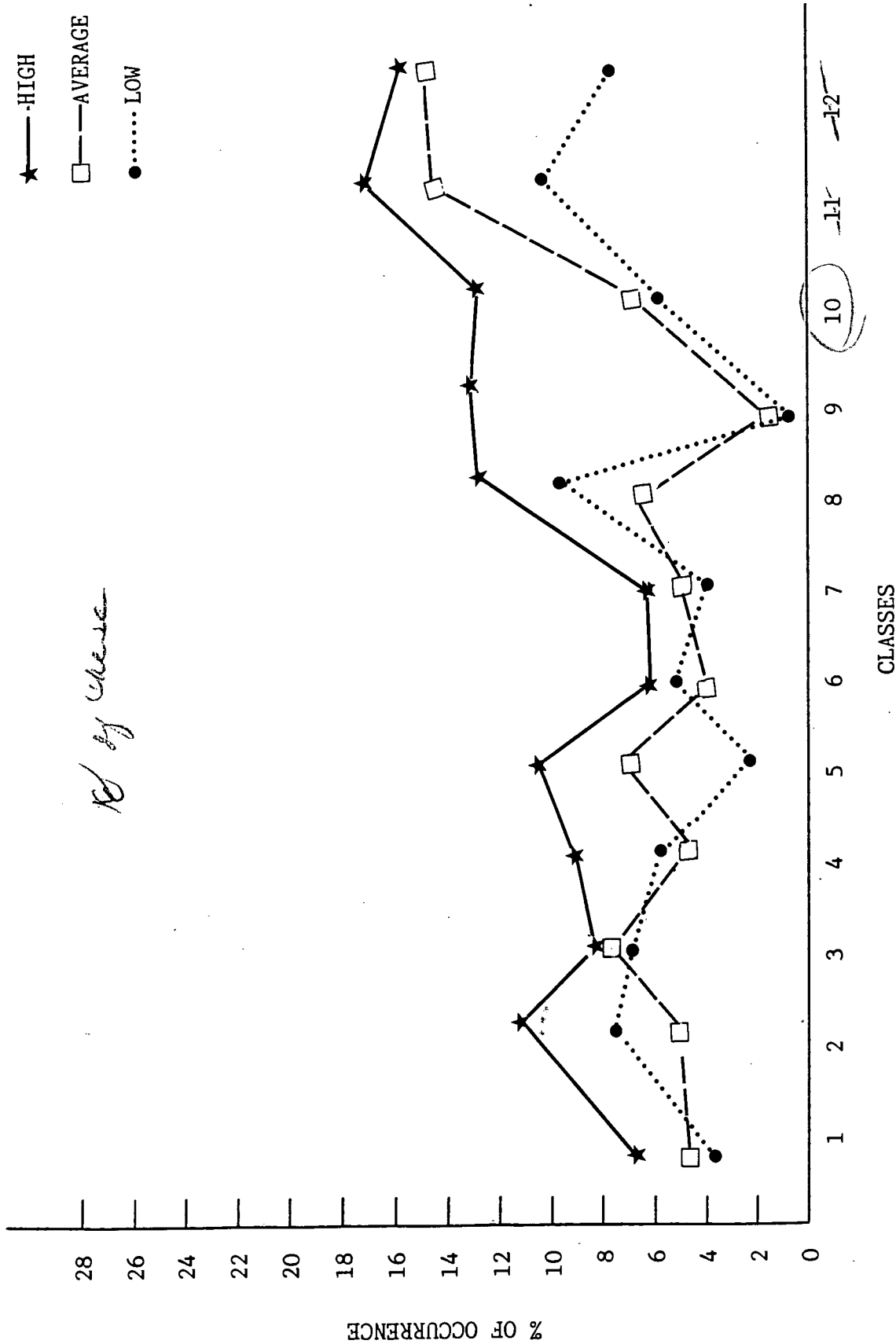
- 8-3 Student's interpretive response followed by teacher acceptance.
- 5-6 Teacher's information-giving followed by teacher directions.
- 2-5 Teacher praise followed by teacher direction-giving.
- 8-5 Interpretive student response followed by teacher direction.
- 5-8 Teacher information-giving followed by student interpretive response.
- 4-8 Teacher questions followed by predictable student response.
- 3-2 Teacher acceptance followed by teacher praise.
- 3-5 Teacher praise followed by teacher information-giving.
- 9-7 Student-initiated response followed by teacher criticism.
- 8-5 Student predictable response followed by teacher information-giving.
- 8-6 Predictable student response followed by teacher directions.
- 5-9 Teacher information-giving followed by student-initiated response.
- 3-6 Teacher acceptance followed by teacher directions.

Phase Two: DAC Results Day-to-day

The use of the 17 DAC parameters by the physical education teacher with high-skilled, average-skilled, and low-skilled students on a day-to-day basis for an entire unit is summarized in the following section. Visual comparisons indicated that differences existed in the behavior of the teacher as he interacted with each group of students.

The ^{male} physical education teacher exhibited more praise to the high-skilled students throughout the entire unit (see Figure 2). The amount of praise received by the high-skilled students increased from the beginning of the unit to the end of the unit. This amount remained constant day-to-day, with the only decrease occurring during classes 6 and 7. The amount of praise exhibited by the teacher to the average-skilled students remained constant for the first eight classes. During class 9 the amount of praise received by these students decreased sharply, but then it increased steadily from class 9 until the end of the unit. The amount of teacher praise received by the low-skilled students remained relatively constant throughout the unit, the only increases being in classes 8 and 11. The amount of praise varied slightly among the three groups of students. The high-skilled students received more praise over the course of the unit than the average-skilled and low-skilled students, with the only difference being at the end of the unit when the average-skilled students increased in the amount of praise they received from the teacher to a level similar to the high-skilled students.

Use of acceptance by the teacher was slightly more evident for the high-skilled students during the unit than for the average-skilled and low-skilled students (see Figure 3). The amount of acceptance exhibited by the teacher toward the high-skilled students decreased following class



✓ Figure 2. Teacher praise of the high-skilled, average-skilled, and low-skilled students on a day-to-day basis. 36

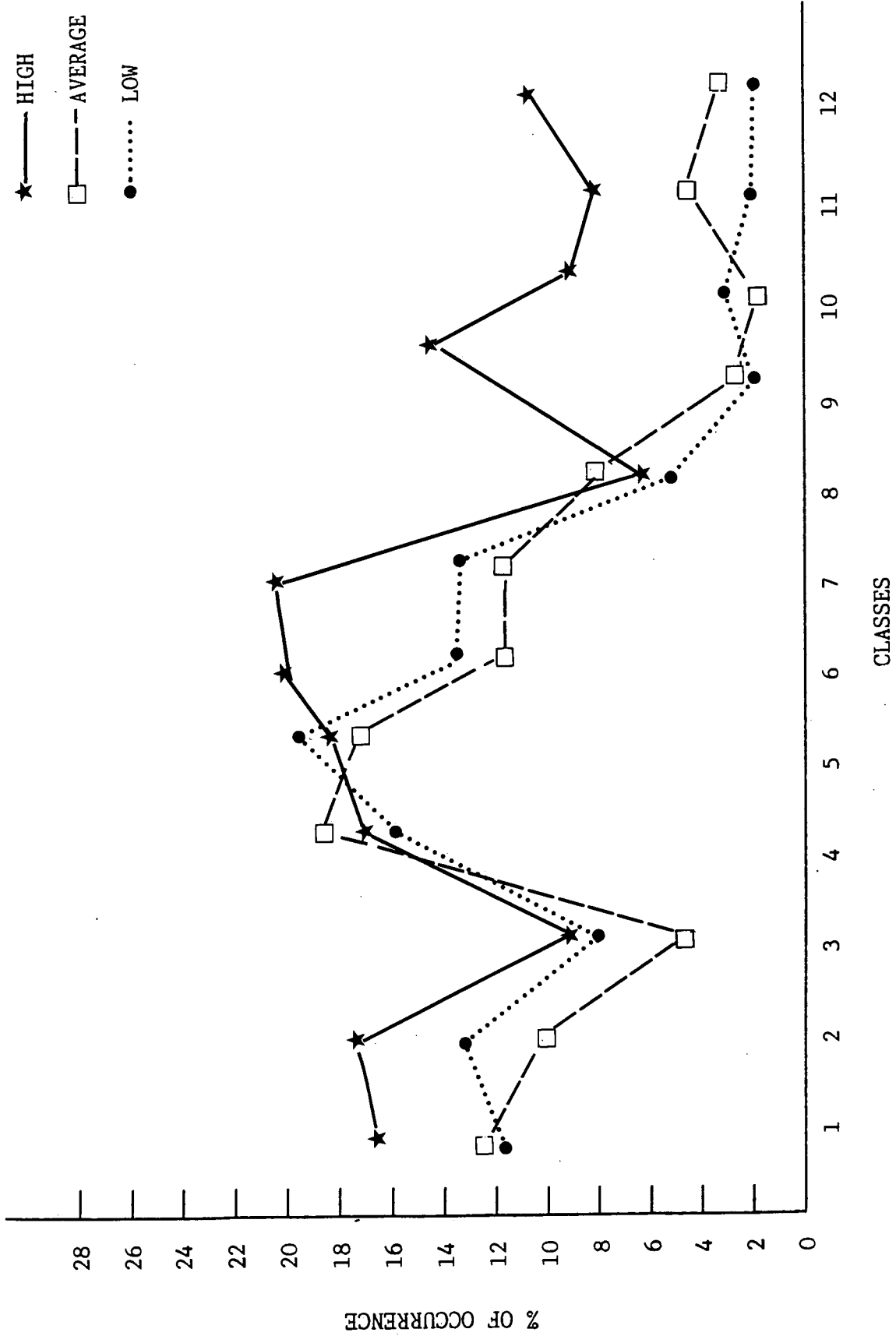


Figure 3. Teacher acceptance of the high-skilled, average-skilled, and low-skilled students on a day-to-day basis.

2 and increased during class 4. It then remained constant until class 8, when it decreased sharply. The amount of acceptance increased again during class 9 and decreased during class 10 to remain steady until the end of the unit. The average-skilled and low-skilled students followed a similar pattern during the course of the unit. The use of teacher acceptance for the average- and low-skilled students decreased at the beginning of the unit, increased during class 4, and then decreased steadily until the end of the unit. The differences among the three groups of students were less evident in the beginning of the unit until class 6, and then a definite pattern emerged, with the high-skilled students receiving more acceptance by the teacher than the other two groups.

Differences in use of teacher questions for the high-skilled, average-skilled, and low-skilled students were less evident on a day-to-day basis among the three groups of students (see Figure 4). There was no significant difference among the three groups of students, and a consistent pattern emerged for the beginning of the unit until the end. The only variance in the instructor's consistency came in class 9, when the high-skilled students received more information than the average- and low-skilled students.

The use of directions by the teacher during this unit was evident more with the average-skilled and low-skilled students than with the high-skilled students (see Figure 6). The low-skilled students received more directions from the teacher until class 6 when this percentage fell below the average-skilled and high-skilled students' percentages. However, the use of directions by the teacher toward the low-skilled students increased sharply during class 8 and decreased toward the end of the unit, but still remained higher than for the other two groups of students. The average-

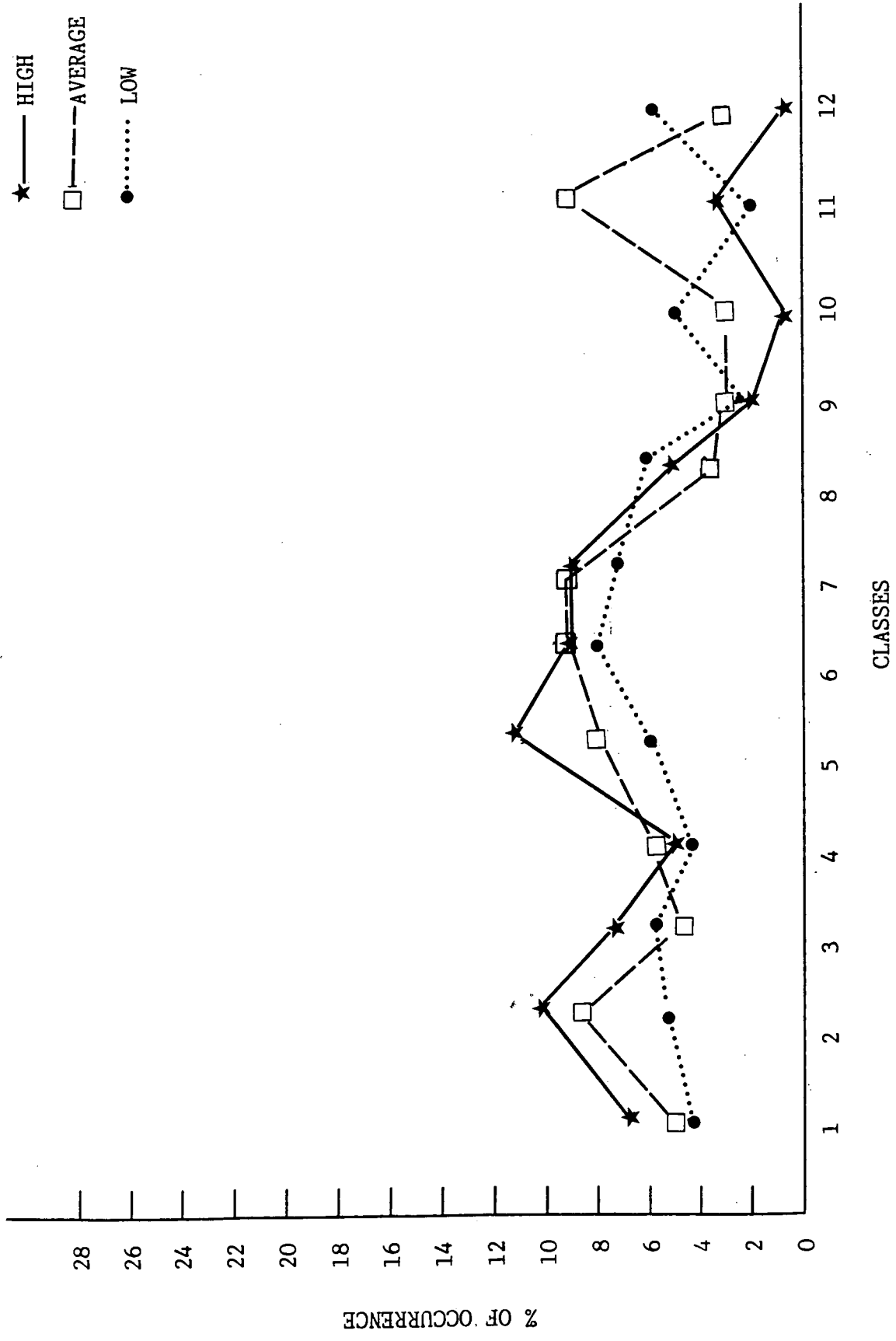


Figure 4. Teacher questions toward the high-skilled, average-skilled, and low-skilled students on a day-to-day basis.

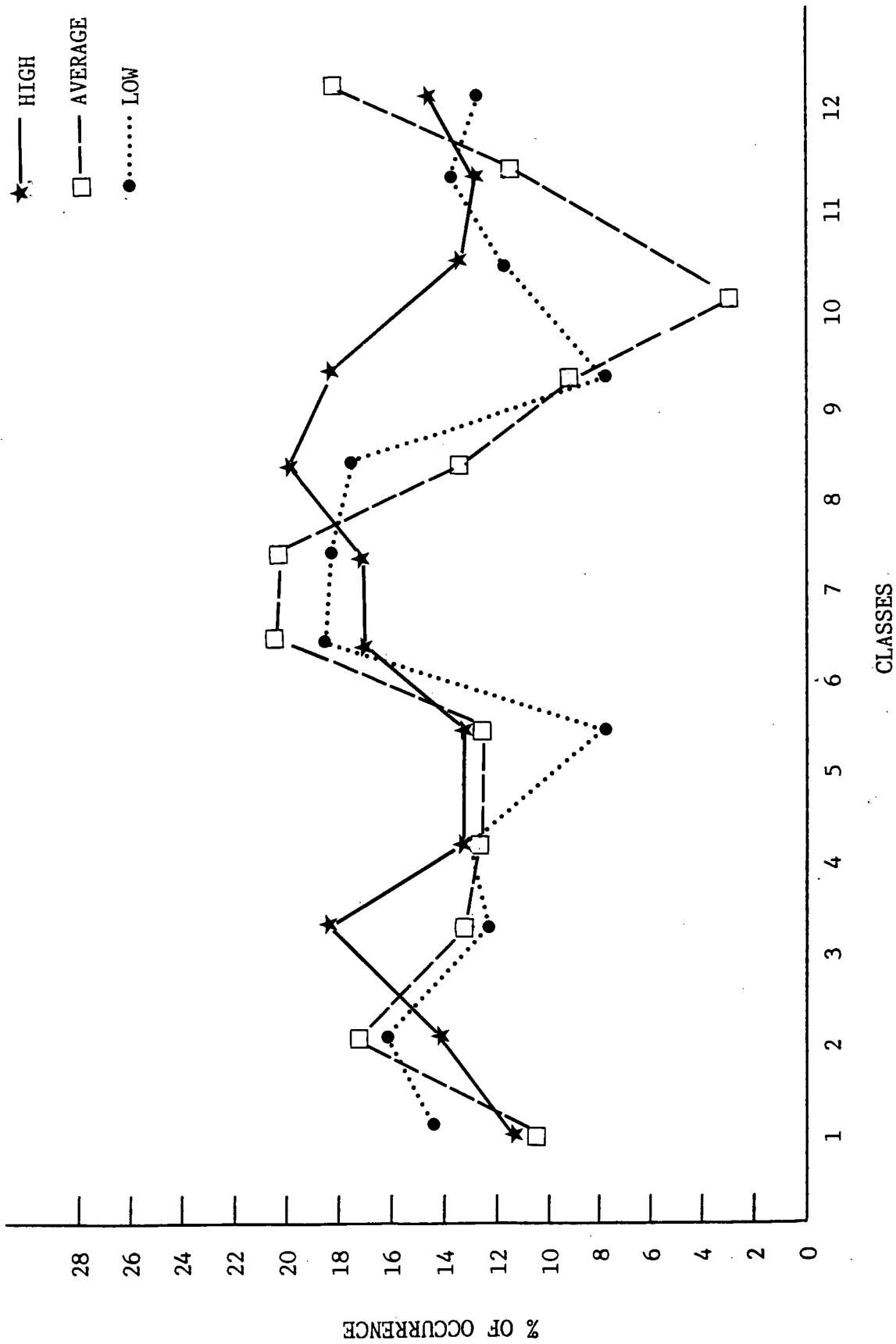


Figure 5. Teacher information-giving to the high-skilled, average-skilled, and low-skilled students on a day-to-day basis.

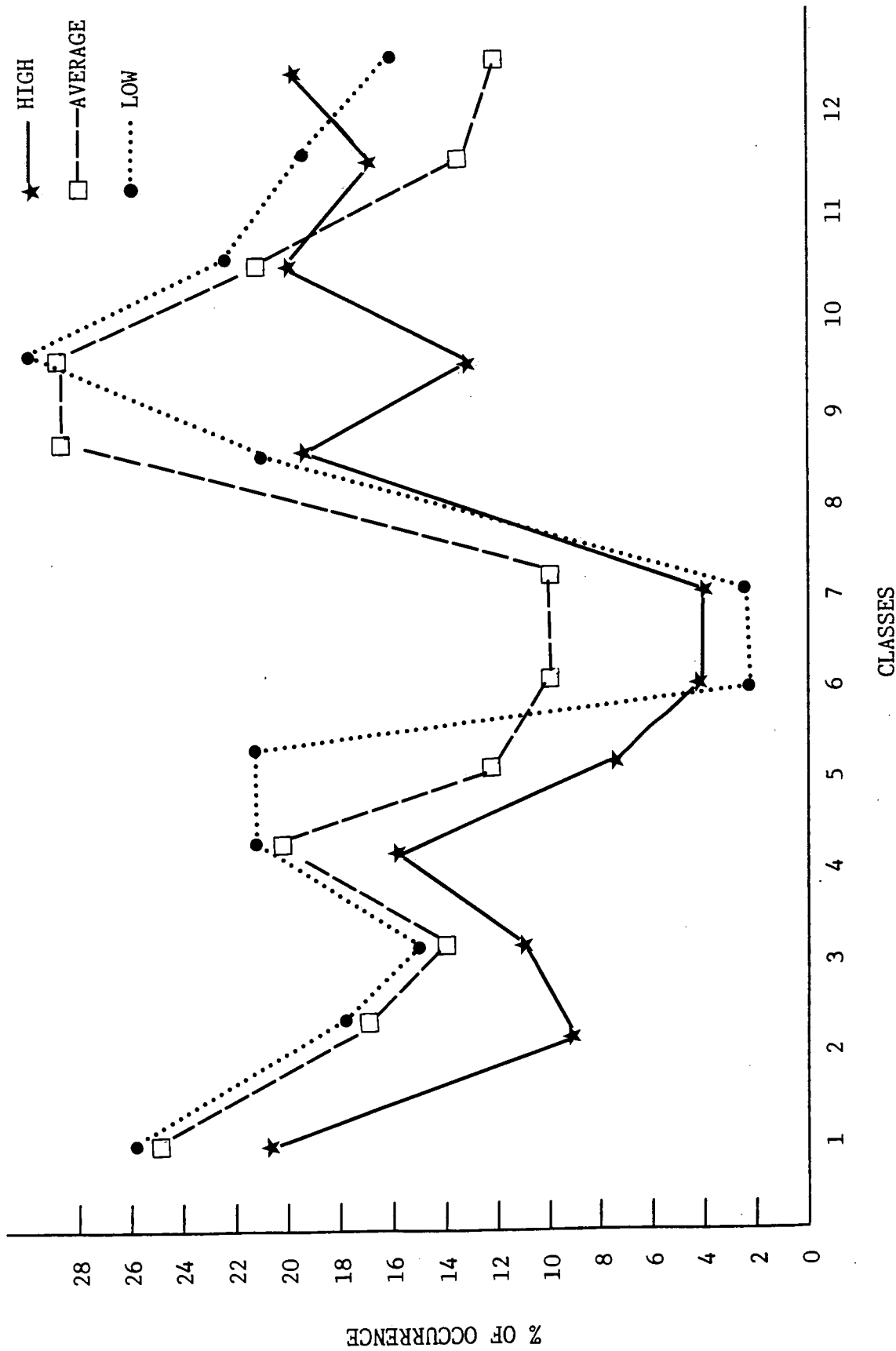


Figure 6. Teacher directions toward the high-skilled, average-skilled, and low-skilled students on a day-to-day basis.

skilled students followed a pattern similar to that of the low-skilled students. The low-skilled and average-skilled students were rather close in comparison until class 6 when the average-skilled students received more directions than the other two groups of students. The use of directions by the teacher toward the average-skilled students increased sharply in class 8 and decreased toward the end of the unit, in a pattern similar to that of the low-skilled students. The high-skilled students received less directions from the teacher than did the other two groups of students. The only exceptions were during classes 6, 7, and 12. In classes 6 and 7 the high-skilled students received more directions than the low-skilled students, but still less than the average-skilled students. Class 12 was the only class in which the high-skilled students received more directions than the other two groups of students.

The use of criticism by the teacher was directed more at the average-skilled and the low-skilled students than toward the high-skilled students (see Figure 7). The average-skilled and low-skilled students followed a similar pattern until class 6. From this class the low-skilled students received more criticism than the average-skilled students until class 10. Then the use of criticism by the teacher toward the average-skilled students increased to remain similar to the low-skilled students until the end of the unit, when it decreased for both groups in class 11 and increased in class 12. The high-skilled students received more criticism from the teacher in the beginning of the unit, for the first five classes. The use of criticism by the teacher decreased after class 5 for the high-skilled students and remained consistently lower than for the other two groups of students.

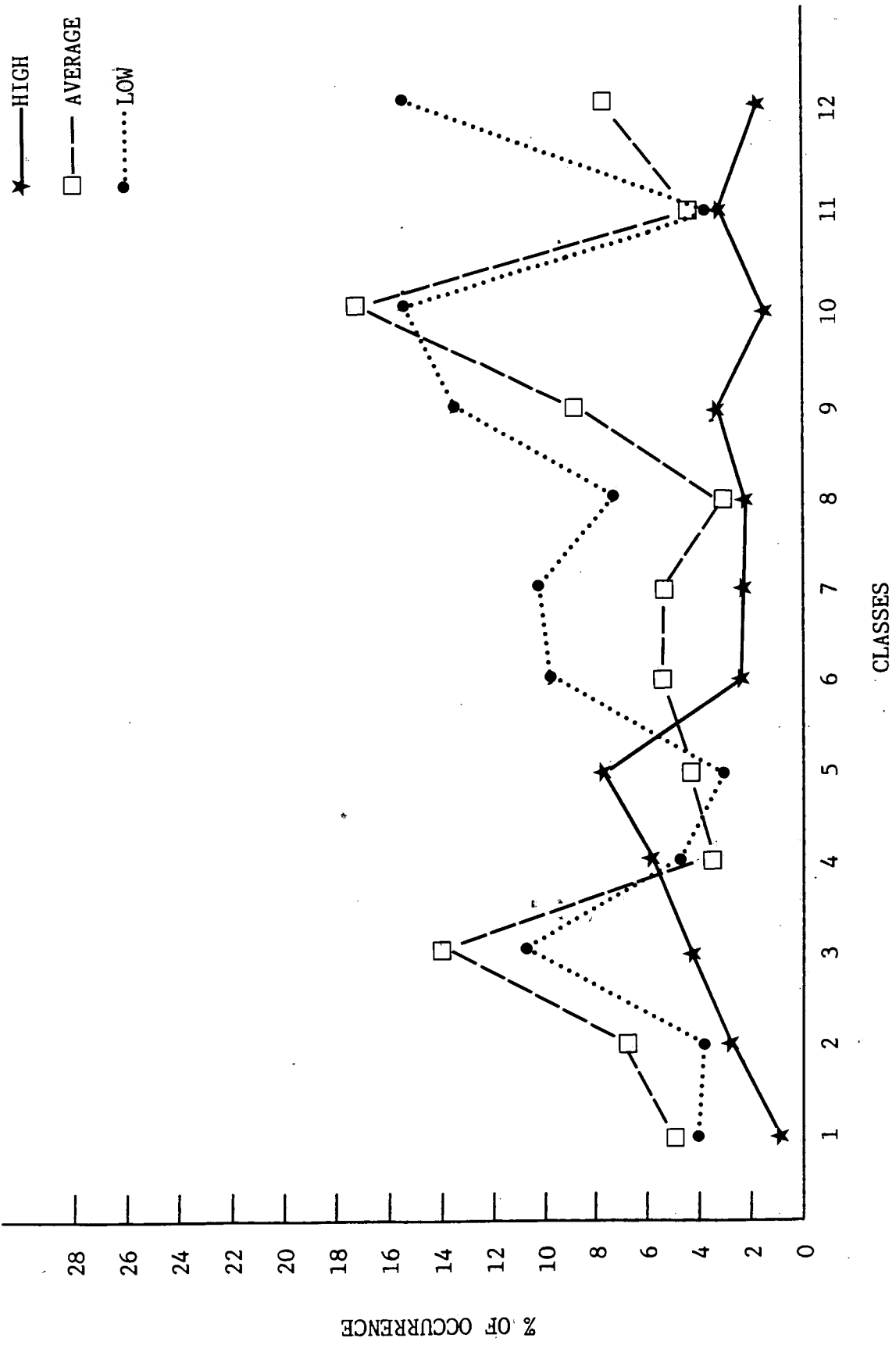


Figure 7. Teacher criticism toward the high-skilled, average-skilled, and low-skilled students on a day-to-day basis.

During this unit the average-skilled and low-skilled students exhibited more predictable student response than the high-skilled students (see Figure 8). The low-skilled students were relatively consistent throughout the unit until classes 11 and 12. Their predictable responses decreased during the final two classes. The average-skilled students remained similar to the low-skilled students for the first nine classes, with the only exception occurring during class 5 when the average-skilled were significantly lower. From class 9 to class 10 the amount of predictable student response increased significantly more for the average-skilled students than for the other two groups until class 11, when this amount decreased and remained similar to the predictable response of the low-skilled students. The high-skilled students exhibited significantly less predictable student response for a majority of the unit than did the other two groups of students. The only exceptions came during classes 4, 10, and 12, when the high-skilled students increased slightly more than the other two groups. On a whole throughout the unit the high-skilled students were considerably lower in their predictable responses than the average-skilled and the low-skilled students.

The amount of student interpretive response exhibited by the high-skilled students was higher than that exhibited by the average-skilled and low-skilled students (see Figure 9). Interpretive responses for the high-skilled students were significantly higher during classes 1 and 2 and then decreased during class 4. During class 5 interpretive responses increased significantly and remained consistent until class 10, when they increased sharply and then decreased during class 12. The average-skilled and low-skilled students had similar patterns of interpretive responses during the entire unit. In 9 of the 12 classes the average-skilled students

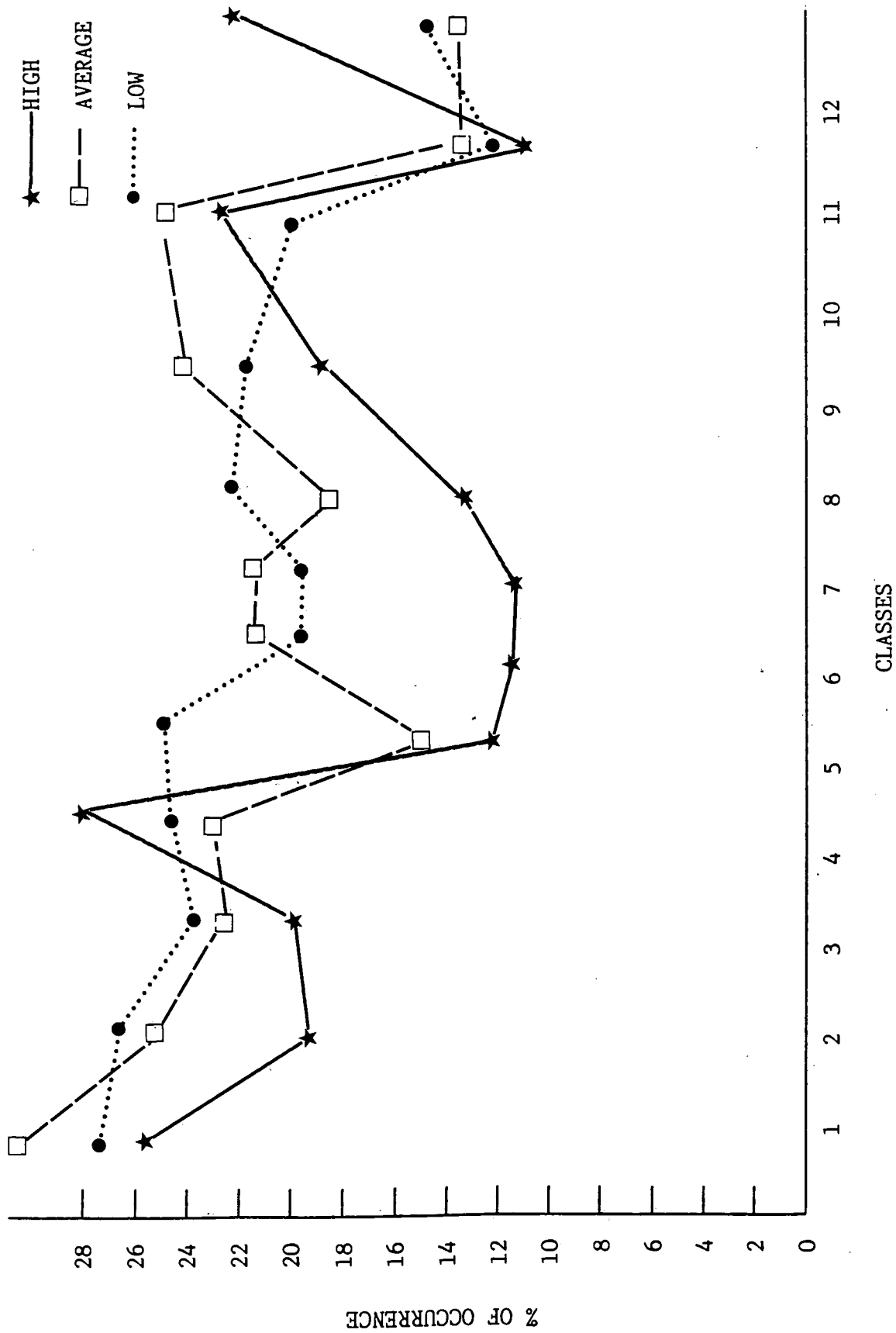


Figure 8. Student predictable response exhibited by the high-skilled, average-skilled, and low-skilled students on a day-to-day basis.

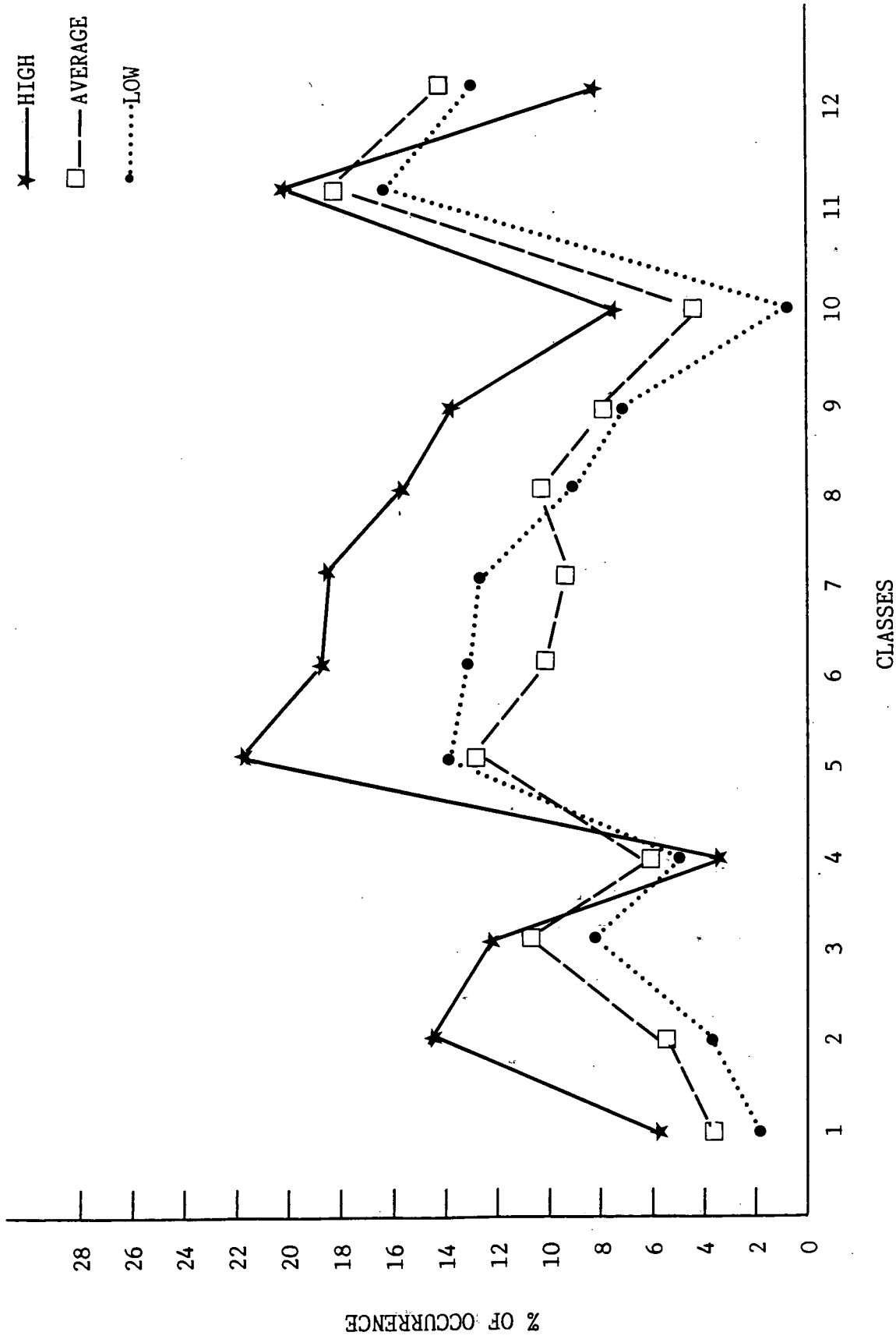


Figure 9. Student interpretive response exhibited by the high-skilled, average-skilled, and low-skilled students on a day-to-day basis.

exhibited more interpretive responses than the low-skilled students. Differences among the three groups of students were evident during classes 5-10; during these classes the high-skilled students exhibited more interpretive responses than the other two groups.

Student-initiated responses for the three groups of students varied slightly day-to-day during the unit (see Figure 10). The low-skilled students had a slightly higher pattern of initiated responses than the average-skilled and high-skilled students for the entire unit. The average-skilled students displayed a more consistent pattern of initiated responses than the other two groups of students. The high-skilled students emerged with a very inconsistent pattern but remained slightly lower than the low-skilled students and similar to the average-skilled students. The differences among the three groups of students were very slight throughout the unit on a day-to-day basis.

Phase Three: ALT-PE Results

The percentages for the ALT-PE categories of the high-skilled, average-skilled, and low-skilled students are summarized in Table 3. Visual comparisons of the information indicate differences existed among the three groups. In the context level the differences were very slight. These were in the area of general content, as the low-skilled students spent 13.0% of the time in warm-up activities as compared to the average-skilled students' 12.0% and the high-skilled students' 12.4%. Differences also existed in the amount of time the students spent in game play. The high-skilled students spent more time in game play (15.0%) as compared to the average-skilled (14.8%), and the low-skilled students (14.7%).

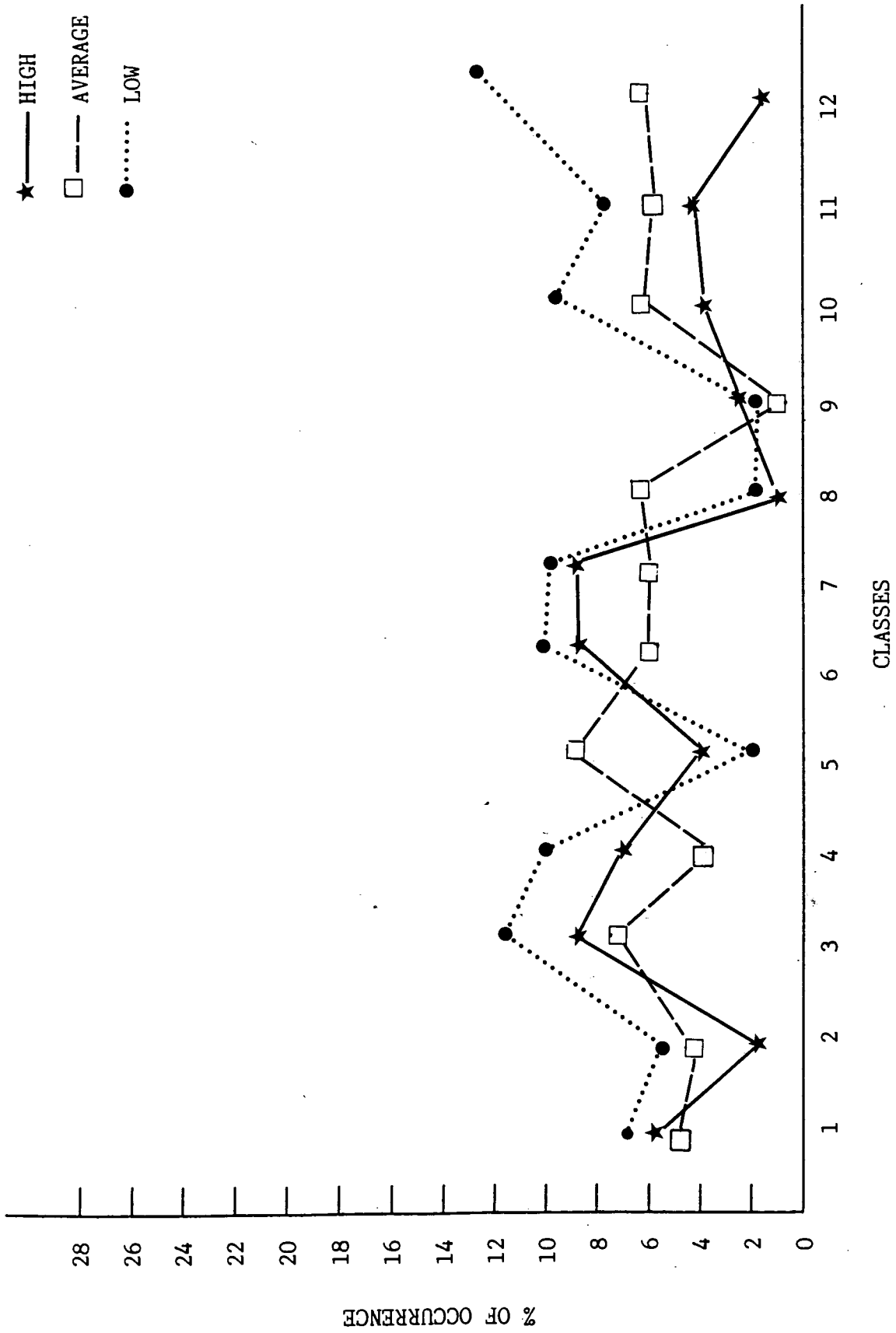


Figure 10. Student-initiated response exhibited by the high-skilled, average-skilled, and low-skilled students on a day-to-day basis.

Table 3 2
 Percentages for ALT-PE Categories

Male
Female

Categories	Low- skilled Percentages	Average- skilled Percentages	High- skilled Percentages
<u>Context Level</u>			
General Content	32.4	31.6	32.2
Transition	15.5	15.6	15.8
Management	3.2	3.5	3.5
Break	.6	.4	.4
Warm-up	13.0	12.0	12.4
Subject Knowledge	4.7	4.7	5.4
Technique	2.9	2.8	3.2
Strategy	.0	.0	.0
Rules	.8	.9	1.1
Social Behavior	1.0	1.0	.0
Break	.0	.0	.0
Subject Motor	62.8	63.5	62.2
Practice	48.0	48.6	47.2
Scrimmage	.0	.0	.0
Game	14.7	14.8	15.0
Fitness	.0	.0	.0

Table 3 (continued)

Categories	Low- skilled Percentages	Average- skilled Percentages	High- skilled Percentages
<u>Learner Involvement</u>			
Not Engaged	76.8	73.9	66.1
Interim	.8	1.0	11.2
Waiting	42.7	39.9	32.5
Off-task	7.2	6.8	2.5
On-task	19.3	19.5	23.0
Cognitive	6.7	6.5	6.9
Engaged	23.1	26.0	33.8
Motor-appropriate	15.3	20.2	27.6
Motor-inappropriate	6.6	4.2	3.0
Motor-supporting	1.1	1.6	3.2
Total Intervals	1195	1990	1959

During this phase the most significant differences came in the learner involvement level. There were significant differences among the high-skilled, average-skilled, and low-skilled students in the not-engaged activities. The low-skilled students (.8%) and the average-skilled students (1.0%) spent very little time performing interim activities compared to the high-skilled students spending 11.2% of the time performing interim tasks. Differences existed among the three groups in the amount of time spent waiting. The low-skilled students spent 42.7% of the time waiting during learning activities, compared to 39.9% for the average-skilled students and 32.5% for the high-skilled students. The low-skilled students were off-task 7.2% of the time, the average-skilled students were off-task 6.8%, and the high-skilled students were off-task the least often--only 2.5% of the time. The high-skilled students were on-task 23% of the time, the average-skilled students 19.5% of the time, and the low-skilled students 19.3% of the time.

Differences were found in the amount of time the three groups of students were actively engaged in motor tasks. The high-skilled students were actively involved 33.8% of the time, as compared to 26.0% of the time for the average-skilled students and 23.1% of the time for the low-skilled students. The high-skilled students were motor-appropriate 27.6% of the time, the average-skilled students 20.2% of the time, and the low-skilled students only 15.3% of the time. This indicated that the more highly skilled students accumulated more ALT-PE than students in the other groups. The high-skilled students were involved in motor-inappropriate activities 3.0% of the time, the average-skilled 4.2% of the time, and the low-skilled 6.6% of the time.

Phase Four: ALT-PE Variables Day-to-day

Comparisons of the ALT-PE variables of the high-skilled, average-skilled, and low-skilled students on a day-to-day basis for an entire unit are presented in the following section.

The total time the three groups of students were involved in motor activities during class varied slightly throughout the unit (see Figure 11). The only significance occurred in class 9, when the high-skilled students' total time fell below the other two groups'.

Differences were found in the amount of time the high-skilled, average-skilled, and low-skilled students were actively engaged in motor activities (see Figure 12). The high-skilled students were motor engaged a higher percentage of the time, especially in the first seven classes of the unit. During the 8th class the motor-engaged percentage decreased, but still remained slightly higher for the high-skilled students than for the average-skilled and the low-skilled students. The average-skilled and low-skilled students were consistent in the percentage of engagement in motor activities. The difference between the two groups was very slight, and both remained lower than the high-skilled students for all the classes except class 8.

The low-skilled and average-skilled students were involved in not-motor-engaged activities more than the high-skilled students (see Figure 13). During classes 1-8, the average-skilled and low-skilled students were similar in their involvement in not-engaged activities with little difference between the two groups. During class 9 the average-skilled students decreased and the low-skilled students remained consistent until the end of the unit. The high-skilled students were consistently lower in their involvement in not-engaged activities in the first seven classes as

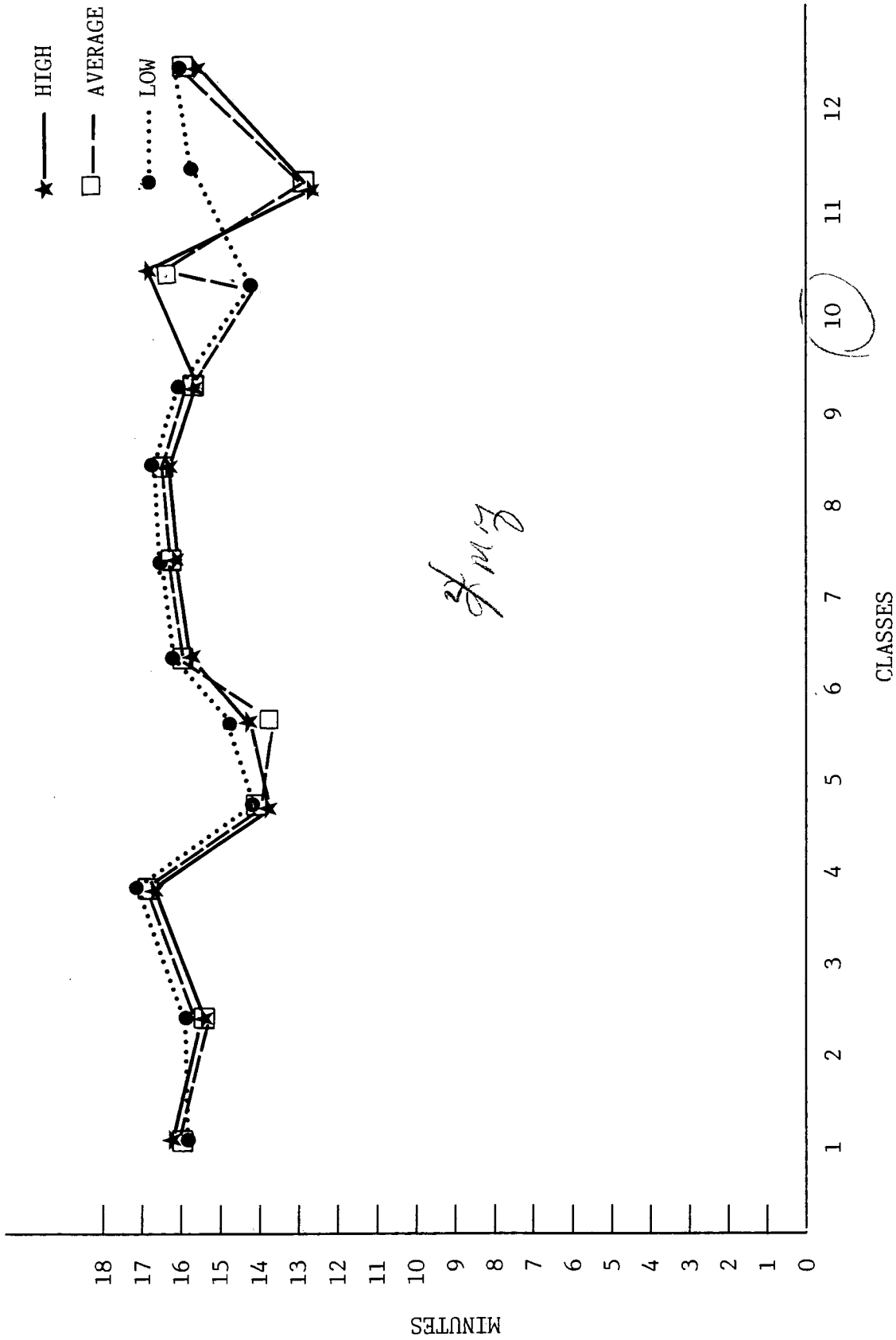


Figure 11. Total time for high-skilled, average-skilled, and low-skilled students on a day-to-day basis.

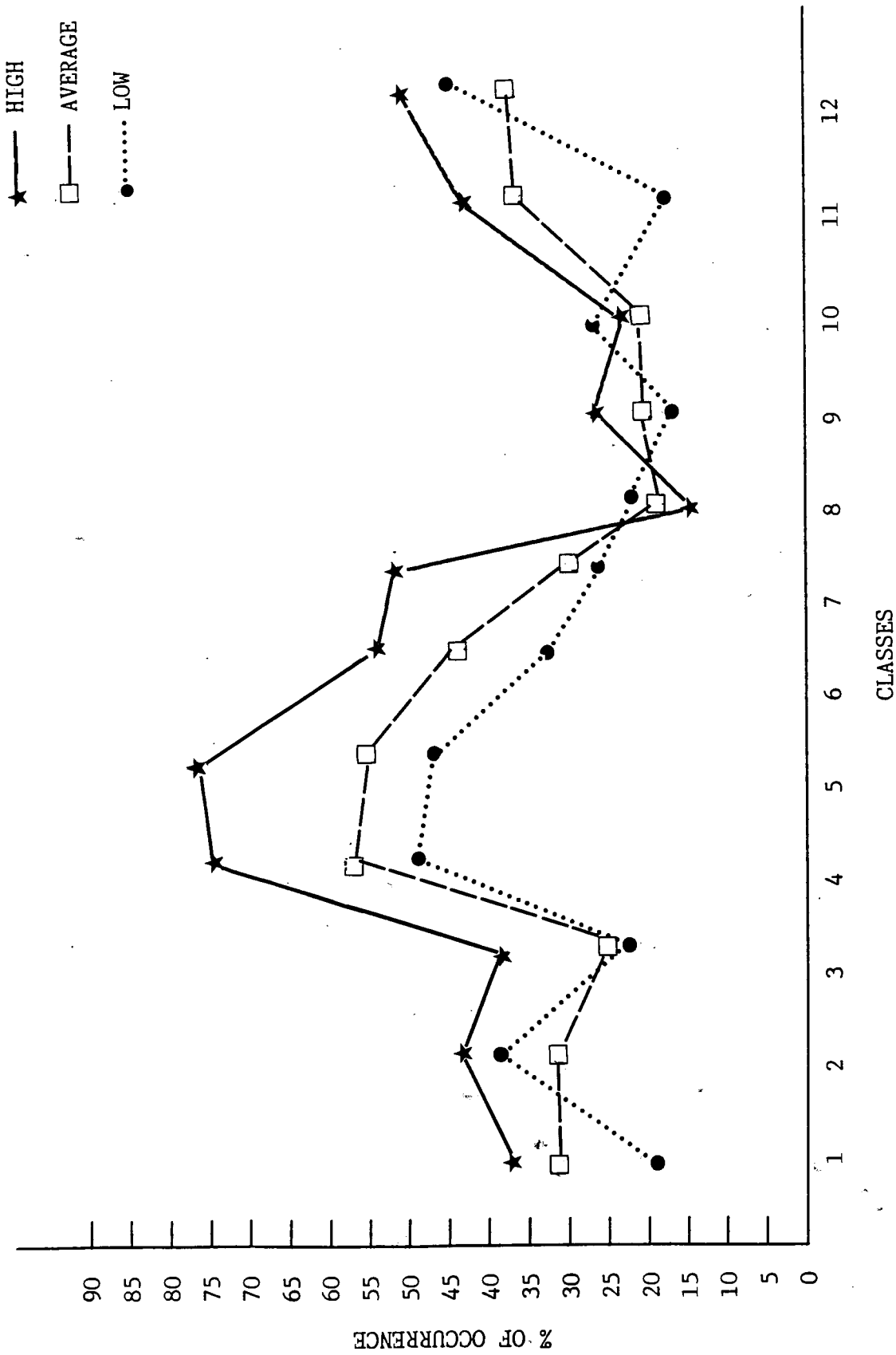


Figure 12. Motor-engaged percentages for high-skilled, average-skilled, and low-skilled students on a day-to-day basis.

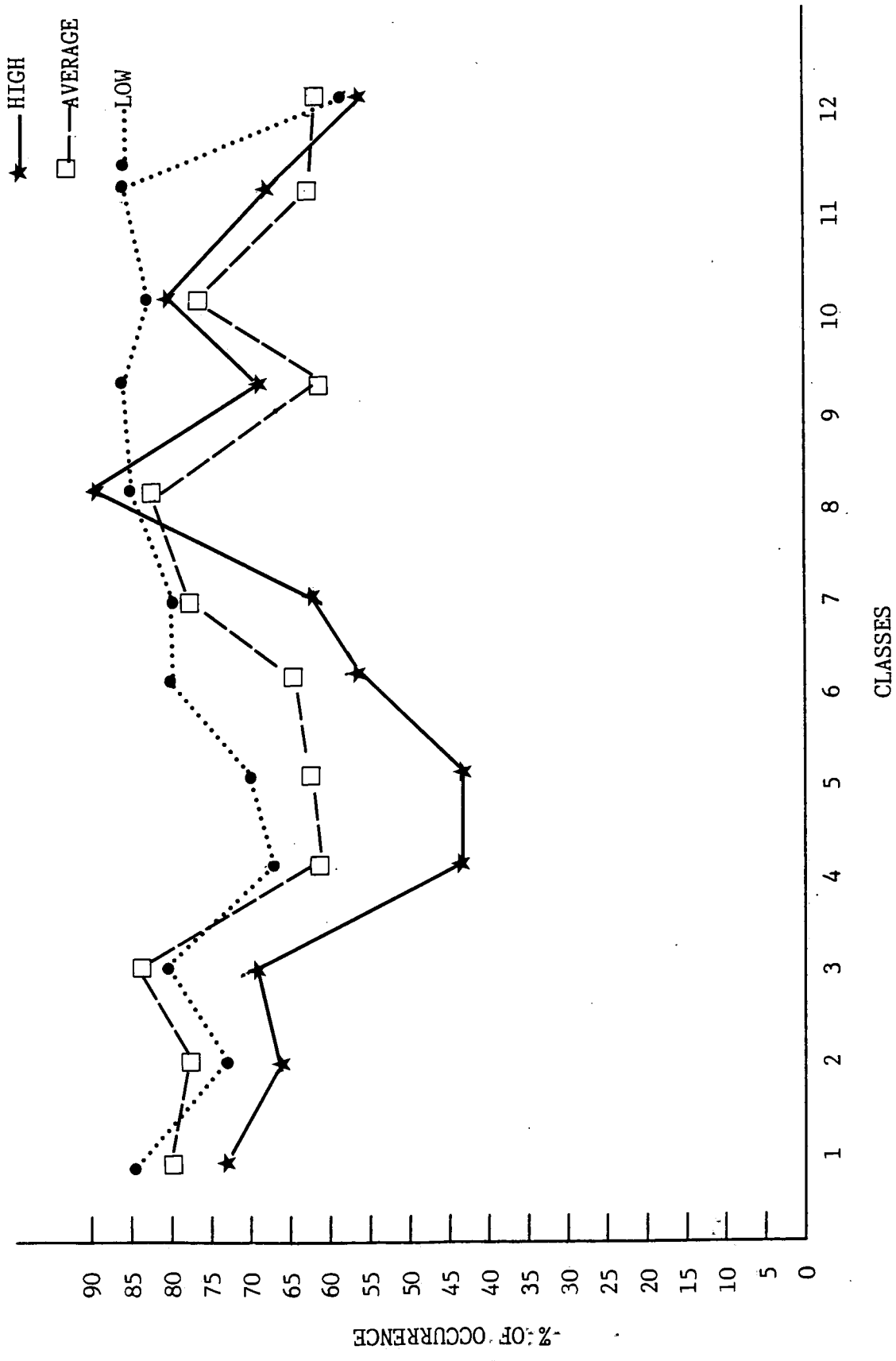


Figure 13. Not-motor-engaged percentages for high-skilled, average-skilled, and low-skilled students on a day-to-day basis.

compared to the other two groups of students. During class 8 this percentage was higher than for the other groups and remained very similar to the percentages of the average-skilled and low-skilled students until the end of the unit.

Subject matter motor, the amount of time students spent in game play, was very similar for all three groups (see Figure 14). Most of the classes for the entire unit varied only the slightest percentage. The only class with a discernible difference was class 6. During this class the high-skilled students' involvement in game play was below the other two groups' percentages.

No significant differences among the high-skilled, average-skilled, and low-skilled students on a day-to-day basis were found in the amount of time they spent learning subject-related knowledge (see Figure 15). The average- and low-skilled students emerged with consistent patterns throughout the unit, which were similar for the two groups. The high-skilled students were slightly higher during classes 4, 5, 8, and 9.

The average-skilled students' ALT engaged ratio decreased in the first classes and increased in the last four classes (see Figure 16). This indicated that the activities were inappropriate for the average-skilled students in the beginning of the unit and more appropriate at the end. The low-skilled students were significantly lower than the other two groups until the last class. This indicated that the activities throughout the unit were inappropriate for the low-skilled students.

The amount of time the students were involved at the learner involvement level for each class was significantly higher for the high-skilled students in classes 1-7 (see Figure 18). During class 8 this time decreased, and then it increased slightly until the end of the unit.

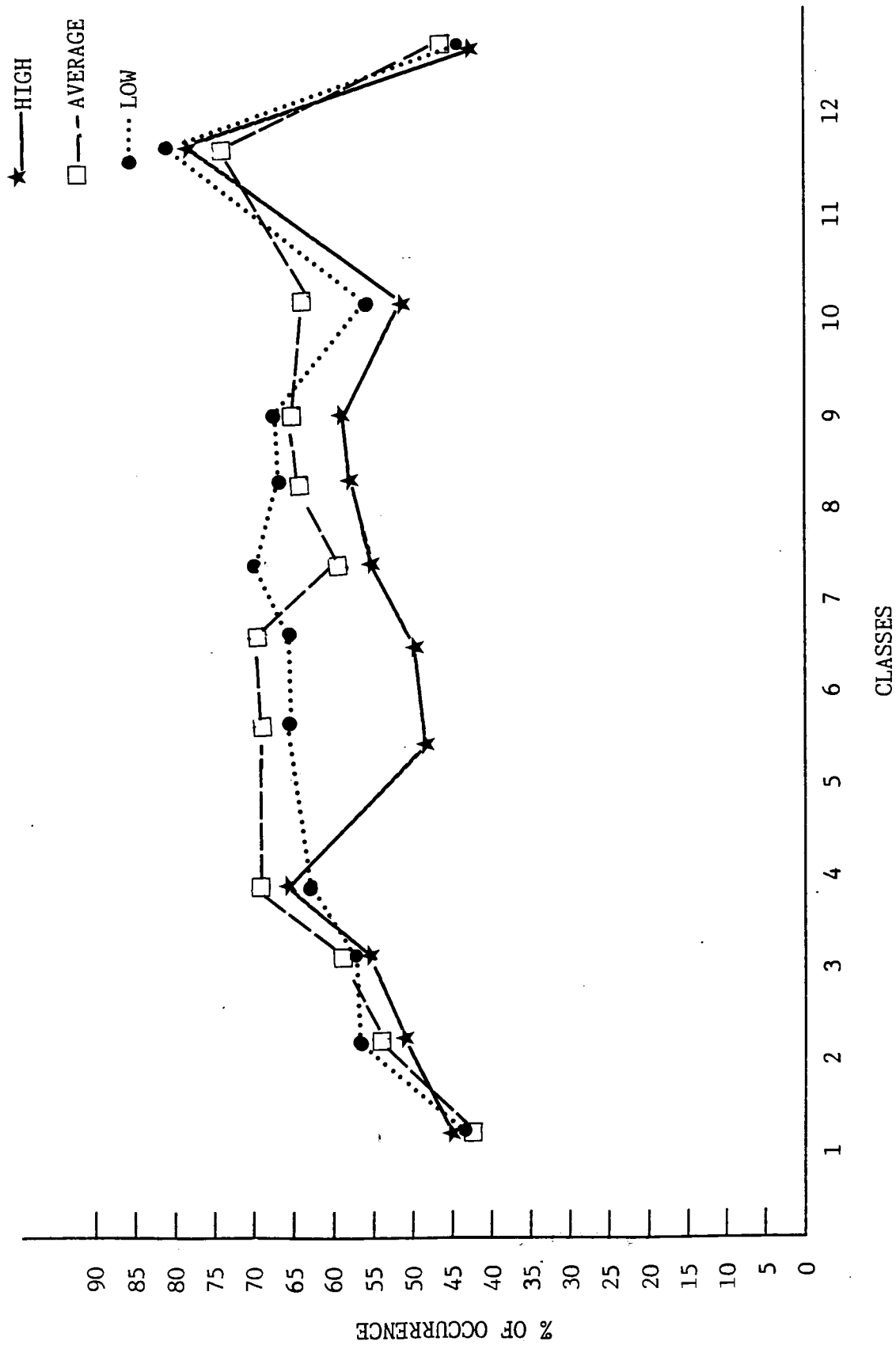


Figure 14. Subject matter motor percentages for the high-skilled, average-skilled, and low-skilled students on a day-to-day basis.

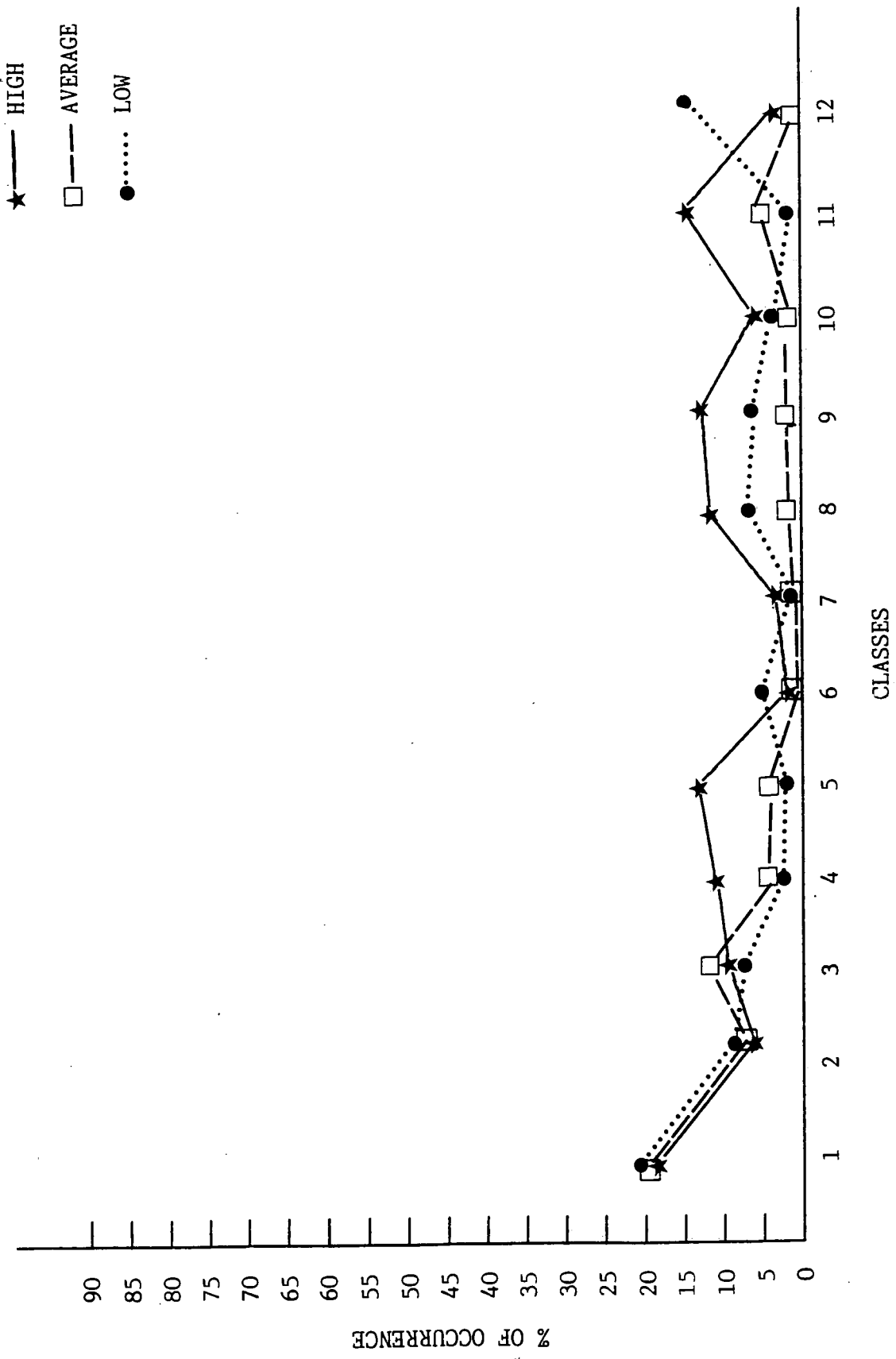


Figure 15. Daily amount of subject matter knowledge for high-skilled, average-skilled, and low-skilled students.

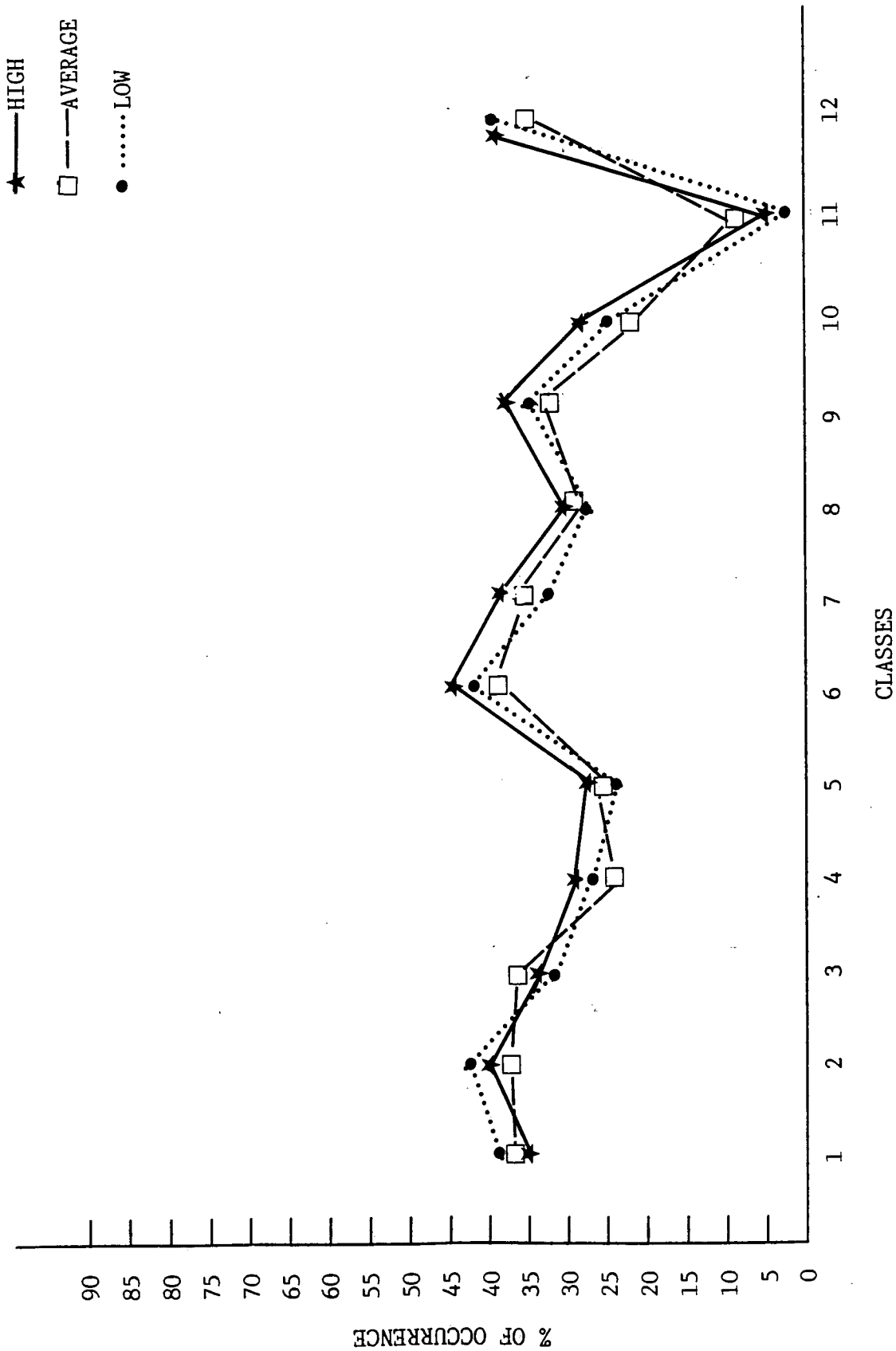


Figure 16. Daily amount of general content for high-skilled, average-skilled, and low-skilled students.

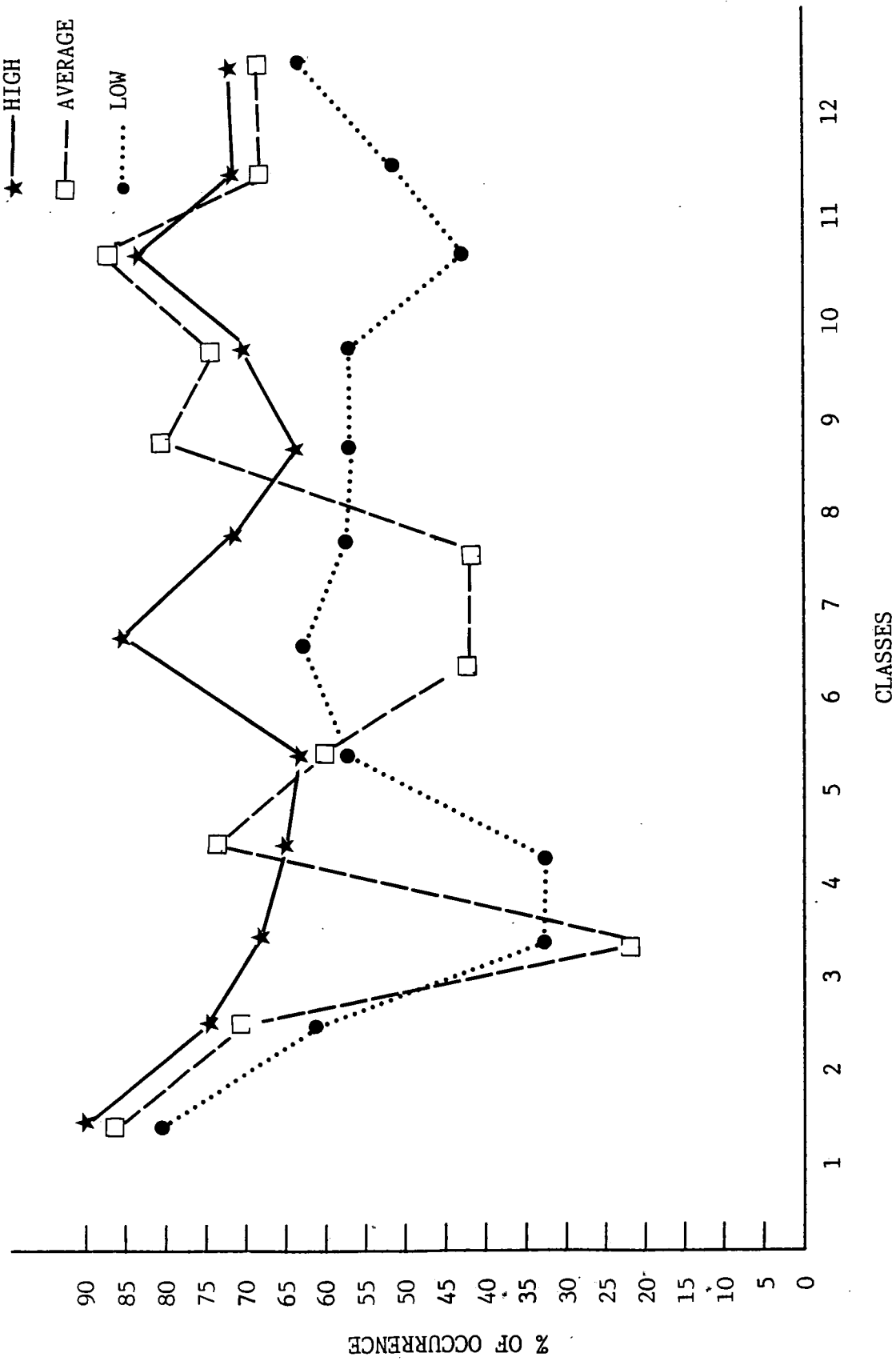


Figure 17. Daily ALT engaged ratio for the high-skilled, average-skilled, and low-skilled students.

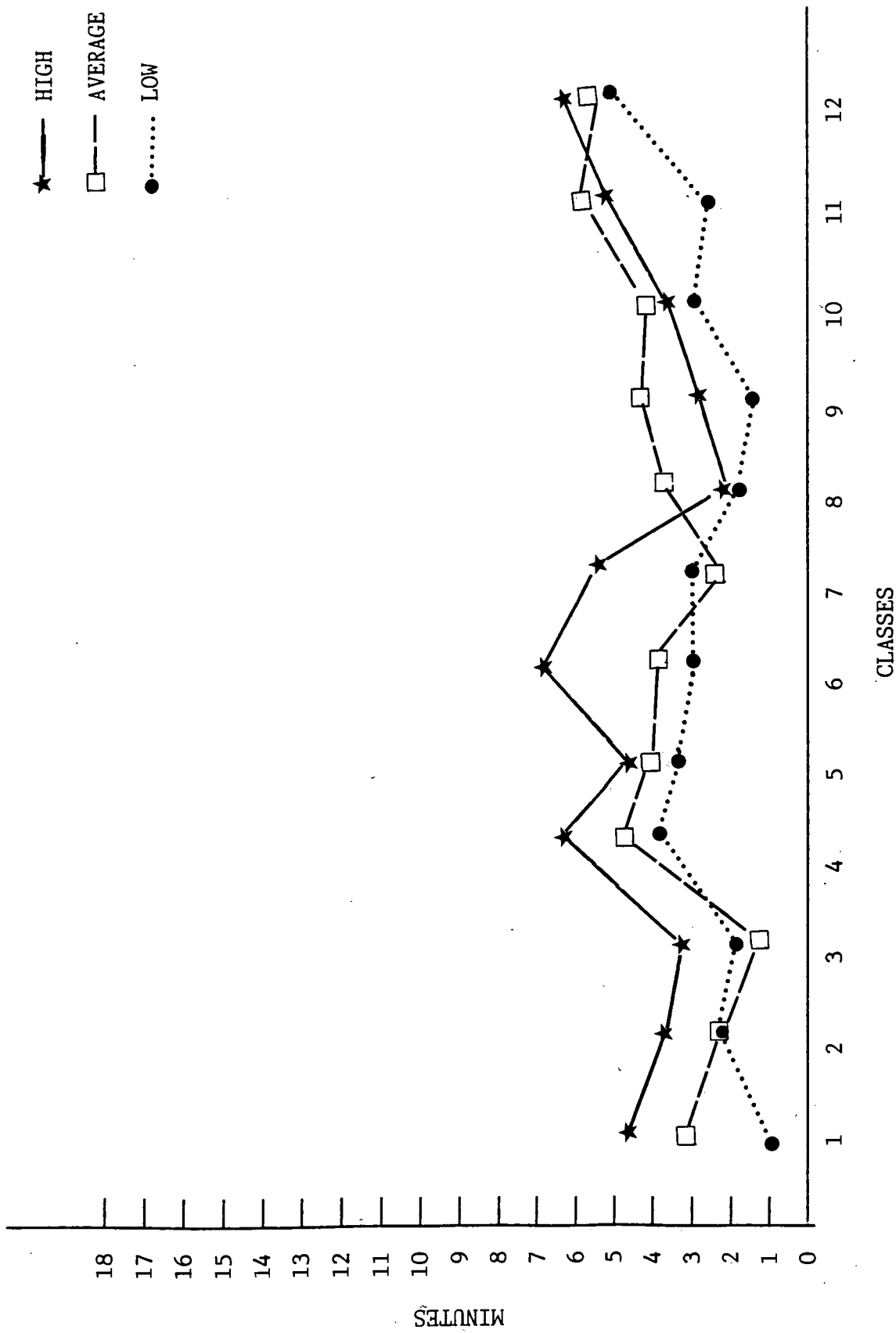


Figure 18. Daily amount of learner involvement for high-skilled, average-skilled, and low-skilled students. 61

The average-skilled and low-skilled students were consistent at the learner involvement level, and the differences between the two groups were very slight. During class 8, class 10, and class 12, all three groups were very similar in their percentages. Overall the high-skilled students emerged at a higher percentage than the average-skilled and low-skilled students for the first seven classes.

The percentage of ALT-PE accumulated by the high-skilled students was significantly higher than the percentages of the average-skilled and low-skilled for the first seven classes (see Figure 19). During class 8 this percentage decreased and then increased steadily until the end of the unit. The average-skilled students' percentage of ALT-PE remained inconsistent during the unit, but it was usually higher than the percentage for low-skilled students. The low-skilled students ALT-PE remained fairly consistent during the unit until class 12, when the ALT-PE equalled the other two groups' ALT-PE.

Summary

In order to determine coder reliability for this study, one videotape was randomly selected to be coded using DAC on two independent observation sessions by Dr. Victor H. Mancini, an expert coder of DAC. The top 10 interaction patterns were ranked and then subjected to the Spearman rank order correlation technique. The mean correlation of .9862 that was found was sufficient to indicate that the coder was reliable.

In order to determine reliability for using ALT-PE, the scored-interval agreement method, as described by Hawkins and Dotson (1975), was used. One randomly selected tape was coded on two independent observation sessions simultaneously by the investigator and Dr. Victor H. Mancini. Interobserver agreement was determined for each of the categories of the

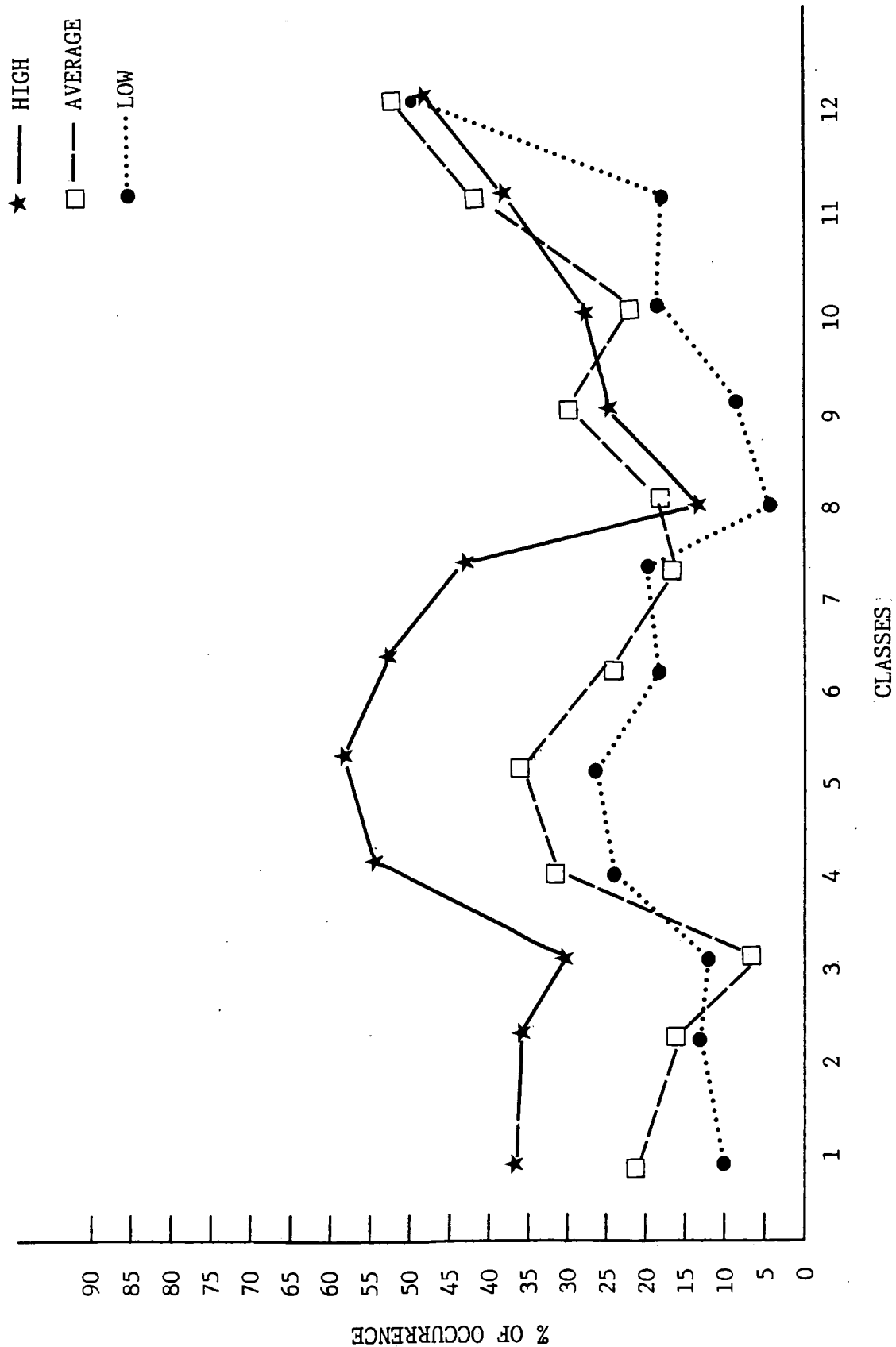


Figure 19. Daily percentages of ALT-PE for high-skilled, average-skilled, and low-skilled students.

ALT-PE recording instrument by dividing the number of intervals on which there was agreement by the number of agreements plus disagreements and multiplying the figure by 100 (Hersen & Barlow, 1976). The interobserver agreement (IOA) ranged from 85.7% to 100% (see Appendix D).

Visual comparisons of Table 1, Figure 1, and Table 2 indicated that differences existed in the behaviors of the physical education teacher toward the high-skilled students, average-skilled, and low-skilled students. The high-skilled students received more acceptance and praise and exhibited more initiated response, both teacher-suggested and student-suggested, than the low-skilled and the average-skilled students. The average-skilled and low-skilled students received more directions and criticism and exhibited more predictable behavior than did the high-skilled students. These comparisons were made on a day-to-day basis for the entire unit, using Figures 2-10.

Visual comparisons of Table 3 indicated that differences existed in the ALT-PE categories for the high-skilled, average-skilled, and low-skilled students. In the categories under Context Level, the differences were very slight. The major differences existed in the learner involvement level engaged and not-engaged activities. The low-skilled students were not-engaged 10.6% of the time, and the average-skilled students were not engaged 7.7% of the time more than the high-skilled students. The high-skilled students were involved in interim activities 10% more of the time than the low-skilled and average-skilled students. The low-skilled students spent 42.7% of the time waiting as compared to 39.9% for the average-skilled and 32.5% for the high-skilled students.

Visual comparison indicated that differences did exist for the average-skilled, low-skilled, and high-skilled students in engaged activities.

The high-skilled students were involved in engaged activities nearly 10.1% more of the time as compared to the low-skilled students and 7.8% more of the time than the average-skilled students. The high-skilled students were motor-appropriate 12.3% more of the time as compared to the low-skilled students.

Figures 10-19 give a comparison of the ALT-PE variables on a day-to-day basis for the entire unit. Visual comparisons of these results indicated a slight difference among the low-skilled, average-skilled, and high-skilled students for an entire unit. The differences were not as pronounced on a day-to-day-basis.

Chapter 5

DISCUSSION OF RESULTS

The present study is the first to use the Dyadic Adaptation of CAFIAS (DAC) to examine the interaction behavior patterns of a physical education teacher with low-skilled, average-skilled, and high-skilled students on a day-to-day basis for an entire unit. DAC has been used in similar studies (Martinek & Johnson, 1979; Reisenweaver, 1980; Streeter, 1980) to compare the interaction patterns of physical education teachers with high-skilled and low-skilled students. Similar studies have also been done in the field of coaching. Hoffman (1981) used DAC to examine the interaction patterns of two collegiate lacrosse coaches, one male and one female, with low-skilled and high-skilled athletes. Boyes (1981) used DAC to examine the interaction patterns of collegiate football coaches with starting and non-starting athletes.

This study also used the revised Academic Learning Time in Physical Education instrument (ALT-PE) (Siedentop, Tousignant, & Parker, 1982) to identify how low-skilled, average-skilled, and high-skilled students spent their time in class on a day-to-day basis for an entire unit. A similar study was conducted by Shute, Dodds, Placek, Silverman, and Rife (1982) using the initial ALT-PE (Siedentop, Birdwell, & Metzler, 1979) to describe an elementary physical education class and to compare the ALT-PE of high-, medium-, and low-skilled students.

Visual analysis of the DAC results for the entire unit indicated that differences did exist in the behaviors of the physical education teacher with the low-skilled, average-skilled, and high-skilled students.

During the physical education classes, the teacher gave more information, praise, and acceptance to high-skilled students than to the average-skilled and low-skilled students. The teacher tended to give more direction and criticism to and receive more predictable responses from the average-skilled and low-skilled students. The most frequent interaction pattern for all three groups of students was teacher directions followed by predictable student response. The majority of class time, however, was spent giving feedback to the students during an activity or game. It is important to note that with the average-skilled and low-skilled students, feedback in the form of criticism was one of the top 10 interaction patterns (9-7).

On a day-to-day comparison only slight differences in interactions occurred among the low-skilled, average-skilled, and high-skilled students. The high-skilled students received more praise, acceptance, and information day-to-day than did the average-skilled and low-skilled students. These differences in behaviors were more pronounced in the beginning of the unit when the teacher spent more time instructing than toward the end of the unit when the teacher was providing feedback. At the beginning the teacher gave more information to describe the skills and background necessary to learn the activity; once learned, feedback was given to improve. The average-skilled and low-skilled students received more directions followed by teacher criticism as the unit progressed day-to-day.

The results of this study indicated that differences existed in the behaviors and interactions of the physical education teacher with high-skilled, average-skilled, and low-skilled students. These results were similar to the results obtained by Martinek and Johnson (1979), Reisenweaver (1980), and Streeter (1980) in physical education and by Brophy and Good

(1970), Cornbleth, Davis, and Button (1972), Good, Sikes, and Brophy (1972), and Jeter and Davis (1972) in education.

Using DAC, Martinek and Johnson (1979), Reisenweaver (1980), and Streeter (1980) all concluded that physical education teachers gave more praise and acceptance of ideas and actions to the high-skilled students than to the low-skilled students, which agrees with the results found in the present study. Crowe (1979) in a study using the Brophy-Good system, also concluded that junior high physical education teachers gave more praise and acceptance of ideas and actions to high achievers than to low achievers. These results were also congruent to the results of studies conducted in education (Brophy & Good, 1970; Cornbleth et al., 1972; Good et al., 1972; Jeter & Davis, 1972).

Studies by Crowe (1979), Martinek and Johnson (1979), Reisenweaver (1980), and Streeter (1980) concluded that physical education teachers had a tendency to ask more questions of the high-skilled students than of the low-skilled students. In this study, the teacher asked significantly more questions of the high-skilled students (15.9%) than of the average-skilled students (6.0%) and the low-skilled students (5.5%).

The amount of information given to the high-skilled students by the physical education teacher is similar to the results reported by Reisenweaver (1980) and Streeter (1980), who concluded that high-skilled students received more information from their teachers than did low-skilled students.

The physical education teacher in this study was found to give more directions to the low-skilled and average-skilled students than to high-skilled students. These results concur with those of Reisenweaver (1980) and Streeter (1980). It appears possible that teachers may believe low-

skilled and average-skilled students need more guidance or need to be told what to do more than the high-skilled students.

The use of criticism by the teacher in this study is similar to the findings by Reisenweaver (1980) and Streeter (1980), who found that teachers gave significantly more criticism to the low-skilled students than the high-skilled students. These low-skilled students were characterized by the highest percentage of student-initiated behaviors, which in most cases were off-task behaviors, followed by teacher criticism (9-7).

The high-skilled students in this study were characterized by more interpretive behaviors, whereas average-skilled and low-skilled students were found to be more predictable in their responses. These results were also found by Reisenweaver (1980) and Streeter (1980). The predictable behavior of the average-skilled and low-skilled students may be related to the increased amount of directions given to these students by the teacher. The greater amount of interpretive behavior of the high-skilled students may be related to the greater amounts of praise, acceptance of ideas, and use of questions exhibited by the teacher toward these students.

The interaction patterns and teaching behaviors of the teacher over the entire unit, 12 classes, changed slightly on a day-to-day basis. These results were similar to the results obtained by Lombardo (1979). Although the current investigation is different in its concept some comparisons can be made. Lombardo (1979) used CAFIAS to study the teaching behaviors and interaction patterns of four elementary physical education teachers over 20 teaching days. Lombardo (1979) concluded that teaching behaviors changed slightly over 20 teaching days. The current investigation used DAC, which looks at the teacher only as he/she

interacts with a specific student or students. The results were similar in that the teaching behaviors of the teacher in the current investigation changed slightly over the 12 teaching days.

This study is the first to use the revised Academic Learning Time in Physical Education (ALT-PE) (Siedentop et al., 1982) to compare the academic learning time in physical education of high-skilled, average-skilled, and low-skilled elementary students on a day-to-day basis for an entire unit. A similar study by Shute et al. (1982) used the original ALT-PE system (Siedentop et al., 1979) to compare the ALT-PE of high-, medium-, and low-skilled students in elementary movement classes.

Visual comparisons of Table 5 indicated differences existed among the high-skilled, average-skilled, and low-skilled students. There were minimal differences among the three groups at the context level. The two distinct differences found were that the high-skilled students received more information about the technique of the activity and participated more in game play than the low-skilled and average-skilled students. The lack of differences at the context level was to be expected. The context level measures and describes the activity of the whole class, and all three groups of students were members of that class. Essentially there should be very little difference among the high-skilled, average-skilled, and low-skilled students at the context level.

The most significant difference among the high-skilled, average-skilled, and low-skilled students occurred at the learner involvement level. The low-skilled and average-skilled students were not engaged for a greater percentage of the time than the high-skilled students. Students in all groups spent considerable time waiting since this was a gymnastics unit

characterized by students' time spent waiting in lines to participate on apparatus. The instructor could have used better class management to decrease the waiting time of students by using other students to spot or more mats to practice tumbling while waiting for a turn at a particular station.

Differences among the three groups were found in the amount of time devoted to interim activities and the amount of time spent in off-task activities. The high-skilled students were involved in interim activities 11.2% of the time compared to 1% of the time for the average-skilled and .8% of the time for the low-skilled students. One possible reason the high-skilled students spent more time in interim is that they more easily completed their assigned task and were able to move on to the next station sooner and also able to move to more stations. The low-skilled students were off-task 7.2% of the time as compared to 6.8% of the time for the average-skilled, and only 2.5% of the time for the high-skilled students. This could possibly be related to the amount of not-engaged activity taking place because of class structure; the high-skilled students spent less time in off-task activities by moving to shorter lines or by helping other students in class.

Analysis of the data indicated differences among the high-skilled, average-skilled, and low-skilled students in their involvement during the unit. The high-skilled students were motor engaged 7.8% more than the average-skilled students, and the high-skilled percentage was 10.7% more than the low-skilled students'. The high-skilled students spent 27.6% of the time in motor appropriate activities as compared to 20.2% of the time for the average-skilled and 15.3% for the low-skilled students. Motor engagement could have been increased by the teacher by structuring the

learning environment better, such as making use of task cards or using more stations with student assistance (spotting).

Most of the investigations completed up to this point have utilized the original ALT-PE system (Siedentop et al., 1979) (see Appendix G). The current research project used the revised ALT-PE system (Siedentop et al., 1982) which uses a group-focused context decision and an individually focused learner decision format. Subject knowledge and subject matter motor in the revised system contain categories that are almost the same as the PE content level in the original system. Sub-categories in the general content category are similar in both systems with the only exception being that the category of warm-up in the revised system replaced waiting in the original system. Motor engaged in the revised system is similar to engaged responding in the original system. The amount of ALT-PE in the original system is calculated by motor activity at three levels: an easy, medium, and hard level; whereas ALT-PE in the revised system is equivalent to the percentage of time in the category of motor appropriate activity. Many of the other categories are very similar for both systems.

Although the current investigation is different in its concept some comparisons can be made with the studies done by Metzler (1979) and Shute et al. (1982). The general content figures of 32.4% for the low-skilled, 31.6% for the average-skilled, and 32.2% for the high-skilled students were slightly higher than the 26% reported by Metzler (1979) and higher than observed by Shute et al. (1982) in movement education classes.

The PE content percentages recorded by Shute et al. (1982) can be compared to the combined percentages subject matter motor category and the subject knowledge category of this study. The 67.5% for low-skilled, 68.2% for average-skilled, and 67.6% for the high-skilled students was

lower than the 78% recorded for low-skilled students and 80% recorded for the high-skilled students reported by Shute et al. (1982) in movement education classes. This might be attributed to the nature of the unit. This study involved a gymnastics unit in which most of the students' time would be involved in practicing stunts or waiting in lines for individual turns. The Shute et al. (1982) study was involved in movement education classes with more time and opportunity for game play and for individualized activity.

④ A significant comparison can be made between this study and Metzler (1979) and Shute et al. (1982) in the area of subject matter motor. Metzler (1979) reported that scrimmage was practically nonexistent, while skill practice and game conditions comprised 56% of the total PE context (subject motor) recorded. Shute et al. (1982) reported similar data with 45% of the class time spent in practice and scrimmage. In this study skill practice and game play percentages were considerably higher when compared to the previous studies. The high-skilled were involved 62.2%, average-skilled 63.5%, and the low-skilled students 62.8% of the time.

The results obtained from the learner involvement level in this study are in direct contrast to those obtained in Metzler (1979) and Shute et al. (1982). These studies concluded that physical education classes had a relatively equal amount of engaged and not-engaged time. In this study the students had a not-engaged percentage considerably higher than their engaged percentage. The low-skilled were not engaged 76.8% of the time, the average-skilled 73.9%, and the high-skilled students 66.1%. Essentially, this indicates that the students spent more time inactive as opposed to actively participating.

Since the physical education setting was poorly structured by the teacher, the high-skilled students tended to move to the front of the lines and the low-skilled and average-skilled students moved to the back of the lines. This led the low-skilled (7.2%) and the average-skilled students (6.8%) to have a higher percentage of off-task than the high-skilled students (2.5%). The percentage of off-task behaviors in this study is relatively low compared to the amount of off-task behaviors found by Metzler (1979) and Shute et al. (1982). The amount of time the students spent waiting can be compared to previous studies. Metzler (1979) found that the waiting percentage was 27.5% and Shute et al. (1982) found a waiting percentage of 24% as compared to the waiting percentage in this study of the low-skilled (42.7%), average-skilled (39.9%), and high-skilled students (32.5%). The results were considerably higher in this investigation, but this may be due to the way the subject was taught and the way the class was structured by the teacher. This unit was poorly organized by the teacher and resulted in a considerable amount of inactivity.

The ALT-PE data in this study can be compared to the ALT-PE (M) data found in the Shute et al. (1982) study. Shute et al. (1982) reported the ALT-PE (M) data for high-skilled students to be 16%, for medium-skilled students 11%, and for low-skilled students 13%. In this study the ALT-PE is reflected in the motor appropriate category. The high-skilled students were motor appropriate 27.6% of the time, average-skilled 20.2%, and the low-skilled 15.3%. The differences may possibly be due to the different subject matter being taught. This also led to the students being more inactive a considerable amount of the time and resulted in the low-skilled (6.6%), and the average-skilled (4.2%), and the high-skilled (3.0%) students being more motor inappropriate.

The ALT-PE data also revealed small differences among the high-skilled, average-skilled, and low-skilled students on a day-to-day basis for an entire unit of instruction. The ALT engaged ratio (see Figure 17) reflects the appropriateness of the instructional design. Initially the ratio was high for all three groups, but it decreased as the unit progressed. This was due to the fact that the students were involved in not-engaged activities more as the unit proceeded.

Visual comparisons of the DAC data day-to-day (Figures 2-10) and the ALT-PE data day-to-day (Figures 11-19) permit the drawing of tentative relationships between the teacher's behaviors and student involvement throughout the unit. The high-skilled students received more praise, acceptance, and information than the low-skilled and average-skilled students. The high-skilled students accumulated slightly more ALT-PE than the average-skilled and the low-skilled students which possibly resulted in more praise and acceptance on a day-to-day basis. The low-skilled and average-skilled students received more criticism than the high-skilled students and were off-task and unsuccessful or inappropriately engaged more often than the high-skilled students on a day-to-day basis.

Further relationships between the ALT-PE data and the DAC data can be made using the combined DAC (Figure 1) and the combined ALT-PE percentages for the unit (Table 5). The high-skilled students received more praise, acceptance, and information than the average-skilled and low-skilled students. As seen in Table 5, the high-skilled students were on-task 23.0% of the time as compared to 19.5% for the average-skilled and 19.3% for the low-skilled students; this indicates that they performed the managerial, transitional tasks, and warm-up activities in the prescribed manner, as directed by the teacher. The high-skilled students were motor

appropriate 27.6% of the time as compared to 20.2% for the average-skilled and 15.3% for the low-skilled. The greater success experienced in performing motor activities by the high-skilled students likely resulted in them receiving more praise from the teacher.

The low-skilled and average-skilled students received more criticism and directions than the high-skilled students (Figure 1). The low-skilled and average-skilled students were off-task 7.2% of the time as compared to the average-skilled 6.8%, and the high-skilled 2.5% (Table 3). Also contributing to teacher criticism could be the fact that the low-skilled (6.6%) and the average-skilled (4.2%) had a higher percent of inappropriate motor activity than the high-skilled students (3.0%).

These data seemed to suggest possible relationships between the DAC and ALT-PE instruments. The high-skilled students received more praise, acceptance, and information, and they had a higher percentage of being on-task and motor appropriate than the low-skilled and average-skilled students. The low-skilled and average-skilled students received more criticism and directions, had predictable responses, and were off-task and motor-inappropriate more than the high-skilled students. The high-skilled students received praise for doing what they were supposed to be doing, and the low-skilled and average-skilled received more criticism for not doing what they were instructed to do.

Summary

This study was the first to use DAC and ALT-PE (Siedentop et al., 1982) in investigating the interaction behavior patterns of a physical education teacher with low-skilled, average-skilled, and high-skilled students for an entire unit. Visual analysis of the data revealed that differences existed in the behaviors of the physical education teacher toward low-

skilled, average-skilled, and high-skilled students.

Visual interpretation of the DAC data led to the rejection of the null hypothesis that no differences would exist in the teaching interaction patterns of the physical education teacher toward low-skilled, average-skilled, and high-skilled students. The teacher exhibited more praise and more acceptance of ideas and gave more information to the high-skilled students than to the average-skilled and low-skilled students. The low-skilled and average-skilled students received more criticism and directions than the high-skilled students. The high-skilled students were characterized by interpretive behavior, whereas the low-skilled and average-skilled students were more predictable in their responses. The results of this study are similar to those found by Martinek and Johnson (1979), Reisenweaver (1980), and Streeter (1980).

Visual analysis of the ALT-PE data led to the rejection of the null hypothesis that stated there would be no significant differences in the ALT-PE of the high-skilled, average-skilled, and low-skilled students. Visual interpretation revealed the ALT-PE ranged from 27.9% for the high-skilled student, and 15.3% for the low-skilled students. The high-skilled students' ALT-PE was significantly higher day-to-day than the average-skilled and low-skilled students'. Noticeable differences were found in the engaged motor and not-engaged motor activities. The not-engaged, waiting; not-engaged, off-task; and engaged motor-inappropriate percentages were higher for the low-skilled students and average-skilled students, while the not-engaged, on-task and engaged, motor appropriate favored the high-skilled student. The low-skilled and average-skilled waited longer in lines, which led to off-task behaviors more than the high-skilled students. The high-skilled students were involved with less

waiting, more skill practice, and greater movement among pieces of apparatus than the low-skilled students and average-skilled students.

The findings of this investigation differed to varying degrees from the results of Academic Learning Time in Physical Education studies conducted by Metzler (1979) and Shute et al. (1982). These studies used the early version of the ALT-PE instrument (Siedentop et al., 1979) while this investigation used the revised ALT-PE instrument (Siedentop et al., 1982). Comparisons can be made but they must be made carefully.

Visual comparisons of the DAC and ALT-PE data revealed some relationships between the two systems for the high-skilled, average-skilled, and low-skilled students. The high-skilled students received more praise and more acceptance, and were motor appropriate and on-task a higher percentage of the time than the low-skilled students and the average-skilled students. The low-skilled students and average-skilled students received more criticism and directions, and were motor-inappropriate and off-task more than the high-skilled students. Simply stated, the high-skilled students were involved in activities they were supposed to be involved with and received praise and acceptance from the teacher. The low-skilled and average-skilled students were involved in activities that were not appropriate for the classroom and received criticism and more directions from the teacher.

Chapter 6

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS FOR FURTHER STUDY

Summary

This investigation was conducted to compare the teaching interaction patterns of a male elementary physical education teacher with high-skilled, average-skilled, and low-skilled students and the amount of ALT-PE accrued by these students on a day-to-day basis for an entire unit of instruction. The subject was a male physical education teacher at the elementary level from the Albany, New York area. The teacher ranked his students according to skill level in the activity of this particular unit. The top 33% were identified as high-skilled, the middle 33% were identified as average-skilled, and the lowest 33% were identified as low-skilled students. Two students from each skill grouping were randomly selected for observation. The teacher was videotaped for an entire unit, 12 classes, during the 1981-1982 school year.

Data were obtained from the 12 videotapes for the teacher and analyzed with the Dyadic Adaptation of CAFIAS (DAC) to assess teacher-student interactions, and the Academic Learning Time in Physical Education (ALT-PE) instrument to describe student involvement. The data collected from the coding of DAC were transferred onto computer cards for computer analysis. The data were compiled into percentages for the 20 variables identified by DAC and compared visually. The data collected for ALT-PE were computed manually, and the data compiled into percentages for the ALT-PE parameters, which were also compared by visual analysis.

Visual comparisons of the teachers' interactions with low-skilled, average-skilled, and high-skilled students indicated differences did exist. The teacher gave more praise, acceptance, and information to the high-skilled students. More interpretive behavior was exhibited by the high-skilled students than by low-skilled and average-skilled students. The average-skilled and low-skilled students received more criticism and more directions, which resulted in more predictable student responses, than did the high-skilled students. The teacher spent a majority of time in the unit providing feedback for the students as they progressed day-to-day.

Examination of the DAC data resulted in the finding that there were significant differences in the interaction patterns of the teacher as he interacted with high-skilled, average-skilled, and low-skilled students. Visual comparisons of the data found in this study resulted in the rejection of the null hypothesis which stated there would be no significant difference in the interaction patterns of the elementary physical education teacher with high-skilled, average-skilled, and low-skilled students.

Examination of the ALT-PE data resulted in the finding that significant differences in accumulated ALT-PE existed among the low-skilled, average-skilled, and high-skilled students. The high-skilled students spent a greater amount of time involved in on-task and interim activities; they also accrued more ALT-PE. The low-skilled and average-skilled students had a greater percentage of waiting and off-task activities and more motor inappropriate activity. All three groups of students had a high percentage of inactivity due, in part, to the poor organization of the class by the teacher. The students spent a considerable amount of time waiting in lines to participate in class activities. Visual comparisons of the data found in this study resulted in the rejection

of the null hypothesis which stated there would be no significant difference in the ALT-PE of low-skilled, average-skilled, and high-skilled students.

The DAC data and the ALT-PE data, when viewed, suggest a tentative relationship between teacher behavior and student involvement during classes. The high-skilled students received more praise, acceptance, and information; this may be due to the fact they had a higher percentage of being on-task and motor appropriate more than the low-skilled and average-skilled students. The low-skilled and average-skilled students received more criticism and directions and had predictable responses; this may be due to the fact that they were off-task and motor-inappropriate more than the high-skilled students.

Conclusions

The results of this study led to the following conclusions regarding the interaction behavior patterns of a male physical education teacher in his interactions with low-skilled, average-skilled, and high-skilled students and the accumulated ALT-PE of low-skilled, average-skilled, and high-skilled students on a day-to-day basis for an entire unit of instruction.

1. The interaction patterns of the physical education teacher were not the same with high-skilled, average-skilled, and low-skilled students.
2. The physical education teacher gave more praise and more acceptance of ideas to high-skilled students than to average-skilled and low-skilled students.
3. The physical education teacher received more interpretive responses from the high-skilled students than from the low-skilled and average-skilled students.

4. The physical education teacher received more predictable responses from the average-skilled and low-skilled students than from the high-skilled students.

5. The physical education teacher gave more information to the high-skilled students than to the average-skilled and low-skilled students.

6. The physical education teacher's interactions and behaviors with high-skilled, average-skilled, and low-skilled students changed slightly over the course of the unit.

7. There were no significant differences in the Context Level for the high-skilled, average-skilled, and low-skilled students.

8. The high-skilled students spent more time in motor engaged activities than the average-skilled and low-skilled students.

9. The high-skilled students were actively engaged in motor responses more than the average-skilled and low-skilled students.

10. The high-skilled, average-skilled, and low-skilled students spent a considerable amount of time inactively waiting to participate in an activity.

11. The amount of ALT-PE changed slightly on a day-to-day basis for the high-skilled, average-skilled, and low-skilled students.

Recommendations for Further Study

The following recommendations are suggested for further study:

1. A replication of this study could be undertaken using a larger number of teachers and students.

2. Conduct a similar study at the secondary level.

3. A similar study using low-skilled, average-skilled, and high-skilled athletes in an athletic setting could be undertaken.

4. A similar study comparing a male and a female physical education teacher could be instituted.

Appendix A
INFORMED CONSENT FORM
TEACHER'S COPY

The purpose of this study is to compare the teaching interaction patterns of a physical education teacher with high-skilled, average-skilled, and low-skilled students on a day-to-day basis for an entire unit of instruction and the academic learning time expressed by these students.

The subject is a male elementary physical education teacher from the Albany, New York area. The teacher will be videotaped for an entire unit, 12 classes, during the 1981-1982 school year. The teacher will be asked to wear a wireless microphone and will be filmed using a videotape machine. At no time will the teacher's normal actions be affected by the taping. Each tape will be coded using the Dyadic Adaptation of CAFIAS and the Academic Learning Time in Physical Education. At the end of the unit, the teacher will be asked to rank his students as high-skilled, average-skilled and low-skilled according to their ability for this particular unit.

It is assured that names in this study will be kept in the strictest confidence. Taping is solely for the purpose of this study and will only be available to the researcher, Dr. Victor H. Mancini, and the teacher involved. Data analysis on information gathered on your classes will be available for review upon request. Thank you.

Researcher: Michael A. Ryan

Yes, I agree to participate in this study.

No, I do not agree to participate in this study.

Signature

Date

Appendix B
INFORMED CONSENT FORM
PARENT'S COPY

The study in which your son/daughter is asked to participate is looking at the interaction behavior patterns of an elementary physical education teacher with his students for an entire unit of instruction. During class your son/daughter will be videotaped 12 times during the 1981-1982 school year. The taping will not interfere with his/her normal actions in class.

It is assured that names in this study will be kept strictly confidential. If you do not have any questions and are willing to let your son/daughter be a subject in this study, please sign your name below.

Thank you,
Michael A. Ryan

Student's Name

Parent's Signature

Date

Appendix C
 CODER'S RELIABILITY FOR SELECTED
 SUBJECTS USING SPEARMAN'S r_s
 Class 3^a

Top 10 Cells ^b	Rank Observation One ^c	Rank Observation Two	<u>d</u> ^d	<u>d</u> ²
6-8	1.0	1.0	.00	.00
8-3	2.0	2.0	.00	.00
5-9	3.5	3.0	.50	.25
8-6	3.5	4.0	.50	.25
8-5	5.5	6.0	-.50	.25
8-8	5.5	5.0	.50	.25
5-5	7.0	7.0	.00	.00
4-8	9.0	8.0	1.00	1.00
5-8	9.0	9.0	.00	.00
9-7	9.0	10.0	-1.00	1.00
Total				3.00

^a.9727.

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

^cRank observation one and rank observation two refer to the origin of coding.

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

Appendix C (continued)

Class 6^a

Top 10 Cells ^b	Rank Observation One ^c	Rank Observation Two	<u>d</u> ^d	<u>d</u> ²
8\6	1.0	1.0	.00	.00
6-8	2.0	2.0	.00	.00
6-8\	3.0	4.0	-1.00	1.00
5-5	4.0	3.0	1.00	1.00
8-6	5.0	5.0	.00	.00
8\2	6.0	6.5	-.50	.25
8\6	7.0	6.5	.50	.25
8\5	8.0	9.0	-1.00	1.00
8\8\	9.0	8.0	1.00	1.00
4-8	10.0	10.0	.00	.00
Total				4.50

^a.9727.

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

^cRank observation one and rank observation two refer to the origin of coding.

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

Appendix D
 INTEROBSERVER AGREEMENT
 Class 1

Categories	<u>Intervals Recorded</u>		Percent Agreement
	Observer 1	Observer 2	
<u>Context Level</u>			
General Content			
Transition	11	12	91.6
Management	0	0	--
Break	11	10	100.0
Warm-up	12	11	92.3
Subject Knowledge			
Technique	4	4	100.0
Strategy	0	0	--
Rules	0	0	--
Social Behavior	0	0	--
Break	0	0	--
Subject Motor			
Practice	37	38	97.3
Scrimmage	0	0	--
Game	0	0	--
Fitness	0	0	--
Off-camera (*)	6	6	100.0

Appendix D (continued)

Categories	<u>Intervals Recorded</u>		Percent Agreement
	Observer 1	Observer 2	
<u>Learner Involvement</u>			
Not Engaged			
Interim	1	1	100.0
On-task	19	19	100.0
Off-task	0	0	--
Waiting	15	16	93.7
Engaged			
Motor appropriate	28	29	96.6
Motor inappropriate	0	10	90.0
Motor supporting	0	0	--
Off-camera (*)	7	6	85.7

Note. Off-camera (*) denotes when subjects were not in view of observers recording.

Class 9

Categories	<u>Intervals Recorded</u>		Percent
	Observer 1	Observer 2	Agreement
<u>Context Level</u>			
General Content	12	13	92.3
Transition	12	13	92.3
Management	0	0	--
Break	0	0	--
Warm-up	12	13	92.3
Subject Knowledge			
Technique	12	11	91.6
Strategy	0	0	--
Rules	0	0	--
Social Behavior	0	0	--
Break	0	0	--
Subject Motor			
Practice	41	40	97.6
Scrimmage	0	0	--
Game	0	0	--
Fitness	0	0	--

Appendix D (continued)

Categories	<u>Intervals Recorded</u>		Percent Agreement
	Observer 1	Observer 2	
<u>Learner Involvement</u>			
Not Engaged			
Interim	7	6	85.7
On-task	9	10	90.0
Off-task	9	8	88.8
Waiting	10	11	90.0
Engaged			
Motor appropriate	27	28	96.4
Motor inappropriate	15	14	93.3
Motor supporting	0	0	--

Appendix E

THE CATEGORIES OF CAFIAS¹

Categories 2-17 Teacher Behaviors

Categories 8-19 Student Behaviors

Category 10 Confusion

Category 20 Silence

Categories	Verbal	Relevant Behaviors	Nonverbal
	2		12
2-12	Praises, jokes, commands, encourages	Face: Posture:	Smiles, nods with smile (energetic) winks, laughs Claps hands, pats on shoulder, places hand on head of student, wrings student's hand, embraces joyfully, laughs to encourage, spots in gymnastics, helps child over obstacles
	3		13
3-13	Accepts, clarifies, uses, and develops suggestion and feelings by the learner	Face: Posture:	Nods without smiling, tilts head in empathetic reflection, sighs empathetically Shakes hands, embraces sympathetically, places hand on shoulder, puts arm around shoulder or waist, catches implement thrown by student, accepts facilities

Appendix E (continued)

Categories	Verbal	Relevant Behaviors	Nonverbal
	4		14
4-14	Asks questions requiring student answer	Face: Posture:	Wrinkles brow, opens mouth, turns head with quizzical look Places hands in air, waves fingers to and fro anticipating answer, stares awaiting answer, scratches head, cups hand to ear, stands still half turned towards person, awaits answer
	5		15
5-15	Gives facts, opinions, expresses ideas, or asks rhetorical questions	Face: Posture:	Whispers words inaudibly, sings, or whistles Gesticulates, draws, writes, demonstrates activities, points
	6		16
6-16	Gives directions or orders	Face: Posture:	Points with head, beckons with head, yells at Points finger, blows whistle, holds body erect while barking commands, pushes child through a movement, pushes a child in a given direction

Appendix E (continued)

Categories	9	Verbal	9	Relevant Behaviors	9	Nonverbal
		7				17
7-17	3	Criticizes, expresses anger or distrust, sarcastic or extreme self-reference	3	Face:		Grimaces, growls, frowns, drops head, throws head back in derisive laughter, rolls eyes, bites, spits, butts with head, shakes head
				Posture:		Hits, pushes away, pinches, grapples with, pushes hand at student, drops hand in disgust, bangs table, damages equipment, throws things down
		8				18
8-18		Student response that is entirely predictable, such as obedience to orders, and responses not requiring thinking beyond the comprehension phase of knowledge (after Bloom)		Face:		Poker face response, nod, shake, gives small grunts, quick smile
				Posture:		Moves mechanically to questions or directions, responds to any action with minimal nervous activity, robot-like

Appendix E. (continued)

Categories	Verbal	Relevant Behaviors	Nonverbal
	Eine (8)		Eineteen (18)
Eine (8) & Eineteen (18)	Predictable student response requiring some measure of evaluation and synthesis from the student, but must remain within the province of predictability. The initial behavior was in response to teacher initiation	Face: Posture:	"What's more, Sir" look, eyes sparkling Adds movements to those given or expected, tries to show some arrangement requiring additional thinking, e.g., works on gymnastic routine, dribbles basketball, all game playing
	9		19
9-19	Pupil-initiated talk that is purely the result of their own initiative and that could not be predicted	Face: ⁶ Posture:	Interrupting sounds, gasps, sighs Puts hands up to ask questions, gets up and walks around without provocation, begins creative movement education, makes up own games, makes up own movements, shows initiative in supportive movement, introduces new movements into games not predictable in the rules of the games

Appendix E (continued)

Categories	Verbal	Relevant Behaviors	Nonverbal
	10		20
10-20	Stands for confusion, chaos, disorder, noise, much noise	Face:	Silence, children sitting doing nothing, noiselessly awaiting teacher just prior to teacher entry, etc.

¹Cited from Cheffers, Amidon, and Rodgers (1974, pp. 15-17).

Appendix F

THE REVISED CATEGORIES OF ALT-PE¹

Context Level

The first level of decision making focuses on the class as a whole (or a subset of the class) and is designed to describe the context within which student behavior is occurring. There are three major subdivisions at the context level--general content, subject matter knowledge content, and subject matter motor content.

General Content

refers to class time when students are not intended to be involved in physical education activities.

SM Knowledge Content

refers to class time when the primary focus is on knowledge related to physical education content.

SM Motor Content

refers to class time when the primary focus is on motor involvement in physical education activities.

Each of the three main subdivisions at the context level has categories which describe more specifically the nature of the setting within which individual student behavior is occurring. These categories are defined as follows.

General Content Categories

Transition (T)

Time devoted to managerial and organizational activities related to instruction such as team selection, changing equipment, moving from one space to another, changing stations, teacher explanation of an organizational arrangement, and changing activities within a lesson.

Management (M)

Time devoted to class business that is unrelated to instructional activity such as taking attendance, discussing a field trip, lecturing about appropriate behavior in the gymnasium, or collecting money for the yearbook.

Appendix F (continued)

Break (B)	Time devoted to rest and/or discussion of nonsubject matter related issues such as getting a drink of water, talking about last night's ball game, telling jokes, celebrating the birthday of a class member, or discussing the results of a student election.
Warm Up (WU)	Time devoted to routine execution of physical activities whose purpose is to prepare the individual for engaging in further activity, but not designed to alter the state of the individual on a long term basis, such as a period of light exercises to begin a class, stretching exercises prior to a lesson, or a cooling down activity to terminate a lesson.
<u>Subject Matter Knowledge Categories</u>	
Technique (TN)	Time devoted to transmitting information concerning the physical form (topography) of a motor skill such as listening to a lecture, watching a demonstration, or watching a film.
Strategy (ST)	Time devoted to transmitting information concerning plans of action for performing either individually or as a group such as explanation of a zone defense, demonstration of an individual move, or discussion of how best to move the ball down a field.
Rules (R)	Time devoted to transmitting information about regulations which govern activity related to the subject matter such as explanation of the rules of a game, demonstration of a specific rule violation, or viewing a film depicting the rules of volleyball (time devoted to transmitting information about rules governing general student behavior in physical education are coded management).

Appendix F (continued)

Social Behavior (SB)

Time devoted to transmitting information about appropriate and inappropriate ways of behaving within the context of the activity such as explanation of what constitutes sportsmanship in soccer, discussion of the ethics of reporting one's own violations in a game, or explanations of proper ways to respond to officials in a game.

Background (BK)

Time devoted to transmitting information about a subject matter activity such as its history, traditions, rituals, heroes, heroines, records, importance in later life, or relationship to fitness.

Subject Matter Motor Categories

Skill Practice (P)

Time devoted to practice of skills or chains of skills outside the applied context with the primary goal of skill development, such as a circle drill in passing a volleyball, one against one practice of dribbling a basketball, exploration of movement forms, practicing the Schottische step, or practicing a particular skill on a balance beam.

Scrimmage/routine (S)

Time devoted to refinement and extension of skills in an applied setting (in a setting which is like or simulates the setting in which the skill is actually used) and during which there is frequent instruction and feedback for the participants--such as a half court five on five basketball activity, the practice of a complete free exercise routine, six against six volleyball (all with instructions, suggestions, and feedback during the scrimmage).

Game (G)

Time devoted to the application of skills in a game or competitive setting when the participants perform without intervention from the instructor/coach--such as a volleyball game, a complete balance beam routine, the performance of a folk dance, or running a half-mile race.

Appendix F (continued)

Fitness (F) Time devoted to activities whose major purpose is to alter the physical state of the individual in terms of strength, cardiovascular endurance, or flexibility such as aerobic dance, distance running, weight lifting, or agility training (the activities should be of sufficient intensity, frequency, and duration so as to alter the state of the individual).

Learner Involvement Level

The second level of decision making focuses on the individual learner(s) and is designed to describe the nature of the learner(s) involvement in a more specific way. There are two major subdivisions at the learner involvement level--not-motor-engaged and motor-engaged.

Not Motor Engaged

refers to all involvement other than motor involvement with subject-matter-oriented motor activities.

Motor Engaged

refers to motor involvement with subject-matter-oriented motor activities.

Each of the two main subdivisions at the learner involvement level has categories which describe more specifically the nature of the learner's involvement. These categories are defined as follows.

Not Motor Engaged Categories

Interim (I) The student is engaged in a non-instructional aspect of an ongoing activity such as retrieving balls, fixing equipment, retrieving arrows, or changing sides of a court in a tennis match.

Waiting (W) Student has completed a task and is awaiting the next instructions or opportunity to respond such as waiting in line for a turn, having arrived at an assigned space waiting for the next teacher direction, standing on a sideline waiting to get in a game, or having organized into the appropriate formation waiting for an activity to begin.

Appendix F (continued)

Off-task (OF)	The student is either not engaged in an activity he/she should be engaged in or is engaged in activity other than the one he/she should be engaged in-- behavior disruptions, misbehavior, and general off-task behavior, such as talking when a teacher is explaining a skill, misusing equipment, fooling around, fighting, disrupting a drill through inappropriate behavior.
On-task (ON)	The student is appropriately engaged carrying out an assigned non-subject matter task (a management task, a transition task, a warm up task) such as moving into squads, helping to place equipment, counting off, doing warm up exercises, or moving from the gym to a playing field.
Cognitive (C)	The student is appropriately involved in a cognitive task such as listening to a teacher describe a game, listening to verbal instructions about how to organize, watching a demonstration, participating in a discussion, or watching a film.
<u>Motor Engaged Categories</u>	
Motor appropriate (MA)	The student is engaged in a subject matter motor activity in such a way as to produce a high degree of success.
Motor inappropriate (MI)	The student is engaged in a subject-matter-oriented motor activity but the activity-task is either too difficult for the individual's capabilities or the task is so easy that practicing it could not contribute to lesson goals.
Supporting (MS)	The student is engaged in subject matter motor activity the purpose of which is to assist others learn or perform the activity such as spotting in gymnastics, feeding balls to a hitter in a tennis lesson, throwing a volleyball to a partner who is practicing set up passing, or clapping a rhythm for a group of students who are practicing a movement pattern.

¹Cited from Siedentop, Tousignant, and Parker (1982, p. 11-15).

Appendix G

THE ORIGINAL CATEGORIES OF ALT-PE¹

Setting level--describes the general instruction strategy of the observed movement.

Direct Instruction (D). Teacher controls focus and pacing of the instruction.

Task Instruction (T). Instruction defined by task--multiple station and/or multiple task.

Reciprocal (R). Students in identifiable pairs for instruction and feedback.

Group (G). Same function as reciprocal with large group.

Guided Discovery (GD). Teacher leads students toward predetermined goal through series of sequenced prompts.

Problem Solving (P). Teacher controls instruction through sequenced problems in which alternative solutions are possible.

Content-General--describes the focus of the instructional content of the observed movement.

Wait (W). Periods of no activity and no movement prior to and between activities.

Transition (T). Periods of change from one activity to another, including lining up or quieting down for the next activity.

Management (M). Time devoted to practice business which is unrelated to the instructional activities of the day.

Break (B). Intentional periods of no activity to rest students, drink water, etc. Breaks must be initiated by the coach.

Appendix G (continued)

Content-General (continued)

Non-academic Instruction (N). Activities which fall outside the domain of focused instruction, such as rapport-building activities.

Content-Physical Education

Skill Practice (P). Participation in drills and other instructional activities in which the primary goal is individual skill development.

Scrimmage (S). Controlled group practice in which instruction and feedback are frequent. It includes the simulation and/or modification of game playing to focus upon a specific instructional point.

Game (G). Practice under game conditions.

Fitness (F). Repetitive activities for fitness development. Includes warm-up and cool-down activities, such as stretching.

Other Motor Activity (O). Motor activity unrelated to specific goals of the day's instruction is other motor activity.

Knowledge Focus (K). Activities which have knowledge about skill, background information, etc., as the focus.

Social Behavior (B). Activities in which social behavior, attitudes, etc., are the focus.

Learner Moves Level--describes student behavior when Content-PE has been coded on the second (Content) level of an interval.

Engaged Motor Responding (M). Student is performing a skill.

Engaged, Indirect Participation (I). Student is in an activity but not directly involved with the immediate action (includes assisting others in skill practice, such as spotting, setting up targets, retrieving balls, etc.).

Appendix G (continued)

Learner Moves Level (continued)

Engaged Cognitive (C). Cognitive involvement related to instruction, such as listening, questioning, verbal responding, or thinking about the activity.

Not Engaged, Interim (NI). Any non-instructional activity that is part of the P.E. activity. Changing sides of the net and times out between points is not engaged, interim.

Not Engaged, Waiting (NW). Time during activity when student is waiting for help or waiting to participate again. Being a substitute in a game is not engaged, waiting.

Not Engaged, Off-Task (NO). Student is inappropriately disengaged from the lesson.

Difficulty Level--describes the student level of success.

Easy (E). Few errors are made and student performs appropriately with little effort, experiencing success frequently.

Medium (M). Any performance that is other than easy or hard.

Hard (H). Many errors are made, and student appears to be unable to perform appropriately, experiencing success infrequently.

¹Cited from Siedentop, Birdwell, and Metzler (1979), pp. 10-12).

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