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ABSTRACT

This study investigated selected planning and teaching behaviors in 15 undergraduate physical education-teacher education majors over 8 weeks of clinical teaching experience, examining the effect of databased feedback intervention on their preactive and interactive behaviors. Each preservice teacher planned and taught two 30-minute lessons (in gymnastics and fundamental movements) twice weekly for 8 weeks to 1 randomly assigned learner 3-5 years of age. Each teacher was required to develop two instructional objectives for each lesson and procedures for realizing the objectives. Video-audiotapes of the lessons and corresponding lesson plans provided the data for analysis. Subjects received databased feedback (written and verbal information about their lesson plans and teaching behaviors) from university supervisors at four intervals. Results show that during the 8 weeks, their planning and teaching behaviors changed following objective feedback. Subjects could write complete lesson objectives consistently and incorporate task progressions and critical skill cues into their lesson plans quickly after receiving the databased feedback. They also provided specific feedback at higher rates, maintained higher levels of learner time-on-task, and decreased the ratio of general to specific feedback statements. A list of 56 references is included. (SM)

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Preservice Teachers' Planning and Teaching Behaviors in a Clinical Setting

Fundamental to the role of a teacher is the capacity to identify, plan and select quality instructional programs. The ability to predict outcomes prior to experience is closely associated with efficient planning. In an attempt to understand what makes some teachers more effective than others, researchers during the past two decades have studied numerous teacher-learner interactive behaviors in classroom and gymnasium settings. More recently, however, researchers have turned to studying teachers' preactive and interactive behaviors to gain a more complete understanding of teacher effectiveness. The results from several empirical studies suggest that what teachers do in the classroom and gymnasium is directed by what they think prior to entering the interactive environment (Housner & Griffey, 1985; Twardy & Yerg, 1987).

Clark and Peterson (1986) have conceptualized teaching to include both thought and action. They suggest that during the preactive phase of a lesson teachers are making decisions about what to teach and how to arrange the environment to facilitate student learning. During the interactive phase those decisions made before the lesson are acted upon, while during the postactive phase decisions are made about how well the lesson met the stated objectives, information which can be used to plan future lessons. Yinger (1979) suggests that "teacher planning is the major tool by which teachers manipulate the environment that later shape and control their own behavior" (p. 164).

Teachers' preactive behaviors and their relationship to subsequent interactive behaviors have been examined in two studies in physical education. Imwold et al. (1984), who compared the interactive teaching behaviors of preservice physical education teachers across two conditions, a no-planning condition and a planning condition, found that the teachers who did not plan spent more time being silent and less time giving directions in the gymnasium than the teachers who did plan. Twardy and Yerg (1987) found that planning content coverage was positively correlated to teacher demonstration, and planning activity structures, specifically those associated with pacing and learning activities, were positively related to giving directions. The results from these studies suggest that what physical education teachers do prior to teaching effects what they do while teaching.

A significant proportion of the teaching task consists of teachers making decisions and judgements about what their students have learned, should learn, and are learning, and what instructional activities are appropriate. An important issue confronting teacher educators is how to prepare teachers with the skills and competencies to conduct quality instructional lessons. Siedentop (1983) suggests that preservice teachers cannot be expected to maintain appropriate teaching and planning skills if they are not given the opportunity to practice those skills. Teacher education programs devote considerable time to the planning process without much data on the overall effectiveness of gains in planning skills. Graphs, verbal, and written feedback accompanying practice

opportunities has been shown to be successful in changing teaching and planning behaviors (Boehm, 1974; Hughley, 1973).

There is support for the employment of behavioral analysis techniques to evaluate and modify teacher-learner interactive behaviors in the physical education setting (Metzler, 1986; Siedentop, 1982). The results from a growing number of intervention studies, where data-based feedback were given to teachers, indicate that selected teacher and learner behaviors can be changed (Borys, 1986; Grant, Ballard, & Glynn, 1990; Randall & Imwold, 1989; Webster, 1987). However, the majority of this research has focused on interactive teacher behaviors, not preactive teacher behaviors, and has been conducted primarily with inservice or student teachers, not pre-student teachers. In addition, much of the research has focused on single lessons which suggests that there is a need for research across units of instruction (Tinning, 1987).

In this study selected planning and teaching behaviors of junior level physical education-teacher education majors were investigated over an eight week clinical teaching experience. The purpose of this study was to examine the effect of intervention, in the form of data-based feedback, on preservice teachers' preactive and interactive behaviors. Two questions were addressed: (1) Can preservice teachers achieve pre-identified criterion levels for selected planning and teaching behaviors in an eight week clinical teaching experience?; and (2) Can selected planning and teaching behaviors exhibited at the end of an eight week clinical teaching

experience be observed in preservice teachers' planning and teaching three months later?

Method

Subjects

The participants in this study were 15 undergraduate physical education-teacher education majors, all of whom were enrolled in their first formal university-based clinical teaching experience. During this experience, the preservice teachers planned and taught two 30-minute lessons, one in gymnastics and one in fundamental movements, twice a week for eight weeks to one randomly assigned learner between three and five years of age. A total of 32 lessons, 16 gymnastics and 16 fundamental movement, were planned and taught by each preservice teacher over the eight week teaching practicum.

Setting and Data Sources

The preservice teachers were required to develop a plan for each lesson taught. Two instructional objectives and activities and procedures for realizing these objectives were written for each lesson. All lessons were taught in the teaching gymnasium at the university. During each teaching session, the university students worked independently with their child for 30 minutes in gymnastics and 30 minutes in fundamental movements.

Data were obtained from two sources: video-audiotapes and lesson plans. The preservice teachers were video-audiotaped while teaching one gymnastics lesson and one fundamental movement

lesson during each of the first, third, fifth, and seventh weeks of the practicum. The video-audiotapes and corresponding written lesson plans were employed in the data analyses.

Treatment

The preservice teachers were provided with data-based feedback at four different times during the eight week teaching experience. These four interventions corresponded with the video-audiotaping of the preservice teachers' lessons in the first, third, fifth, and seventh weeks of the practicum. At each intervention, the preservice teachers received written and verbal information about their lesson plans and teaching behaviors from one of two trained university supervisors. Information about lesson plans focused on the preservice teachers' formulation of instructional objectives and development of activities for meeting the stated objectives. Information about teaching focused on the teachers' learner-directed feedback statements and learner motor-engaged behavior. After each intervention, the preservice teachers graphed their behaviors scores.

Behavior Maintenance

Twelve weeks after the completion of the eight week teaching experience, eight of the preservice teachers planned and taught two additional lessons, one in fundamental movements and one in gymnastics. Seven of the 15 subjects who participated in the intervention phase of the study could not take part in the follow-up session. Two of the seven teacher subjects were no longer attending university, while five of the learner subjects were unable to attend the follow-up session. The eight preservice teachers who

participated in the follow-up phase of the study taught the same child in the follow-up lessons as during the eight week experience. The follow-up phase of the study was conducted to determine whether the preservice teachers' planning and interactive behaviors observed at the end of the eight week experience were still observable after 12 weeks of no formal planning or teaching.

Instrumentation

Planning Variables.

Three data collection instruments were used in this study, one for coding selected components of lesson plans, a second for coding teacher verbal feedback statements, and a third for coding learner motor-engaged behavior. Three components of lesson plans were coded: (1) instructional objectives; (2) task progressions; and (3) critical skill cues. Instructional objectives were coded for the inclusion of task, condition(s), and standard(s). A three point scoring system was employed. Task progressions and critical skill cues were coded according to their presence/absence in the lesson plan. A task progression was defined as present when two or more sequenced drill activities were listed for the intent of leading the learner toward the achievement of any one instructional objective. Critical skill cues were defined as present when one or more cues specific to the lesson task was listed. The three components of lesson planning identified were selected for two reasons: (1) because the students' lesson plans focused on these three variables; and (2) because of the intuitive tie between these components of planning and the selected teacher and learner behaviors that were coded.

Following is an example of one preservice teacher's lesson plan. In this lesson plan, the instructional objective is complete, the task progression present, and critical skill cues present.

Objective: From a distance of 10 feet, Timmy will be able to overhand throw a tennis ball and hit a 24 inch square target, showing opposite-foot stepping action and trunk action, in at least half of his trials.

Task Progression: (1) Throw at larger target from five feet (with foot print appropriately placed on floor to cue stepping action). (2) Increase throwing distance and decrease target size as Tim shows consistency in trunk and stepping action. (3) Throw at 24 inch target from a distance of 10 feet.

Critical Skill Cues: (1) Opposite foot step; (2) Length of step; (3) Upper trunk rotation.

Teaching Variables.

The lesson video-audiotapes were coded for teacher feedback statements and learner motor-engaged behavior. The preservice teachers' feedback statements were coded using the event recording method. Feedback statements were categorized as either general or specific. A feedback statement was coded as general when the teacher provided the learner with positive, negative, or corrective information that did not identify the exact part of the behavior to which the teacher reacted. When the teacher provided the learner with positive, negative, or corrective information that did identify the exact part of the behavior to which the teacher reacted, it was coded as specific.

Learner motor-engaged behavior was coded using the ALT-PE observation system (Wilkinson & Taggart, 1984). There is considerable support of using motor-engaged behavior as a criterion variable for determining student learning (Dodds, Rife, & Metzler,

1982; Metzler, 1989; Paese, 1985; Phillips & Carlisle, 1983; Placek & Randall, 1986). Learners were coded as motor-engaged when they were involved with subject matter oriented motor activities related to the objectives of the lesson. A 5-second observe, 5-second record interval coding procedure was employed. Because of the uniqueness (one teacher to one learner) and focus (skill development) of the teaching experience, the researchers felt that teacher feedback statements and learner motor-engaged behavior were variables that would provide the best information about what was happening in the learning environments.

Data Analysis

Descriptive and inferential statistics were computed to interpret the raw data. The unit of analysis employed was the lesson. Frequencies were computed to describe the presence/absence of task progressions and critical skill cues, while an average mean was computed to describe the formulation of lesson plan objectives. For teacher feedback statements (general and specific), frequencies were summarized and then rates per minute calculated for each lesson. For learner motor-engaged time, raw score totals were summarized and then converted to percentages of observed intervals for each lesson. These conversions were necessary because the number of minutes observed varied across lessons. Data from the preservice teachers' second lesson and corresponding lesson plan (first week) were used to chart the preservice teachers' baseline behaviors.

To further interpret the questions addressed, one-way analyses of variance-repeated measures (baseline, interventions, and

maintenance) were used to analyze the four variables for which lesson means were compared (planning objectives, teacher general and specific feedback statements, and learner motor-engaged time). Chi square analyses were used to analyze the two variables for which proportions (frequencies) were compared (task progressions and critical skill cues). A .05 level of significance was employed in the analyses.

Interobserver agreement scores were calculated for 42 of the lesson plans and lessons. The scored interval technique was employed to compute interobserver reliability (Hawkins & Dotson, 1975). The overall mean percentage agreement obtained for the planning variables was 96.2% and for the interactive variables 85.6%.

Results

Descriptive Statistics

Planning Variables.

A description of the mean scores for the three components of planning are presented in Figures 1, 2, and 3. Baseline, intervention, and follow-up scores for the gymnastics (GYM) and fundamental movement (FM) lessons are presented separately in each figure. Similarities were revealed for baseline, intervention, and follow-up in both activity areas. Mean scores for all three components of planning increased substantially after the first intervention and plateaued thereafter. The baseline means for instructional objectives were 1.4 (GYM) and 1.8 (FM). Following the first intervention, the means increased to 2.4 (GYM) and 2.5 (FM). These

scores were maintained after the second (GYM 2.4; FM 2.5) and third (GYM 2.6; FM 2.4) interventions. The data indicate that the students initially produced lesson objectives that were missing at least one component (task, condition, or standard), but within two weeks were able to write near complete lesson objectives. The follow-up means show that the preservice teachers were still able to write near complete objectives 12 weeks after intervention (2.8) in GYM and FM.

Task progressions were employed in 20% of the GYM lessons and 7% of the FM lessons at baseline. These scores increased to 47% and 60%, respectively, after the first intervention, and remained at approximately this level after the second intervention (GYM 47%; FM 53%). An additional increase occurred after the third intervention (GYM 73%; FM 69%). The follow-up scores indicate that 12 weeks after intervention the students employed task progressions in 92% of their GYM lessons and in 75% of their FM lessons.

Critical skill cues were identified in 40% of the GYM lesson plans and 33% of the FM lesson plans at baseline. Following the first intervention, the scores increased to 73% in both activity areas and after the second to 87%. Little change was realized after the third intervention (GYM 80%; FM 85%). The follow-up data indicate that 12 weeks after the final intervention the students identified critical skill cues in 92% of all lesson plans.

Teaching Variables.

A description of the mean scores for the three interactive variables are presented in Figures 4, 5, and 6. The descriptive analysis of the interactive data revealed similarities for baseline, intervention, and follow-up in both activity areas. However, score

increases were realized for specific feedback statements and learner motor-engaged behavior, but not for general feedback statements.

The pattern that developed over time for specific feedback statements was very different than the one that developed for general feedback statements. At baseline, the preservice teachers' rate per minute of specific feedback was very low in both activity areas (GYM .17; FM .29). After the first intervention, the rate increased to .69 for GYM and 1.13 for FM, and after the second to 1.09 and 1.69, respectively. Following the third intervention, the rate per minute of specific feedback remained at approximately the same levels (1.12 and 1.45, respectively). The follow-up data indicate increases in GYM (1.9) and FM (1.56).

The mean percent scores for learner motor-engaged time were 25% for GYM and 42% for FM. After the first intervention, motor-engaged time increased to 42% and 55%, respectively. Mean increases were realized after the second (GYM 50%; FM 59%) and third (GYM 52%; FM 63%) interventions as well. The follow-up data show an increase in motor-engaged time for GYM (62%), but a decrease for FM (45%).

At baseline, the mean rates per minute for general feedback statements were 1.17 (GYM) and 2.34 (FM). In the GYM lessons, the rate of general feedback increased to 2.12 after the first intervention and then decreased to 1.9 and 1.64 after the second and third interventions, respectively. In the FM lessons, the rate of general feedback decreased slightly to 2.14 after the first

intervention, and then maintained itself thereafter (intervention two 2.12; intervention three: 2.2).

Inferential Statistics

Intervention Phase.

One way ANOVAs-repeated measures (baseline and interventions) were computed for the variables of planning objectives, teacher feedback statements, and learner motor-engaged behavior. Significant findings were revealed for instructional objectives in the GYM lessons, $F(3,45)=3.93$, $p<.01$, and in the FM lessons, $F(3,45)=18.5$, $p<.01$. In FM, post-hoc analyses (Scheffe F-test) showed differences between baseline and all interventions. In GYM, differences were revealed between baseline and the third intervention.

For specific feedback statements, significant differences were revealed in both GYM, $F(3,45)=11.97$, $p<.01$, and FM, $F(3,45)=5.52$, $p<.01$. Post hoc analyses indicated differences between baseline and all interventions in both areas. For general feedback statements, significant differences were revealed for GYM, $F(3,45)=9.20$, $p<.01$, but not for FM. Post hoc analyses indicated differences between baseline and the first and second interventions.

Significant differences were also found for learner motor-engaged behavior in GYM, $F(3,45)=14.48$, $p<.01$, and FM, $F(3,45)=12.11$, $p<.01$. Post-hoc analyses showed differences between baseline and all interventions for GYM and FM lessons.

Chi square analyses were performed on the data frequency counts for the two dichotomously scored planning variables, task progressions and critical skill cues, across the four data collection

points in order to detect significant change in the presence or absence of these components of planning. The results of these analyses revealed significant changes. The preservice teachers employed task progressions in GYM (chi square=13.23, df=4, $p < .05$) and FM (chi square=11.03, df=4, $p < .05$) more frequently following intervention. Similar findings were found for critical skill cues in GYM (chi square=11.26, df=4, $p < .05$) and FM (chi square=11.70, df=4, $p < .05$).

Follow-up Phase.

The follow-up phase of the study was conducted to determine if changes occurred in the preservice teachers' planning and teaching behaviors 12 weeks after the completion of the intervention phase. Several significant changes were revealed. The follow-up data showed that subjects were writing more complete planning objectives in FM, $F(1,7)=11.52$, $p < .05$, and providing learners with general feedback statements more frequently in GYM, $F(1,7)=29.41$, $p < .01$, and FM, $F(1,7)=109.1$, $p < .01$, and specific feedback statements in GYM, $F(1,7)=8.06$, $p < .02$. In addition, the results revealed that learner motor-engaged behavior decreased in FM lessons, $F(1,7)=12.34$, $p < .01$. No other significant differences were found. Overall, the follow-up analyses indicate that specific planning and teaching behaviors can be maintained over time, even with an absence of practice.

Discussion

This study shows that during an eight week clinical experience, preservice teachers' planning and teaching behaviors can be changed

when objective feedback is provided by university supervisors. The results indicate that preservice teachers can write complete lesson objectives consistently, and can incorporate task progressions and critical skill cues in their lesson plans very quickly after having received data-based feedback from a university supervisor. The results also indicate that preservice teachers can provide specific feedback at higher rates, maintain higher levels of learner time-on-task, and decrease the ratio of general to specific feedback statements after having received data-based feedback. In addition, the data show that selected planning and teaching behaviors can be maintained over a short period of time without practice.

Several important differences were revealed between the gymnastics and fundamental movement lessons in the interactive environment. Learners were motor-engaged for a higher percentage of class time in fundamental movement lessons than in gymnastics lessons, and rate of specific feedback was higher in fundamental movement lessons than in the gymnastics lessons. Learner motor-engaged behavior in gymnastics has been found to be relatively low compared to other activities in other research as well (Beauchamp, Darst, & Thompson, 1990). Given a higher rate of learner motor-engaged behavior in fundamental movement lessons, the preservice teachers had more opportunity to provide their learners with specific feedback.

Although no attempt was made to directly examine the relationship between planning and teaching, the results of this study clearly show that as preservice teachers' planning behaviors improve, their teaching behaviors improve as well. However, one

cannot infer from this study that the preservice teachers' interactive behaviors improved as a result of their improved planning behaviors.

The data from this study have been used to make several teacher preparation program decisions at University of Wyoming. Based on the positive nature of the results, lesson planning, teacher-learner verbal feedback statements, and learner motor-engaged behavior will continue to be the focus of the first formal teaching experience in the program. In light of follow-up findings, less time will be devoted to lesson planning, and more time will be devoted to class management and learner assessment during the second and third pre-student teaching practica in the program.

It is a well known fact that physical education teachers do little planning once in the profession (Earles, 1981; Lawson, 1989; Locke, 1984; Placek, 1984). If permanent changes are to be realized in the planning and teaching behaviors of future physical education teachers, trainees need to plan, teach, and receive objective feedback on a regular basis during preservice training. Experiences like the one described in this paper should help preservice teachers better understand the relationship between planning and teaching.

In few studies have researchers investigated the interactive and preactive behaviors of physical education teacher education majors prior to student teaching (Hawkins, Wiegand, & Bahneman, 1983). To understand how teachers learn to teach, researchers need to monitor behaviors of prospective teachers from program entry to program exit, and on into their first three to five years of teaching. This study focused on the beginning stage of learning to teach. These

same students now need to be studied longitudinally to determine if knowledge and skills attained through clinical preservice teaching experiences are sustained after completion of the program. In addition, the relationship between preservice teachers' preactive and interactive behaviors needs to be studied.

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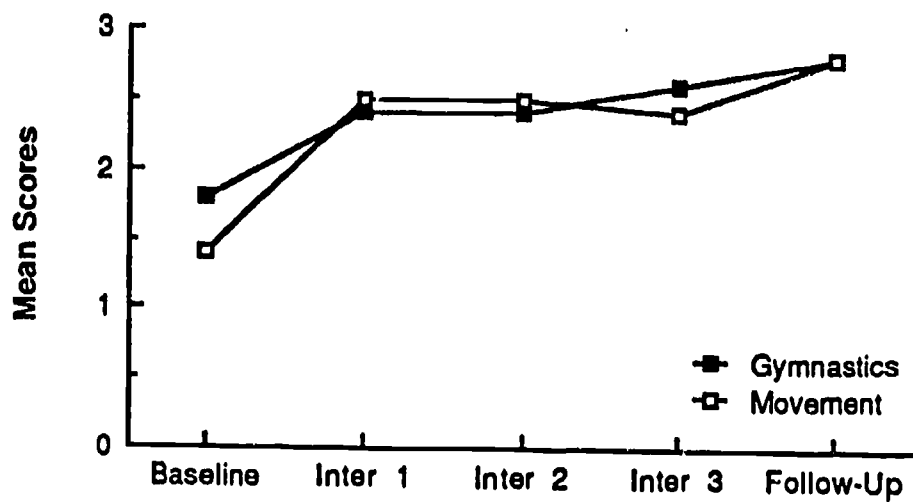


Figure 1. Instructional Objectives.

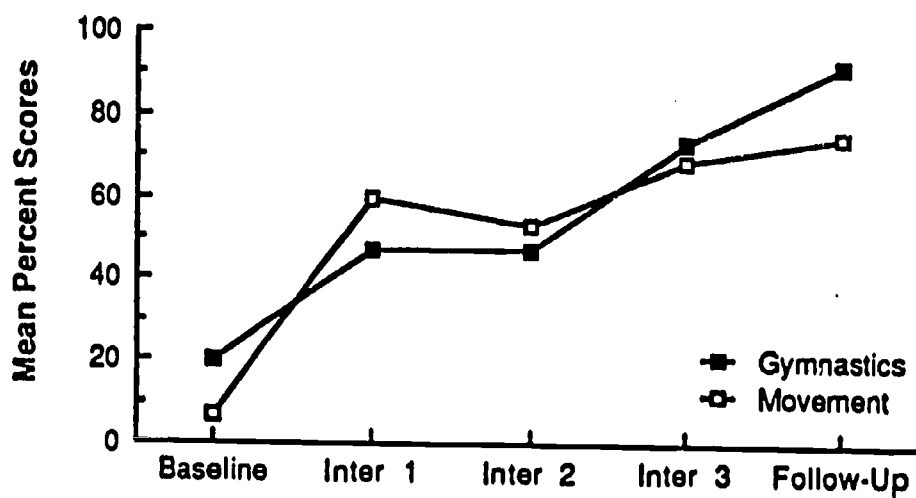


Figure 2. Task Progressions.

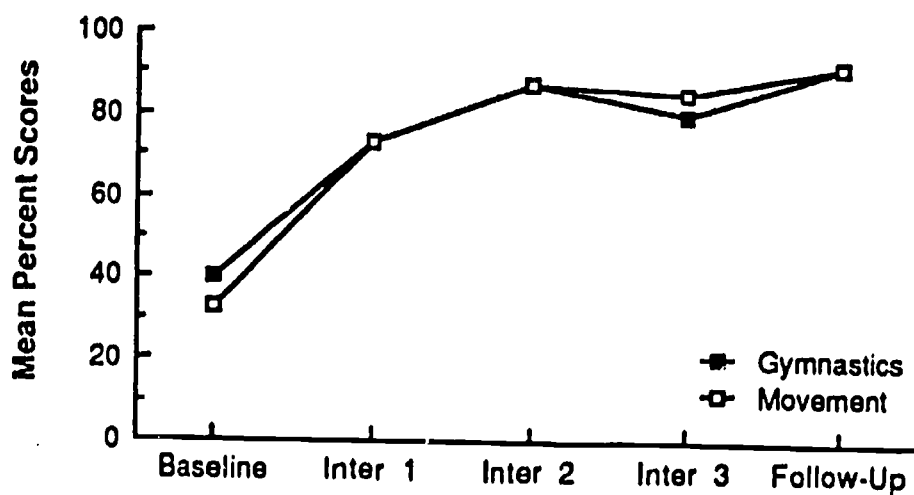


Figure 3. Critical Skill Cues.

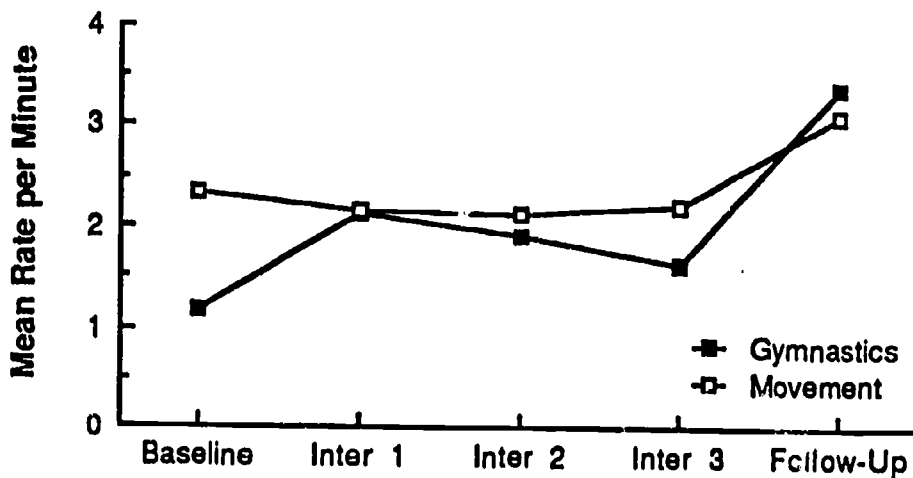


Figure 4. General Feedback Statements

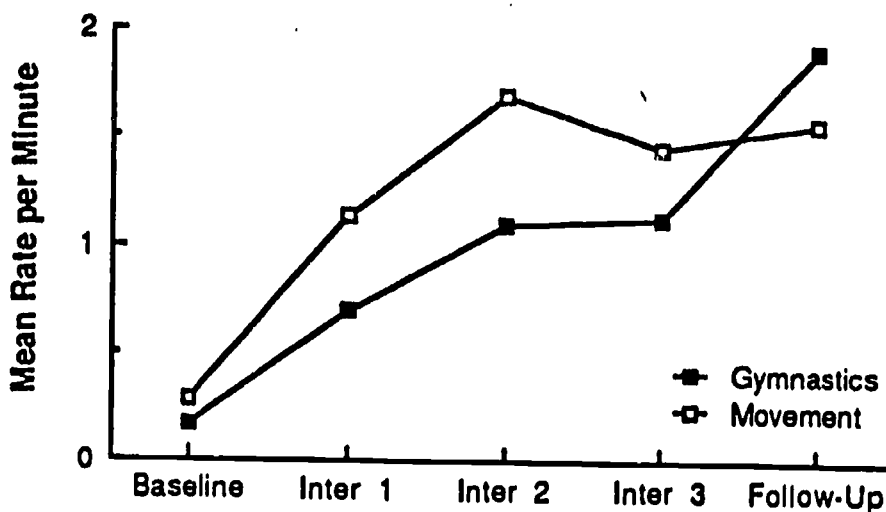


Figure 5. Specific Feedback Statements

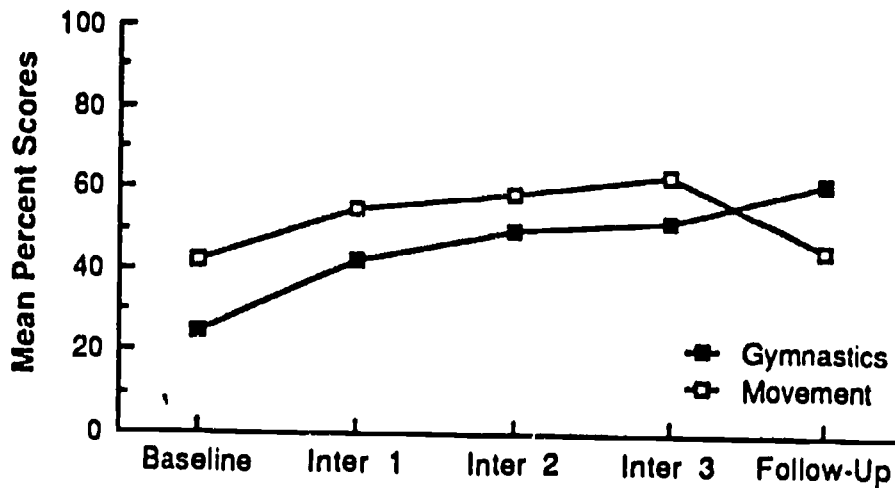


Figure 6. Percent Time Motor-Engaged