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THE EFFECTS OF ATTENTIONAL SHIFT TRAINING ON THE EXECUTION OF SOCCER SKILLS: A PRELIMINARY INVESTIGATION

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One of the most important skills in soccer is the ability to respond quickly and accurately to the changing demands of the competitive environment (i.e., position of ball, teammates, opponents). A multiple baseline design across 4 male collegiate soccer players was used to determine the effectiveness of an attentional training program on the execution of targeted soccer skills. The treatment included information and laboratory attentional shift exercises followed by practice of attentional shifting skills on the execution of different soccer exercises. Following treatment, the accuracy of execution of the experimental soccer drill improved.

DESCRIPTORS: athletic performance, attention, coaching, sports skills, soccer

Attending to appropriate environmental cues is important for optimal performance in sport. However, only a minimal amount of research currently exists on this topic. The majority of literature addressing attention has focused on the earlier work of Nideffer (1976a, 1976b, 1979), who identified three important components of attentional focus: the *direction* of attention (internal or external), the *breadth* of focus (broad or narrow), and the ability of the individual to *shift* the focus of attention. According to Nideffer (1976b), the important attentional styles needed to enhance performance are: (a) *broad-external:* quickly evaluating an external situation (e.g., a soccer player quickly looking up the field to observe the offensive alignment of his or her players and of the defense); (b) *narrow-external:* selectively focusing on one or two external cues (e.g., the ball or the goalkeeper); (c) *broad-internal:* analyzing information and developing a strategy (e.g., selecting what type of defensive strategy to use to neutralize the strengths of the opponent); and (d) *narrow-internal:* focusing on one internal objective (e.g., visualizing a successful shot on goal or focusing on taking a deep, controlled breath). An additional important component of Nideffer's model is the ability to shift from one attentional style to another. In a sport such as soccer, the competitive environment and attentional demands are continually changing. For example, a soccer player scans the environment to find an open space, rushes to it, then shifts focus to narrow-external to receive and control a pass from a teammate. The player must quickly shift attention to broad-external as he or she scans the field looking for the defensive alignment, an open teammate to pass the ball to, or the position of the goalkeeper.

Much of the recent research in the area of attention has been directed toward the development of self-report questionnaires to identify attentional styles within specific sports (Albrecht & Feltz, 1987; Bergandi, Shyrock, & Titus, 1990; Summers, Miller, & Ford, 1991; Van Schoyck & Grasha, 1981). Little research, however, has focused on the process needed to develop attentional skills.

The purpose of this study was to determine the effects of an attentional shift training program on the performance of skills during soccer drills with collegiate soccer players. The goal of attentional training for this study was to match attentional demands of the situation with the attentional style in which the athlete was functioning.

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METHOD

Subjects

Four male collegiate soccer players from a Division I team participated in this study. Subjects were selected based on (a) freshman or sophomore status at the University; (b) the coach's rating as not executing well during the season; (c) the athlete indicating in individual interviews with the primary investigator his own level of dissatisfaction with consistency in skill execution during games; and (d) lower scores on Martens's (1989) test of attentional shift. Martens's test is a survey that asks subjects to rate their attentional shifting effectiveness (i.e., from broad-internal to broad-external) in 12 sport-related situations. Two of the subjects scored below the average (40 to 46) set by Martens on their ability to shift attention (scores were 35 and 39), and 2 subjects scored at the lower end of the average range for attentional shift (scores were 41 and 42). The mean age of the athletes was 20.1 years.

Testing Procedures and Dependent Measures

At an indoor soccer facility, subjects were rated on their ability to hit a designated target during four soccer drills. The order of the drills was randomly selected for each testing session. A point was scored on each drill when (a) the athlete executed all three passes for that drill with a one-touch pass, and (b) the ball was kicked to the correct receiver. The pass was considered successful only when it could be reached by the receiver in fewer than two steps. Each athlete received three attempts for each of the four drills (12 attempts per testing session). Figure 1 illustrates the basic model used for drills.

Drill 1. The most basic of the drills required the athlete to receive the ball from the experimenter and one-touch pass the ball to the person holding the designated target. Each of the other subjects and an assistant held a target (8.5 in. by 11 in.) at knee level. Targets were cards on which one of the following were displayed: a geometric shape, a color, a number, or a letter. For example, if the experimenter called out "A," the subject was to scan the four targets and pass the ball to the person holding Card A.

Drill 2. This drill was similar to Drill 1 except that the targets were mixed (i.e., each target was different, displaying a number, letter, color and shape).

Drill 3. This drill was conducted as in Drills 1 and 2, but the target groups were intermixed and involved more complex shifting. The athlete had to match the color and the shape, number or letter. For example, the targets might all hold up Number 4, but each would be a different color. The experimenter would then call out "blue 4."

Drill 4. The pattern of the drill remained the same, but the complexity of the decision increased. The names of colors appeared on a card. However, each was written in a different color. For example, the word *green* would be spelled on a card in red lettering. The experimenter would cue the athlete to hit the target that was the "word green" (cards included the word *green* in red letters, the word *blue* in yellow letters, the word *red* in blue letters, and the word *yellow* in green letters).

On the first day of practice, each of the four drills was taught to the players, and they were able to practice them for five attempts per drill. After the initial training, testing sessions were conducted with each subject twice per week, 1 hr before practice for their winter recreational league. The format of the drills was the same for each session, but the information on the cards changed (i.e., different colors, geometric shapes, etc.). Each subject executed one set of drills (4 drills × 3 trials), then rotated to a support position. Once all subjects had completed the first set of drills, the second testing trial was administered. This process continued throughout the study. The research assistant and an additional observer independently scored the points during each trial.

Interobserver Agreement

After each practice session, interrater reliability was computed for each subject. The number of agreements between the observers was divided by the number of agreements plus disagreements and multiplied by 100%. An agreement was noted when

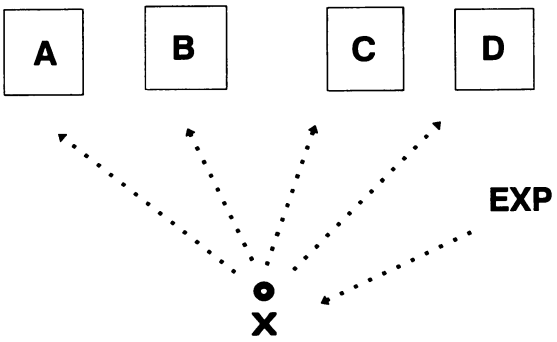

Figure 1. Drill 1. The experimenter (EXP) passes the ball to the subject (X) and at the same time verbally indicates the target he is to hit. This is done by designating a geometric shape, a color, a number, or a letter. The subject must execute a one-touch pass to the designated target receiver (other subjects and assistant holding cards). As soon as the ball is passed by the subject, the experimenter passes him a different ball and calls out a different cue (cards are switched after each attempt). The process continues for four attempts. This completes one trial. A point is scored when the athlete executes all three passes after only one touch and delivers the ball to the correct receiver each time. The pass is correct only if the correct receiver can reach it within two steps.

all of the criteria were met (execute each drill in the session with a one-touch pass and kick the ball to the correct receiver so that it could be controlled by the receiver in fewer than two steps). Mean interrater reliability across all subjects in scoring of a successful versus an unsuccessful pass was 87% (range, 81% to 93%). Disagreement between the raters was generally on whether or not the ball was cleanly passed (one-touch pass) to the correct target.

Experimental Design

A multiple baseline design across subjects was used. The intervention for Subject 1 began after a stable baseline had occurred (after the sixth testing session). The remaining subjects began intervention after Sessions 8, 10, and 12, respectively.

Training Procedures

As with the teaching of any athletic skill, a progression of activities was used that included an information phase (both lecture and office practice of attentional shifting skills) and an application phase (practice of the attentional shift skills while executing soccer drills). During the information phase, skills were explained and the investigator controlled practice of attentional shifting via use of concentration grids and attentional drills in the office. The application phase provided the opportunity to transfer the basic concept and skills into actual practice with soccer skills.

Table 1
Attentional Shift Training Intervention Program

Component	Session	Time per session (min)
Information phase (45 min)		
Phase of attentional styles	1	10
Practice shifting in office	1	3
Concentration explained	1	3
Concentration grid (three grids per session)	1	8
Videotaped replay of game and shifting explained	1	2
Videotape of game used to practice shifting on screen	1	4
Tactical decision making (two attempts per session)	1	5
Homework explained	1	5
Questions and answers	1	5
Application phase (1 hr)		
Feedback from first session	2	5
Drill explained and demonstrated	2	10
Review of attentional shifting	2	5
Practice of attentional shifting during execution of soccer drills	2	35
Questions and answers	2	5

The intervention was conducted individually in two sessions with each athlete. The first session occurred in an office and lasted 45 min; the second session occurred at an indoor training facility and lasted for 1 hr. Table 1 contains an overview of the training intervention program. It provides information on the components used in the intervention program, when they were introduced, and the amount of time spent on each component.

Focusing. Nideffer's (1976b) model of attentional focus was reviewed individually with each subject. Drills were developed for practice both in the office and on the playing field. Office drills consisted of the investigator indicating the attentional style (broad-internal, broad-external, nar-

row-internal, narrow-external) and the athlete shifting focus accordingly. For example, a book would be designated as the narrow-external focus, and the athlete would begin the drill by focusing on the book. The broad-internal style required the subjects to review mentally one or more soccer strategies. The broad-external style required the subject to scan the room trying to take in all the details. For the narrow-internal style, the subject focused on one thought (e.g., "I am relaxed"). The investigator then indicated the style the athlete was to shift to, paused 5 s, and asked the subject to shift to another style. Most of the emphasis in the office drills was on the comprehension of the broad-external field and shifting the attention to the narrow-external field (selected focus point). Subjects were asked to begin practicing the same type of shifting exercises a minimum of 10 times per soccer practice.

Concentration. A concentration grid (Harris & Harris, 1984) was used to assist the subjects in extending the amount of time they were able to focus on one task. The exercise consisted of a block grid (10 in. by 10 in.) in which there were 100 blocks. Each block contained a two-digit number (00 to 99). Subjects were given 1 min to scan the grid and mark off the designated sequence of numbers (e.g., starting with 21, mark as many numbers in sequence as possible; or, beginning with 13, mark every other number occurring in the proper sequence). Environmental distractors were then added to increase the difficulty in maintaining concentration (e.g., talking to the subject, loud noises, phone conversation). Each athlete had one practice attempt at the grid, one undistracted trial, and then two trials with the environmental distractors. This simple drill has been used to expand the concentration ability of athletes, primarily in eastern European countries, and has been reported to correlate with enhanced performance (Williams, 1986).

Videotapes of games. Each subject was shown replays of videotapes of his team's performance in selected soccer matches. Within the parameters of the television screen, a single object was defined as narrow-external and focus on the entire screen was defined as broad-external for this drill. After observing the tape for 2 min and reviewing materials on attentional styles and shifts, the investigator pointed to a randomly selected narrow-external focal point (e.g., a player, the ball, or a piece of background information) on the screen. The athlete was asked to focus on this object until cued (every 5 s) to shift to another designated target (narrow), or to focus on the entire screen (broad). After 2 min of this activity, questions were asked to assess the subject's level of awareness of other activities occurring around the targets. Discussions followed, providing the athlete with an opportunity to report what he saw, the difficulty or ease in making the shifts, the difficulty or ease in staying narrowly focused, and the difficulty or ease of staying broadly focused and taking in both relevant (where is the ball) and irrelevant (what signs did you see on the walls) information.

Subjects were assigned similar shifting activities during their indoor soccer practices. At the beginning of each practice session with the author, the subjects discussed their success in using the shifting skills in practice. Subjects 1 and 3 reported difficulty in quickly analyzing and responding to the broad focus during the practices. Subject 4 felt comfortable with both styles, and Subject 2 was uninterested in the activity.

Tactical decisions. An interesting approach to attentional shift and comprehension was designed by German coach T. K. Trapp and was originally administered in the United States in 1988. The purpose of the drill (see Figure 2) was to examine diagrams of soccer situations and determine the correct tactical decision in a limited amount of time. As reported by Trapp (1989), a good soccer player must make between 8 and 10 tactical decisions (broad-internal) every minute of play. Eight different diagrams were used. Subjects were asked to focus on a book (narrow-external), then shifted to the tactical drill. They were given 20 s to analyze the drill and make a tactical decision (from four choices) as to where the ball should be passed. Feedback was provided on the accuracy of their decisions. Subjects completed this exercise five times.

Application. The skill consisted of the execution of drills on an indoor playing surface (see Figure 3). These drills required the athlete to respond to

information found on flash cards containing colored numbers, letters, and geometric shapes. The subject dribbled and focused on a soccer ball (narrow-external) and was then verbally signaled to shift to broad-external to scan the environment for the cards. A whistle was then blown to signal the subject to shift back to the ball and kick the ball into the designated goal. Broad-external time ranged from 8 to 10 s. During this time the athlete was to keep the ball under control while dribbling through cones, scan the cards for information, and verbalize what was on the cards. The drill ended with the subject kicking the ball into the goal. Questions were then asked to ascertain the level of comprehension (e.g., "which cards did you see and what was the sequence?"). This also provided the investigator and subject with information concerning the level of attention used by the athlete in the broad-external condition. Each athlete had between 8 and 10 attempts at drill execution. In order for an attempt to be successful, the athlete was required to (a) receive the ball, (b) dribble among the obstacles (cones) without touching them, (c) verbalize the information on the cards, and (d) kick the ball into the goal. The number of cards shown was gradually increased to six. After each attempt, the subject received feedback on the number of correct verbal responses on the card sequences (broad-external) and on his control of the dribble. A point was given for each goal scored that met the above criteria. This served as feedback for the subject. After the initial drill explanation, demonstration, and practice, the athletes had 35 min to practice the drill. The skill application took place at a different location than the general practice session.

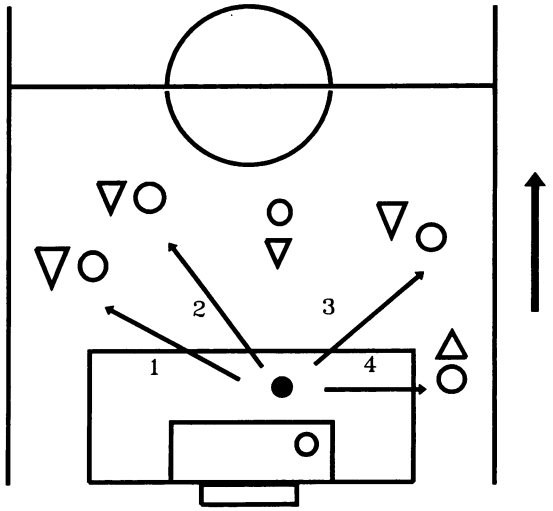

Figure 2. Tactical decision drill. In this drill, the darkened circle represents the player for whom the subject must make the decision. The arrow designates the direction in which the team with the ball is moving. Defenders are represented as circles, and attackers are represented as triangles. The subject had 20 s to determine which option was correct (Trapp, 1989, p. 33; answer: Option 3).

RESULTS

The results of the attentional shift training program on the subjects' successful execution during the soccer drills (as illustrated in testing drills in Figure 1) are reported in Figure 4. The multiple baseline design across subjects showed increases in points scored following the completion of the attentional training intervention. The total possible score for each testing session was 12. The average scores attained during baseline were, for Subject 1, 3.1 (range, 3 to 4); for Subject 2, 3.6 (range, 3 to 4); for Subject 3, 4.4 (range, 3 to 5); and for Subject 4, 4.4 (range, 4 to 5). The mean scores attained during the intervention phase were, for Subject 1, 7.4 (range, 5 to 10); for Subject 2, 7.6 (range, 4 to 9); for Subject 3, 8.6 (range, 6 to 10); and for Subject 4, 8.6 (range, 6 to 10).

DISCUSSION

Improvement in the performance of soccer skills that demand multiple attentional shifts was demonstrated in this study following an intervention that emphasized attentional shift training in office and field settings. "Paying attention" in performing sport skills and in game situations is, for the most part, taken for granted. This study demonstrated that attentional shift training is a complex skill that can be taught. That is, by practicing attending to attention, performance can be enhanced.

One of the next steps in this research should be the exploration of the individual components of the

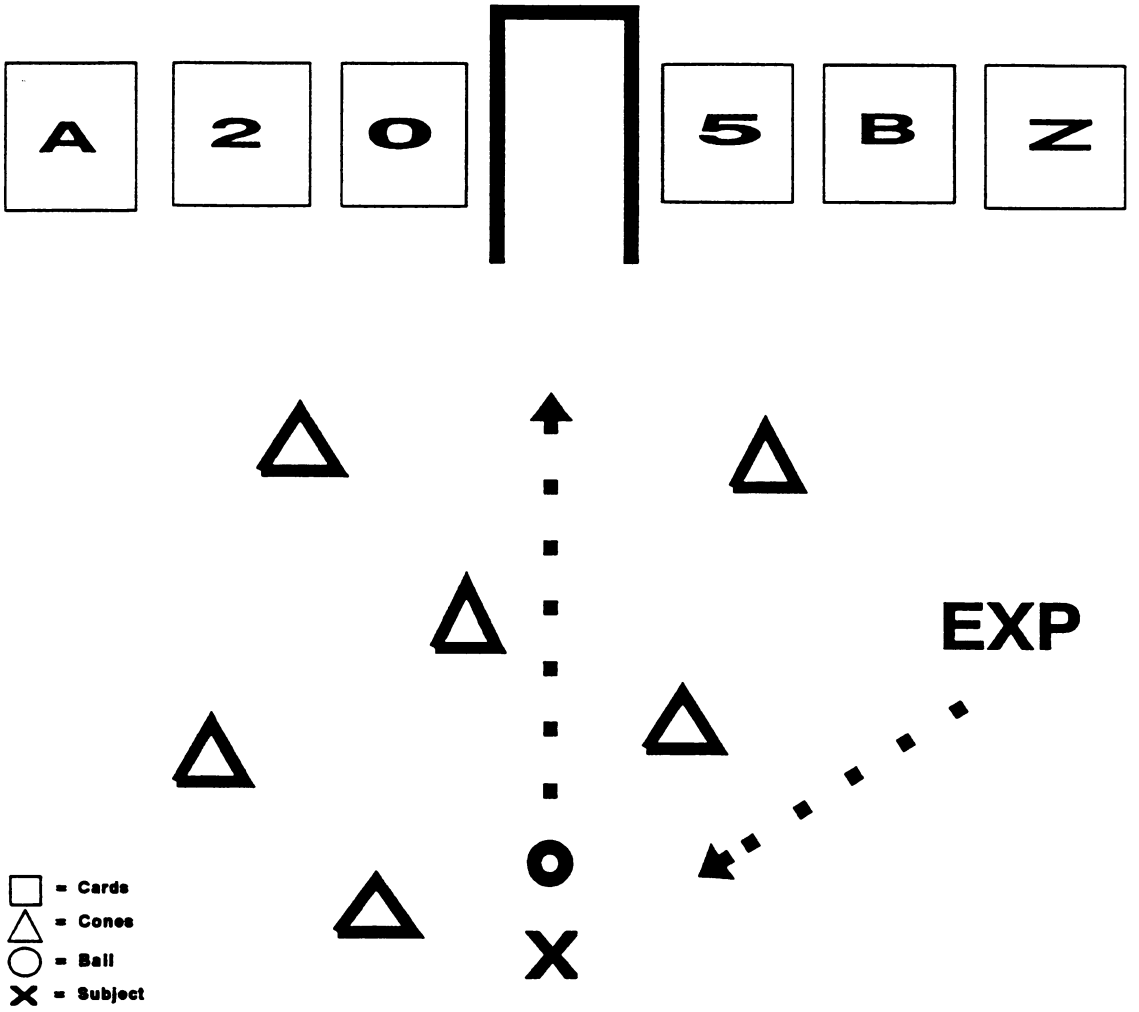

Figure 3. Sample drill from the application phase of the intervention. The subject (X) receives the ball from the assistant at a distance of approximately 25 yards from the goal. The subject dribbles toward the goal and, when verbally signaled, begins to scan all of the cards (broad-external) and yells out the appropriate information. At the whistle, the subject refocuses on the ball and kicks it into the goal (narrow-external). Visual scanning time was approximately 8 to 10 s. Each subject received feedback on the number of correct verbal responses, on dribbling execution, and on his success in kicking the ball into the goal.

intervention program. This study included a multistep attentional shift training program that involved both office and applied exercises. It is unknown whether both of these steps are needed to produce improvements in attentional shifting. In addition, the inclusion of standard check sheets would be useful in assessing the integrity of the independent variables and in pinpointing effective and ineffective strategies. Future research is also needed to determine whether similar results can be obtained with a larger number of subjects, across different sports, and with skills requiring different attentional demands.

Most critically, the effects of training on actual game performance were not examined. By operationally defining designated soccer skills and monitoring their successful execution during competition, a better understanding of the effectiveness of attentional shift during actual game situations might emerge. Unfortunately, because there are so many

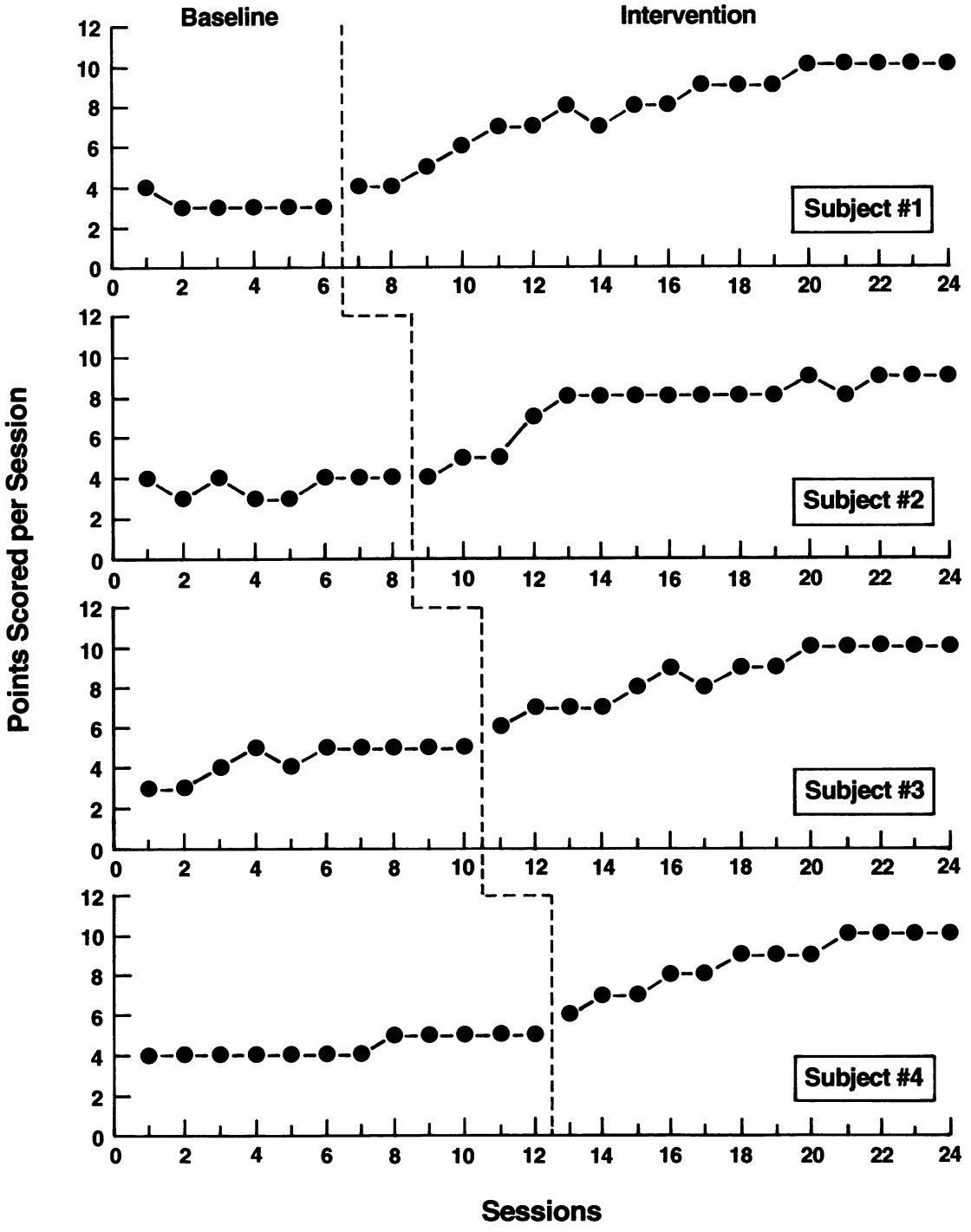

Figure 4. Number of points scored per session for each subject. Each data point represents one testing session of 12 attempts at meeting the criteria for success (4 drills × 3 attempts).

uncontrollable variables (e.g., level of competition, playing conditions, level of play of teammates, level of officiating), a study examining effectiveness during a game is difficult to execute. Additional areas of needed research include the training of coaches in the use of attentional shift training and examination of the effects of coaches' training programs on players' performance.

Research in the application of performance enhancement techniques to sport training and performance is a necessary step in the study of sport. Merely identifying constructs that potentially affect performance, such as "anxiety," "self-confidence," "motivation," and "attention," provides little assistance in changing behaviors. The identification of problematic areas must be followed with the development of strategies that are usable in training and competition.

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