

*EFFECTS OF PUBLIC POSTING, GOAL SETTING, AND
ORAL FEEDBACK ON THE SKILLS OF
FEMALE SOCCER PLAYERS*

BRANDILEA BROBST

UNIVERSITY OF NEBRASKA-LINCOLN

AND

PHILLIP WARD

THE OHIO STATE UNIVERSITY

We evaluated the effects of public posting, goal setting, and oral feedback on the skills of 3 female high school soccer players during practice scrimmages. The dependent variables were the percentage of appropriate responses when the player (a) kept and maintained possession of the ball, (b) moved to an open position during a game restart (e.g., goal or corner kick), and (c) moved to an open position after passing the ball. We also assessed the extent to which changes in practice performances generalized to games. A social validity questionnaire was completed by both players and coaches to assess the acceptability of the intervention's goals, procedures, and outcomes. Results indicate that the intervention was effective in improving performances during practice scrimmages but produced limited generalization to game settings.

DESCRIPTORS: public posting, goal setting, oral feedback, female athletes, soccer

Public posting is an effective behavioral strategy that has demonstrated utility in a variety of settings. In school settings, it has been used to improve the performance of students in science (Thorpe & Darch, 1979), reading (Van Houten & Lai Fatt, 1981), writing (Van Houten & Nau, 1980), attendance at school (R. V. Hall, Cristler, Cranston, & Tucker, 1970), and direction following (Burnett, McLaughlin, & Hunsaker, 1978). Public posting has also been used to reduce speeding (Ragnarsson & Björvinsson, 1991; Rogue & Roberts, 1989; Sherer, Friedman, Rolieder, & Van Houten, 1984), to increase children's use of hearing aids (Hundert, McMahan, & Kitcher, 1982), to improve employee performance (Nordstrom, Lorenzi, & Hall, 1990), to increase donations to a senior center (Jackson & Mathews, 1995), and to improve the res-

cue skills of lifeguards (Ward, Johnson, Ward, & Jones, 1997). Public posting is also a component of several package interventions including classwide peer tutoring (Maheady, Harper, & Sacca, 1988), peer-mediated accountability (Ward, Smith, Makasci, & Crouch, 1998), and the good behavior game (Barrish, Saunders, & Wolf, 1969).

In sport settings, public posting is often combined with goal setting to improve the performance of athletes (Martin, 1997). Goal setting is used most often as a performance standard that is established by the athlete or a coach (Locke & Latham, 1990). Investigations using goal setting as an independent variable include studies that have demonstrated the effects of (a) "do your best" encouragement versus instructor-set specific goals in rifle shooting in a college physical education class (Boyce, 1990) and the stick-handling skills of members of a college lacrosse team (Weinberg, Sticher, & Richardson, 1994); (b) "do your best" encouragement versus instructor-set difficult

Address correspondence to Phillip Ward, The Ohio State University, Sport and Exercise Education, 309 Pomerene Hall, 1760 Neil Ave., Columbus, Ohio 43210-1221 (e-mail: ward.116@osu.edu).

goals versus performer-set goals in performing sit-ups (H. K. Hall & Byrne, 1988); and (c) self-set goals during a college basketball season (Swain & Jones, 1995) and during a college archery class (Barnett & Stanicek, 1979). Collectively, the results of these studies show that (a) setting goals is more effective than not setting them, (b) short-term goals (i.e., goals to be accomplished today or in the immediate future) are more effective than longer term goals, and (c) instructor and self-set goals are similarly effective. Research has also shown that goal setting is strengthened when the goals are made public (Hayes et al., 1985).

There are advantages to combining public posting and goal setting as a package intervention. Goal setting provides an explicit criterion (as opposed to "do your best"), and public posting is a method that makes the performances public and also provides feedback to performers. Van Houten (1980) suggests that public posting both prompts and reinforces performance.

Studies combining public posting and goal setting in sport settings have been used to reduce absenteeism, late arrivals, and early departures as well as to increase the work rate of members of a youth swimming team (McKenzie & Rushall, 1974); to increase the rate of legal body checking in a collegiate ice hockey team (Anderson, Crowell, Doman, & Howard, 1988); to increase the practice and game performance of collegiate football players (Ward & Carnes, 2002; Ward, Smith, & Sharpe, 1997); and to reduce illegal and improper behaviors occurring during tennis matches by collegiate tennis players (Galvan & Ward, 1998).

Oral feedback is another frequently used component of public posting interventions, though it is often not explicitly described as a component of such interventions. When feedback is used in conjunction with public posting and goal setting, it is typically limited to restating orally what has been pub-

licly posted (e.g., Swain & Jones, 1995). Most of the studies previously cited fall into this category. Exceptions include studies in which feedback occurred in the form of self-recording of performance (Critchfield & Vargas, 1991; McKenzie & Rushall, 1974) and as a point system tied to specific consequences (Siedentop, 1980; Ward, Johnson, Ward, & Jones, 1997).

In the current study, 3 members of a female high school soccer team participated in a public posting, goal setting, and oral feedback intervention over the course of one season. The purposes of this study were (a) to assess the effects of the intervention on the ball-handling skills of team members, (b) to assess the extent to which improvements in practice performance generalize to game play, and (c) to measure the acceptability of the intervention to the coaches and players.

METHOD

Participants and Setting

Three female players from a middle-class high school soccer team participated in the study. Participants ranged in age from 15 to 17 years and had played soccer for at least 5 years. The players were selected by the head coach and were then invited to participate. Selection criteria included players who regularly attended practices and whom the coach determined were likely to play at least half of every game. Originally, 5 players agreed to participate. One player was injured in the 1st week of the season and was unable to continue practices with the team. A 2nd player was excluded from the study in the 3rd week because she missed several practice sessions due to commitments to another sport. The remaining 3 players were all midfielders.

The study was conducted over the course of the soccer season and consisted of 27 practices and 10 games. Practices were held most days excluding Sundays and days when

games were played. Practice sessions were conducted on the high school soccer field for 2 hr. The first 1.5 hr were devoted to instruction, and the last 30 min were used for scrimmaging. Games were conducted against other varsity teams in the school district.

Dependent Variables and Data Collection

Three behaviors were selected as dependent variables in this study. First, occasions on which a player received the ball from a partner and then dribbled the ball for at least 5 s without losing possession to either another player (e.g., as a result of a tackle) or as a result of unforced error (e.g., stumbling) were labeled *movement with the ball*. Second, there are several occasions during a soccer game on which the game is stopped and restarted. These restarts occur when a goal or corner kick is taken and when the ball is thrown in from the sideline. At these times players must move to an open space (i.e., free of defenders) to receive a ball that is kicked or thrown to them. This behavior was labeled *movement during restarts*. Third, occasions on which a player has moved to a supporting position after having passed the ball were labeled *movement after the player passed the ball*. A supporting position was defined as a player placing herself in a position at which she was able to receive a passed ball from a teammate and ahead of the position at which she passed the ball.

The behaviors were recorded whenever the team had possession of the ball and were coded as appropriate if the skill was executed as described or inappropriate if the skill was executed incorrectly either because of forced (i.e., defender interference) or unforced (e.g., no movement by participant) error. The 30-min practice scrimmages and games against other teams were videotaped and were then coded. Data were collected using event recording of the dependent measures by two experienced adult league soccer players and by the first author. Because the num-

ber of responses in both practices and games varied according to the number of opportunities available, data were converted to a percentage of appropriate movements for each dependent measure rather than reported as a frequency. Most practices and games were already videotaped for performance analysis by the coaches; thus, the presence of a video camera during practice and games was a common occurrence for these players.

Prior to the study, observers completed a training session in which they (a) matched definitions of appropriate and inappropriate responses with descriptions of plays, (b) practiced coding the dependent measures from a videotape and received feedback on their discriminations, and (c) observed and coded performances on a videotape to determine accuracy. The tapes had been pre-coded by a soccer expert with national certification to establish an accuracy benchmark against which to compare the observers' responses. A criterion of greater than 95% agreement was established between the pre-coded data and the observers' responses.

Experimental Design and Procedure

A multiple baseline design across behaviors (i.e., movement after receiving the ball, movement during restarts, and movement after the player passed the ball) was used to assess the effects of the intervention for each participant.

Baseline. During this phase the team practiced the three dependent variables along with other skills and drills as part of the coach's practice plans. The players received regular feedback and error correction of their performances from two team coaches for all skills during these practice sessions. These conditions remained constant throughout the other phases of the study.

Intervention. The intervention was a package consisting of public posting, goal setting, and oral feedback. The head coach and the lead author established a goal of 90% correct

performance of the target behaviors. The criterion was chosen because the skills were already in the repertoire of the players, because the coach believed that her players ought to be demonstrating a proficiency level of at least 90% during scrimmages, and because similar studies had used this criterion (e.g., Ward & Carnes, 2002; Ward, Smith, & Sharpe, 1997). The head coach and lead author met with the 3 participants as a group and explained the target behavior, how it was measured, and the rationale for the 90% criterion. Players were also informed that the results of each day's practice would be posted on a daily performance chart. The participants were informed that the data would not be used to determine their place on the team, but rather would serve as feedback to help them improve their performance. The intervention was introduced sequentially across the target behaviors (i.e., movement after receiving the ball, movement during restarts, and movement after the player passed the ball) in accordance with a multiple baseline design.

The performance chart was not displayed during baseline, and the behaviors were not listed until they were part of the intervention. The chart reported the name of player, the target behaviors according to the phase of the intervention, and the dates of the practices. The percentage of appropriate performance for each date was added to the chart as the study progressed. Thus the charts looked very much like the figures except that they were in tabular format. Baseline data were not reported, and only behaviors currently being intervened on were displayed.

The chart was located on a picnic table beside the playing field around which water breaks and on-field meetings were held. During the intervention, prior to each practice session, the lead author met with the players individually and reviewed the data on the chart. Players received praise for

meeting the goals and encouragement if they did not. No other feedback was provided. At the start of the intervention the coach and the lead author explained the purpose of the chart to the other players on the team.

Maintenance. A maintenance phase was used to assess whether the skills would be maintained after the intervention was withdrawn. Maintenance was assessed only for movement with the ball. Conditions during maintenance were identical to baseline conditions.

Generalization. Data were also collected during all regular season games against other high school teams to determine whether the improvements in performance would generalize from practices to games. Performances during the games were not posted on the performance chart, nor were the players informed of their game performances.

Interobserver Agreement

Interobserver agreement measures were assessed on 37% of the practice sessions and 40% of the games. Agreement was computed by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100%. The overall mean was 97.4%. Mean and range for movement after receiving the ball were 98.1% (range, 88% to 100%); for movement after the player passed the ball, 97.4% (range, 87% to 100%); and for movement during restarts, 96.5% (range, 85% to 100%).

Social Validity

Following the last game, the players and the coach were asked to complete an open-ended questionnaire to assess the acceptability of the intervention. The questionnaire contained eight items and asked the players and the coach to comment on the effectiveness of the intervention, the appropriateness of the procedures, the continued use or modification of the intervention, and their

satisfaction with the procedures (a copy of the questionnaire is available from the corresponding author).

RESULTS

The results of the intervention for Sam, Jan, and Amy are shown in Figures 1 through 3. Increases occurred in the percentage of appropriate responses from baseline to intervention for all behaviors for each participant during practice scrimmages. Typically, data were variable during baseline and became stable once the intervention was implemented.

For movement with the ball, the data show an immediate positive change from baseline to intervention for Amy and Jan and a similar but delayed effect that occurred on the 2nd day of the intervention for Sam. For movement during restarts, the data show an immediate positive change from baseline to intervention for all 3 participants. Performance during intervention fell below criterion on one occasion for Jan and Amy. For movement after passing, the data show an immediate positive change for Sam but a more gradual change for Jan and Amy. Moreover, although the performances of all participants improved during the intervention, there were several occasions for each participant on which criterion performance was not met.

Maintenance and generalization. Participants continued to perform the movement with the ball skill at the criterion level when the intervention was removed. Examination of the figures shows that there was generalization of this skill for all 3 participants. The remaining two behaviors showed variable patterns of generalization that fell below the criterion established during practices.

Social validity. Two players reported that the intervention positively affected their playing behaviors. Two reported that seeing their performances below the 90% criterion

frustrated them and caused some distress. None of the participants offered suggestions on improvements or changes in the protocol, and they all supported the use of the procedures in the coming year. The coach was very supportive of the intervention and reported that the participants' play improved noticeably as each intervention occurred.

DISCUSSION

In the present investigation, a public posting, goal setting, and oral feedback package intervention was used to provide feedback on the performance of female high school soccer players. The intervention was implemented sequentially across three behaviors (movement with the ball, movement during restarts, and movement after passes), which are skills critical for success in soccer. This study demonstrated that the intervention was effective in improving practice performances for all three behaviors. We also found that players' movement with the ball was maintained near the criterion level when the intervention was withdrawn.

We also sought to assess generalization of skills by measuring performances during games. Generalization from practice to games was clearly evident for movement with the ball for the 3 players. Generalization of the other two skills was not as clear. This finding differs from previous studies that demonstrated generalization of football skills from practice to game sessions (Ward & Carnes, 2002; Ward, Smith, & Sharpe, 1997).

There are several possible explanations for why generalization was limited in the current study. One may be the lack of similarity between practice and game settings. In scrimmages held during practices, the players were familiar with the skills and abilities of each other and could thus use this familiarity to competitive advantage. In games, however, the skills and abilities of their op-

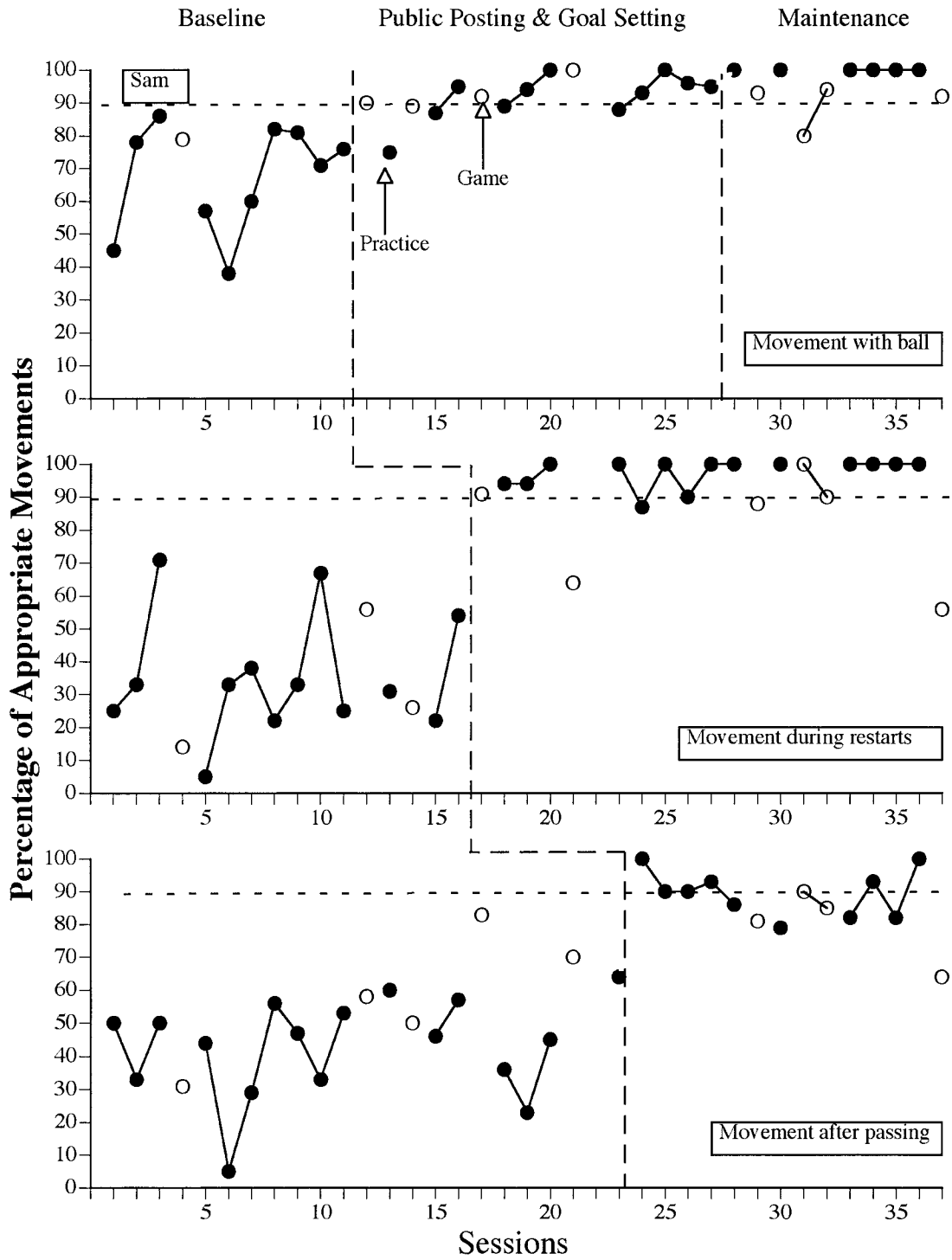


Figure 1. The percentage of appropriate movements after receiving the ball, after passing the ball, and following restarts during practice and game sessions for Sam.

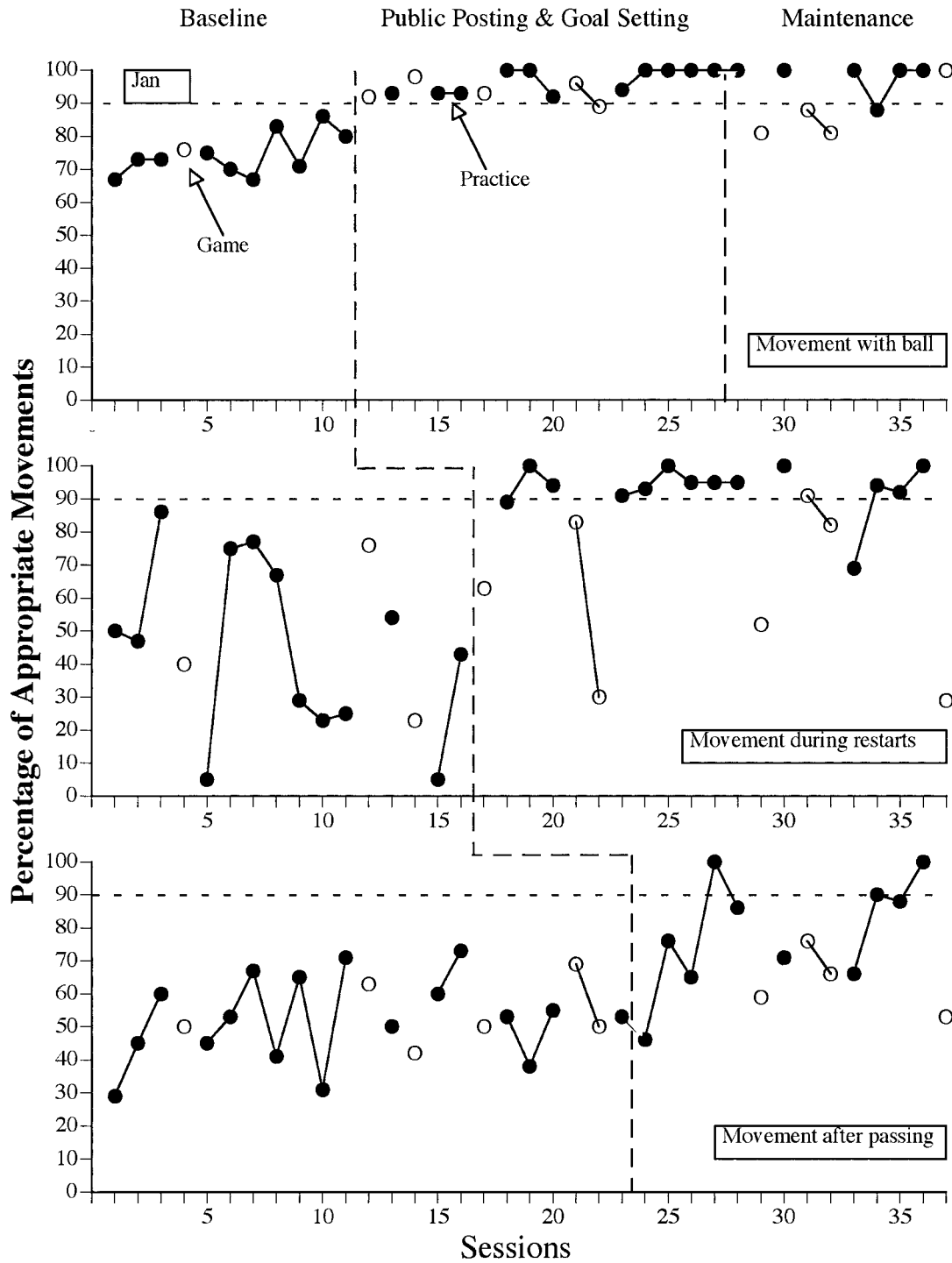


Figure 2. The percentage of appropriate movements after receiving the ball, after passing the ball, and following restarts during practice and game sessions for Jan.

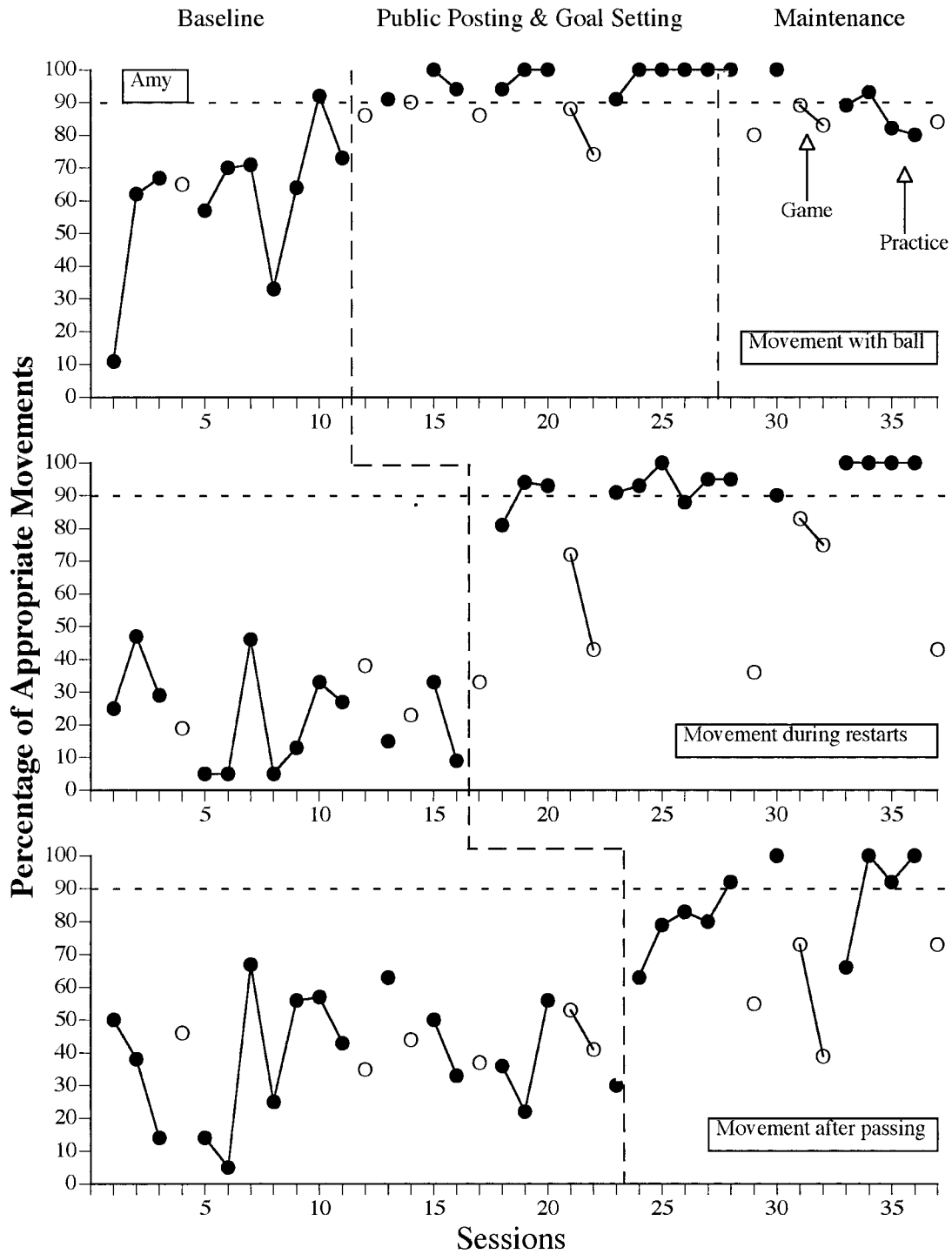


Figure 3. The percentage of appropriate movements after receiving the ball, after passing the ball, and following restarts during practice and game sessions for Amy.

ponents were largely unknown; this may have contributed to the different levels of performances. A second explanation may be the degree to which a coach can interact with players in each setting. In scrimmages, the coach was on the field and provided instruction, whereas in game settings the coach was on the sideline. Finally, the level of performance was highest for movement with the ball in baseline for all 3 players. The other skills were considerably lower. It is possible that generalization from practice to games is a function of the level of performance of the players or the difficulty of the skills. Even though the performances for movement during restarts and movement after passing the ball improved during the intervention, the players may still not have performed consistently or accurately enough to ensure generalization to games. Further investigation is needed to assess the process of generality, because it is ultimately winning games that most influences coaching practices.

There were several occasions on which participants did not meet the 90% criterion despite showing substantive improvements in performances. In hindsight, it would have been better to set more modest goals such as improving the previous day's performance by a specific criterion, rather than adopting a common criterion. Thus one recommendation is to base the criterion on baseline levels obtained for each player and relative to each skill.

These findings support and expand the public posting, goal setting, and feedback research literatures. The protocol used in this study is one that can be easily replicated in physical education and sports settings. Perhaps the greatest strength of this procedure is that it allows players to come into contact with objective measures of their performances, thus allowing them to modify their behavior.

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STUDY QUESTIONS

1. What were the target responses of interest, and what determined whether a response was scored as appropriate or inappropriate?
2. Describe the methods by which observers were trained to collect data.
3. Briefly summarize each of the intervention components.
4. How did the authors assess generalization and maintenance of the target behaviors?
5. What results were obtained during practices and games?

6. According to the authors, what factors may have limited the extent to which improved performance during practice generalized to game situations?

7. What type of experimental design was used to evaluate the effects of intervention? Given that some participants did not meet the performance criterion consistently, can you suggest an alternative design that may have accommodated more gradual improvements in performance?

8. Considering each of the interventions as a separate independent variable that may have influenced performance, what would be the practical benefit of conducting a component analysis of intervention effects?

Questions prepared by Stephen North and David Wilson, The University of Florida