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Cognitive-Behavioral Training for College Basketball Free-Throw Performance

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A cognitive-behavioral training program was implemented to improve the free-throw performance of three male Division-II college basketball players. A multiple-baseline design across subjects was used, finding percent improvements of 88%, 78.6%, and 50% for subjects 1, 2, and 3. Cognitive changes were measured via a videotape feedback reconstruction process. Significant changes from negative to positive cognitions were found.

Several authors have advocated the use of psychological interventions such as cognitive restructuring, relaxation, systematic desensitization, and imagery practice (Smith, 1979; Long, 1979; Suinn, 1972), but they have not reported investigations of the effectiveness of their programs. A few studies have examined the effectiveness of cognitive-behavioral intervention. Gravel, Lemieux, and Ladouceur (1980) used Suinn's (1972) visual-motor behavioral rehearsal, a combination of systematic desensitization, positive imagery, and slow-motion imagery rehearsal, with cross-country skiers. They found differences between the training and control group on self-report measures, but did not analyze race results. Meyers, Schleser, Cook, and Cuvillier, (1979) found no differences between simple instruction and the use of cognitive interventions on gymastic performance. Epstein (1980) found no effect of mental rehearsal on dart-throwing ability; at the same time, Gould, Weinberg, and Jackson (1980) found only a participatory arousal strategy to improve performance on a leg-strength task.

A few investigations have specifically addressed basketball skills. Dewitt (1980) used an intervention package that included relaxation, mental rehearsal, and cognitive restructuring, finding differences between the training and control groups on performance ratings. Specific changes in coping styles and

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basketball skills (e.g., changes in field goal percentage) were not assessed. Meyers, Schleser, and Montogomery Okwumabau (1982) looked at changes in both free-throw and field goal percentages after cognitive-behavioral training for two women college players. Results were mixed with increases in foul-shooting percentage for one subject and field goal percentage for the other.

To summarize, evidence suggests that athletic performance can be improved via cognitive-behavioral interventions. Results are mixed, however, and few studies include both measures of athletic performance and cognitive changes. Adequate experimental controls are also lacking in some studies. The purpose of the present study was to assess the effectiveness of a cognitive-behavioral training program on both the coping skills and free-throw shooting of male college basketball players during intercollegiate competition.

METHOD

Subjects

Three male intercollegiate basketball players were chosen from a Division II team of 12 players. The players with the lowest ratios of game-to-practice free-throw percentages were chosen. Subject 1 was a 20-year-old sophomore, subject 2 was a 21-year-old junior, and subject 3 was a 20-year-old junior. The game-to-practice free-throw percentage ratios for the three subjects were .28, .62 and .80, respectively.

Design

A single-subject multiple-baseline design was used. Baseline data were collected for 3, 6, and 8 weeks prior to initiating training for the three subjects. The order of beginning training was randomly determined.

Procedure

Players were seen individually 3–4 hours the first week of training, 2–3 hours the second, and ½–1 hour for the remainder of the study. Training was conducted both in the coach's office and during team practice of free throws. Homework was assigned throughout training, including deep muscle relaxation and mental rehearsal of coping strategies. Tape recordings of deep muscle relaxation instructions were provided. There were four aspects of training:

(1) deep muscle relaxation, (2) identification of negative self-statements, (3) development of positive self-statements, and (4) in vivo rehearsal during team practice.

Measures

A cognitive measure was taken prior to training and 4 weeks after initiating training for each subject. Cognitive changes were measured by having subjects reconstruct their thoughts while watching videotapes. Players were then asked to divide the narratives into discrete thoughts by putting each complete thought into parentheses, which were coded by two independent raters into three categories: (1) positive statements – including statements of confidence; description of positive coping processes such as relaxation, imagery, and mechanics of shooting; and statements minimizing the game context; (2) negative statement – including statements pertaining to the outcome that imply pressure to succeed, and statements of negative self-evaluation; and (3) interfering statements – including those statements unrelated to performance and/or the game situation. Free-throw data were collected by the team manager at the end of practice for practice data used to identify subjects. Game data were collected by the team statistician.

RESULTS

Reliability between raters was calculated using Cohen's Kappa (Cohen, 1960). Raters agreed on 54 of 59 statements, indicating a Kappa of .84. Disagreements were coded by a third rater, whose response was used in the analysis.

Table I shows the percentage of positive and negative + other statements before and after training. Other statements were combined with negative since only one other statement was found. Fourteen percent of the pretraining statements were positive as compared to 71% during posttrain-

Table I. Positive and Negative + Other Statements Before and After Training[a]

	Training		
Statements	Before	After	Total
Positive	5(14%)	15(71%)	20
Negative + other	32(86%)	6(29%)	38
Total	37	21	58

[a] $\chi^2_{(1)} = 19.88$, $p < .005$.

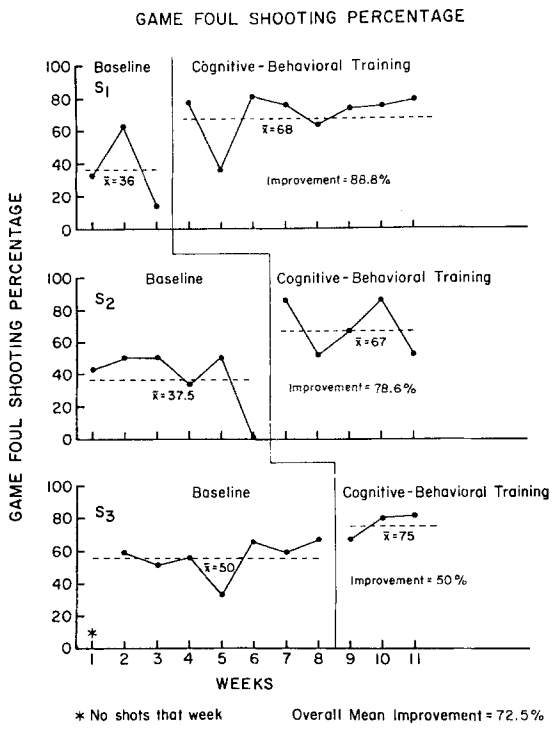

Fig. 1. Game foul-shooting percentage per subject by week.

ing reconstructions. The percent of negative + other statements was 86% before training and 29% after training. Overall, cognitive changes during foul shooting were significant ($\chi^2_{(1)} = 19.8$, $p < .005$).

Changes in athletic performance from baseline to training are represented in Figure 1. Subject 1's game free-throw percentage improved from a mean of 36% during baseline to a mean of 68% during training, which is an 88.8% improvement. Subject 2 improved 78.6% from a mean at baseline of 37.5% to a mean during training of 67%. The last subject improved 50%, from a mean of 50% during baseline to 75% during training. This yields an overall mean improvement of 72.5%.

DISCUSSION

The purpose of this study was to demonstrate the effectiveness of a cognitive-behavioral training program on basketball free-throw performance. The training package resulted in improvements in game free-throw percen-

tages and cognitive changes were found in the percentage of positive coping strategies being used after training. This replicates and expands on the works of Dewitt (1980) and Meyers et al. (1982) in that positive changes in both athletic performance and cognitions were found.

A potential limitation of the study is the demand characteristic present when self-report data are used such as the videotape reconstructions. The use of physiological or self-report anxiety measures would have been informative although difficult logistically. Klinger, Barta, and Glas (1981) recorded narrations of thoughts and mood rating of players while sitting on the bench during games. This methodology could be used to supplement videotape reconstructions. The lack of control for attention effects is another issue. Expectation of success has been demonstrated to enhance athletic performance (Ness & Patton, 1979; Weinberg, Yukelson, & Jackson, 1980). Conversely, an expectation for success may be an important aspect of the program. Isolating this factor is an important question for future research.

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