Psychological Interventions With Athletes in Competitive Situations: A Review

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Although sport psychologists utilize numerous interventions and techniques intended to enhance the performance of athletes in competition, the selection of those interventions has not always been based on research for which adequate validity has been established. In an attempt to provide sport psychologists with a working body of accurate knowledge and suggestions for future intervention research, an analysis and synthesis of research is presented that addresses the efficacy of different psychological interventions with athletes performing in competitive situations in the sport in which they regularly compete. From information reported in 19 published studies, covering 23 interventions, it was concluded that educational relaxation-based interventions and remedial cognitive restructuring interventions with individual athletes are, in general, effective.

Currently, sport psychologists utilize numerous interventions and techniques intended to enhance the performance of athletes in competition. A problem exists, however, in that a great deal of the outcome research in sport psychology does not use athletes as research participants or their performance in competitive situations as the dependent variable. Consequently, one must concur with Dishman's (1983, p. 127) statement that "it is not clear to what extent contemporary sport psychology possesses a clearly defined and reliable technology for intervention in applied settings." Practitioners who utilize results from studies conducted in laboratories, or studies employing contrived settings, tasks, or dependent variables, also rely upon generalizations for which adequate validity has not been established.

According to Owen and Lee (1987), although it is often easier to obtain samples of students than to assess sport performers, the generalizability of findings from one group to the other is somewhat questionable, and even among athletes there are differences between elite and subelite competitors in their use of cognitive strategies. For example, Kirschenbaum, Ordman, Tomarken, and

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Holtzbauer (1982) found that positive self-monitoring affects behavior most favorably under those circumstances in which people are learning something new, not when they are maintaining or refining self-regulated behavior over time. The view expressed by Owen and Lee (1987), that there are differences in the cognitive strategies employed by “more” and “less” successful athletes, is supported by numerous other studies (Gould, Weiss, & Weinberg, 1981; Highlen & Bennett, 1979; Mahoney & Avenier, 1977; Mahoney, Gabriel, & Perkins, 1987; Meyers, Cooke, Cullen, & Liles, 1979).

In addition, authors or practitioners who attempt to generalize favorable research results with a particular intervention from one type of task to a different type of task, for example dynamic strength to static strength, closed skill (self-paced) to open skill (reactive), or a skill requiring high arousal to one requiring low arousal, are treading on equally thin empirical ice. In order to provide practitioners with a working body of accurate knowledge, and sport psychologists with suggestions for future intervention research, there appears to be a great need for a critical review of research addressing the efficacy of existing psychological interventions on athletes in competitive situations. Although reviews on psychological interventions have been conducted in the area of mental practice of motor performance (Corbin, 1972; Feltz & Landers, 1983; Richardson, 1967; Weinberg, 1982), to our knowledge a review of studies employing interventions with athletes in competitive situations does not exist at this time.

**Selection of Studies**

The selection criteria for this review comprised two major categories: (a) the research participants had to be athletes who competed on a regular and organized basis, and (b) the design had to involve performance (as the dependent variable) in a noncontrived competitive situation, in the sport in which the participants regularly competed. Examples of well-designed studies that were excluded on this basis are Boutcher and Crews (1987), Gravel, Lemieux, and Ladouceur (1980), Schomer (1987), and Ziegler, Klinzing, and Williamson (1982). Although each of these studies used athletes, none assessed actual performance in a noncontrived competitive situation. It is important to note here that we in no way mean to imply that research studies not meeting the criteria for selection into this review are not important; rather, they have great heuristic value as contributors to the knowledge base in the general field of interventions in sport.

A manual search of the literature going back to 1972, the widely recognized beginning of published sport psychology intervention research (Suinn, 1972), was conducted in the following journals: Behavior Therapy, Canadian Journal of Applied Sport Sciences, Cognitive Therapy and Research, International Journal of Sport Psychology, Journal of Sport Behavior, Journal of Sport Psychology, Perceptual and Motor Skills, Quest, Research Quarterly for Exercise and Sport, and The Sport Psychologist. In addition, any studies cited in an article in one of these journals was reviewed for possible inclusion into this review. In the selection process, both unpublished (where available) and published research studies were considered. Unpublished studies comprised theses, dissertations, and abstracts from the following annual conferences over the last 10 years (1978 was the earliest issue NASPSPA’s secretary could locate): American Alliance for Health, Physical Education, Recreation and Dance (AAHPERD); Association for
the Advancement of Applied Sport Psychology (AAASP); and North American Society for the Psychology of Sport and Physical Activity (NASPSPA). We are aware that many intervention studies may appear in non-English journals; however, these were not considered. After the selection process was completed, a total of 23 interventions (19 studies), all of which were published, were determined to have met all of the criteria for inclusion into this review. A number of AAASP and NASPSPA conference abstracts described unpublished studies that might have been included in this review. However, we were unable to obtain copies of those studies and consequently we were not able to include any unpublished studies in this review.

Classification of Interventions

For the purposes of this review, interventions were defined as actions initiated by someone other than the athlete that focused on psychological skills in an attempt to improve the athlete’s performance during competition. Interventions in this review were categorized into three areas: studies employing relaxation training, studies employing behavioral techniques, and studies employing cognitive restructuring interventions. These three classifications were based on typical content areas presented in texts on sport psychology interventions. Traditionally, relaxation techniques have been referred to as cognitive interventions, despite in many cases any attempt at the restructuring of cognitions. For example, Noel’s (1980) “coping strategy,” which followed a relaxation procedure, only involved “calmly observing any errors and making corrections as appropriate” (p. 223). This clearly does not involve any deliberate cognitive restructuring process and therefore is reflective of an intervention classified as relaxation. In essence, not all relaxation procedures actually contain the same, or similar, active therapeutic ingredients as other techniques traditionally believed to alter cognitions, for example systematic desensitization. For this reason we decided to create a separate category for those interventions employing relaxation training that did not have a clear and deliberate attempt to alter cognitions. Those interventions using biofeedback to induce relaxation before attempting some form of cognitive restructuring (De Witt, 1980) were included in the cognitive restructuring classification due to their restructuring component. The classification of interventions resulted in 9 being classified as relaxation, 3 as behavioral, and 11 as cognitive restructuring.

Coding Characteristics of the Studies

For purposes of clarity and brevity, the characteristics of the studies are reflected in Table 1 and coded into categories in three areas: subject characteristics, intervention characteristics, and research design characteristics.

The subject characteristics addressed three areas: the number of research participants in the study, their sex, and a brief description of the athletes used as research participants. Most athletes were classified as collegiate; however, those collegiate athletes on national teams were described as national level. Each of these areas provided information relevant to evaluation of the study and the samples to which its results may appropriately be generalized.

The intervention characteristics also addressed three areas, or questions: the task and whether it was primarily self-paced or reactive, the class of inter-
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<tr>
<th>Study</th>
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<th>Length of sessions</th>
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<th>Manipulation check</th>
<th>Results</th>
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<tr>
<td><strong>Relaxation</strong></td>
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<td>Hall &amp; Erffmeyer</td>
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<tr>
<td>(1983)</td>
<td>10</td>
<td>F</td>
<td>Collegiate athletes</td>
<td>Free-throw accuracy, self-paced</td>
<td>1. VMBR (relaxation &amp; imagery rehearsal)</td>
<td>10</td>
<td>20 min</td>
<td>Pre-post</td>
<td>Minimal</td>
<td>2&gt;1 in improvement in free-throw accuracy</td>
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<td>2. VMBR followed by exposure to videotaped modeling</td>
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<td>Lee &amp; Hewitt</td>
<td>36</td>
<td>F</td>
<td>Regional gymnasts (youth)</td>
<td>Gymnastic performance, self-paced</td>
<td>1. Visualization in flotation tank</td>
<td>6</td>
<td>40 min</td>
<td>Simple</td>
<td>None</td>
<td>1&gt;2, 3 in meet scores</td>
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<td>(1987)</td>
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<td></td>
<td>2. Visualization, in group setting, out of flotation tank</td>
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<td>3. Simple control group</td>
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<td>Mumford &amp; Hall</td>
<td>59</td>
<td>M &amp; F</td>
<td>Sectional &amp; national skaters</td>
<td>Skating figures, self-paced</td>
<td>1. Internal visual imagery</td>
<td>4</td>
<td>50 min</td>
<td>Motivational</td>
<td>None</td>
<td>1 = 2 = 3 = 4 in skating figures as rated by professional judges</td>
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<tr>
<td>Name</td>
<td>Gender</td>
<td>Age</td>
<td>Level</td>
<td>Activity</td>
<td>Progressive relaxation</td>
<td>Exposure to films related to, but not of, skating figures</td>
<td>VMBR</td>
<td>Simple control group</td>
<td>Imagery only</td>
<td>Attention-placebo control group</td>
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<td>Nideffer &amp; Deckner</td>
<td>M</td>
<td>1</td>
<td>M</td>
<td>Collegiate athlete</td>
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<td>Exposures to films related to, but not of skating figures</td>
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<tr>
<td>Noel</td>
<td>M</td>
<td>6</td>
<td>M</td>
<td>Collegiate level</td>
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<td>Exposures to films related to, but not of skating figures</td>
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<tr>
<td>Suinn</td>
<td>F</td>
<td>6</td>
<td>F</td>
<td>Collegiate level</td>
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<td>Exposures to films related to, but not of skating figures</td>
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<tr>
<td>Weinberg, Seabourne,</td>
<td>M</td>
<td>32</td>
<td>M</td>
<td>University karate club</td>
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<td>Exposures to films related to, but not of skating figures</td>
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<td>&amp; Jackson</td>
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<td>Exposures to films related to, but not of skating figures</td>
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<td>Weinberg, Seabourne,</td>
<td>M</td>
<td>18</td>
<td>M</td>
<td>University karate club</td>
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<td>Exposures to films related to, but not of skating figures</td>
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<td>&amp; Jackson</td>
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<td>Exposures to films related to, but not of skating figures</td>
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<tr>
<td>Behavioral</td>
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<tr>
<td>Heward (1978)</td>
<td>9</td>
<td>M</td>
<td>&quot;Semi-pro&quot; athletes</td>
<td>Baseball batting efficiency (EA), reactive</td>
<td>Performance contingent monetary rewards</td>
<td>14</td>
<td>4-6 at bats</td>
<td>Single-S</td>
<td>NA</td>
<td>Players improved 22% in batting efficiency average (EA) after reinforcement phase; EA did not decrease during baseline phase two</td>
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<tr>
<td>Kirschenbaum,</td>
<td>67</td>
<td>F</td>
<td>League bowlers</td>
<td>Bowling performance, self-paced</td>
<td>1. Instruction &amp; (+) self-monitoring 2. Instruction &amp; (-) self-monitoring 3. Instruction only 4. No-contact control group</td>
<td>&lt;15</td>
<td>1 game</td>
<td>Motivational</td>
<td>Minimal</td>
<td>1 = 2 = 3 = 4</td>
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<td>Ordman, Tomarken,</td>
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<tr>
<td>&amp; Holtzbauer (1982)</td>
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<tr>
<td>Komaki &amp; Barnett</td>
<td>5</td>
<td>M</td>
<td>Pop Warner</td>
<td>Execution of 3 football plays, reactive</td>
<td>Checklist use with contingent feedback &amp; modeling</td>
<td>24</td>
<td>1-4 trials</td>
<td>Single-S</td>
<td>NA</td>
<td>Overall performance increased after each intervention phase was introduced, as rated by &quot;non-blind&quot; coaches</td>
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<td>(1977)</td>
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<tr>
<td>Study</td>
<td>Participants</td>
<td>Intervention Details</td>
<td>Condition</td>
<td>Improvement</td>
<td>Notes</td>
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<tr>
<td>Cognitive Restructuring</td>
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<tr>
<td>De Witt (1980)</td>
<td>6 M Collegiate Football athletes</td>
<td>EMG feedback, relax., systematic desensitization</td>
<td>12 1 hr</td>
<td>Pre-post</td>
<td>None</td>
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<td></td>
<td>12 M Collegiate Basketball athletes</td>
<td>1. EMG &amp; HR feedback, relaxation combined with imagery &amp; cognitive restructuring</td>
<td>11 1 hr</td>
<td>Pre-post, simple</td>
<td>None</td>
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<tr>
<td>Fenker &amp; Lambiotte (1987)</td>
<td>28 M Collegiate Football athletes</td>
<td>Relaxation and imagery of readiness &amp; coping, centering, establishing a performance, not goal, orientation</td>
<td>@50 10 min or occasionally 1 hr</td>
<td>None</td>
<td>Adequate Higher game &quot;grades&quot; assigned by &quot;non-blind&quot; coaches; the team's &quot;best season in 20 years&quot;</td>
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<tr>
<td>Hamilton &amp; Fremouw (1985)</td>
<td>3 M Collegiate Free-throw athletes</td>
<td>Relaxation with cog restructuring and in vivo rehearsal</td>
<td>@15 hrs</td>
<td>Single-S total</td>
<td>None</td>
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<th>Study</th>
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<tbody>
<tr>
<td>Heyman (1987)</td>
<td>1</td>
<td>M</td>
<td>Amateur boxer</td>
<td>Boxing performance in “noisy” arenas, reactive</td>
<td>Hypnosis with “noise” stopping, systematic desensitization</td>
<td>3;18</td>
<td>30 min; 1 hr</td>
<td>Single-S</td>
<td>Minimal</td>
<td>Sig. higher ratings of both offense &amp; defense in noisy fights by boxer &amp; “non-blind” coach; increased number of punches thrown during noisy, postintervention fights</td>
</tr>
<tr>
<td>Kirschenbaum &amp; Bale (1980)</td>
<td>1</td>
<td>M</td>
<td>Collegiate player</td>
<td>Golf performance, self-paced</td>
<td>Self-regulation training consisting of relaxation, planning, imagery, &amp; (+) self-monitoring &amp; self-statements</td>
<td>?</td>
<td>1 round</td>
<td>None</td>
<td>Minimal</td>
<td>Improved, on average, one stroke per 18 holes of golf</td>
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<tr>
<td>3 M Collegiate players</td>
<td>M</td>
<td></td>
<td>Golf performance, self-paced</td>
<td>Self-regulation training consisting of relaxation, planning, imagery, &amp; (+) self-monitoring &amp; self-statements</td>
<td>?</td>
<td>20 min of relaxing</td>
<td>Single-S</td>
<td>Minimal</td>
<td>Improved, though n.s. (1 or 2 strokes), as predicted by multiple baseline design</td>
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<tr>
<td>Athlete Type</td>
<td>Gender</td>
<td>Age</td>
<td>Sport</td>
<td>Intervention</td>
<td>Duration</td>
<td>Notes</td>
<td>Results</td>
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<td>Mace, Eastman, &amp; Carroll (1987)</td>
<td>1 M</td>
<td></td>
<td>Olympic athlete</td>
<td>Pommelled-horse performance, self-paced</td>
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<td>Improved performance, relative to other gymnasts, in a number of meets</td>
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<tr>
<td>Meyers &amp; Schleser (1980)</td>
<td>1 M</td>
<td></td>
<td>Collegiate player</td>
<td>Basketball shooting, reactive</td>
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<td>Sig. increased field goal %, points per game, &amp; % of team scoring; number of shots taken decreased</td>
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<tr>
<td>Meyers, Schleser, &amp; Okwumabua (1982)</td>
<td>1 F</td>
<td></td>
<td>Collegiate athlete</td>
<td>Free-throw accuracy, self-paced</td>
<td></td>
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<td>Increased and decreased sig., as predicted by reversal design</td>
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<tr>
<td>Meyers, Schleser, &amp; Okwumabua (1982)</td>
<td>1 F</td>
<td></td>
<td>Collegiate athlete</td>
<td>Field-goal accuracy, reactive</td>
<td></td>
<td></td>
<td>Improved from 37% to 52%</td>
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vention employed (relaxation, behavioral, or cognitive restructuring) and a brief description of the variant or technique used, and the number and length of the intervention sessions comprising the independent variable.

The design characteristics addressed three vital issues: what controls were or were not built into the research design, what if any manipulation checks were employed, and what were the results of the study. The first of these three issues has been a long-standing problem for some of the intervention research in sport psychology. Studies in this review were coded, as in the mental practice review by Feltz and Landers (1983), as having either a pre-post-only design (pre-post), a simple control group design (simple), or a motivational control design (motivational). However, an additional category was created for those studies employing appropriate single-subject designs, such as A-B-A-B or multiple baseline, as suggested by Bryan (1987). Single-case studies that did not employ an appropriate single-subject design were coded as having no control.

The issue of manipulation or intervention checks is of equal importance to the soundness of the research methodology employed in many of these studies, especially those utilizing interventions classified as either relaxation or cognitive restructuring, due to the subjective nature of how individuals experience such interventions. It is important to assess which aspects of the intervention are more or less believable in order to optimize the benefits of future applications of the intervention. The manipulation checks employed were classified, purely upon subjective criteria and through consensual validation, as none, minimal, adequate, or detailed. A minimal manipulation check involved a limited assessment of how engaging or helpful the research participants found the intervention. An adequate manipulation check (e.g., Fenker & Lambiotte, 1987), by contrast, involved an attempt to assess the degree to which subjects were affected by each component of the intervention. A detailed manipulation check was essentially an extensive assessment of how each research participant experienced each component of the intervention. For instance, Weinberg, Seabourne, and Jackson (1981, 1982) employed 11-point Likert scales (e.g., 1 = never present to 11 = always present) and asked a number of detailed questions about the interventions (e.g., "During your 20-minute relaxation period, how long was your ‘ing’ [mantra] present?") and therefore received a rating of "detailed." Finally, a brief discussion of whether the intervention was successful or not was reported under the results column. The table likely will not do justice to the intricacies of each study but should adequately represent each study’s subject, intervention, and design characteristics, as well as its results.

**Review**

The studies in Table 1 seem to show, in general, that the interventions used to enhance the performance of athletes in competitive situations were associated with improvements. It is possible to infer causality in only 11 of the 23 interventions in this review; of those 11 interventions, eight (Hamilton & Fremouw, 1985; Heward, 1978; Heyman, 1987; Kirschenbaum & Bale, 1980; Komaki & Barnett, 1977; Meyers, Schleser, & Okwumabua, 1982; Weinberg et al., 1981, 1982) were shown to have enhanced performance. As these are clearly only broad statements, there are numerous restrictions, moderating variables, and limitations that must be acknowledged. These concerns will be organized and addressed under
subject, intervention, and research design characteristics. A meta-analysis was not conducted due to the relatively small number of studies in each of the three areas. In addition, the 23 interventions are far too heterogeneous in subject, intervention, and design characteristics to enable one to appropriately utilize meta-analysis.

Subject Characteristics

The number of subjects employed in the interventions reviewed ranged from 1 to 67. The majority of the studies used less than 10 subjects, which is typical of intervention studies in sport psychology (Suinn, 1987). Most of these subjects were males. Sixteen interventions used male athletes, six used female athletes, and only one study (Mumford & Hall, 1985) used male and female athletes in the same design.

One might assume that the recent interest in elite athletes would be reflected in samples employed in sport psychology studies. However, only three interventions (Heward, 1978; Mace, Eastman, & Carroll, 1987; Mumford & Hall, 1985) used national or elite athletes as their subjects. Clearly, most of the research has been conducted with collegiate athletes. This trend is similar to what Landers and his colleagues (Landers, Boutcher, & Wang, 1986) found in their survey of Journal of Sport Psychology manuscripts. Few manuscripts submitted to that journal had attempted to assess scientifically the effectiveness of different intervention techniques for elite athletes. As they noted, college and university athletes are predominantly used because they are usually the most available subjects, and obtaining permission to conduct research with elite athletes is often quite difficult (Ravizza, 1988). This is problematic in that generalizability beyond the college level athlete is thus limited.

Only two interventions used youth athletes (under 18 years of age) as subjects (Komaki & Barnett, 1977; Lee & Hewitt, 1987). Komaki and Barnett used a behavioral approach to coaching youth football to improve desired play execution in the offensive backfield. The intervention consisted of behavioral specification and positive reinforcement of frequently run offensive plays. Although the intervention improved performance, the trained observers were either involved in or aware of the experimental manipulation. Lee and Hewitt used young gymnasts (ages 9–17 yrs) to examine the effect of visual imagery in a flotation tank on performance but did not design the intervention for the purpose of specifically benefiting young athletes.

Smith and Smoll (1982) have developed a coping skills program for young athletes directed at the cognitive appraisal and physiological arousal components of stress. Progressive muscle relaxation is used to reduce physiological arousal, and self-statements and self-instruction are used to alter unrealistic beliefs and reduce cognitive anxiety. This cognitive-affective stress management program was used with national level youth (ages 16–18) volleyball players and was found to be somewhat effective in helping the athletes perform in a service return drill and in helping them control their negative thoughts when viewing a videotaped poor volleyball performance (Crocker, Alderman, & Smith, 1988). Interestingly, the program was not effective in reducing anxiety as measured by the Competitive State Anxiety Inventory–2 (Martens, Burton, Vealey, Bump, & Smith, 1983) and the Sport Competition Anxiety Test (Martens, 1977). Hellstedt (1987) also
designed a mental skills training program for young athletes that included relaxation, mental imagery, and goal-setting. Although the program effectively reduced competitive anxiety scores, its effects on competitive performance were not evaluated.

**Intervention Characteristics**

Interventions were investigated in 12 sports, about half of which were reactive and half self-paced. Most (83%) of the interventions tested athletes in individual sports or on individual skills (e.g., free-throw performance) within team sports. This may be due to the fact that individual performance is much easier to assess than team performance, and the athlete has more control over the outcome than in team performance. However, there may also be a greater need for interventions in individual sports/tasks, in which competitive stress is usually higher than in team situations (Simon & Martens, 1979).

The nature of the interventions were more educational (74%) than remedial in that they emphasized the development of psychological skills necessary for optimal participation and enjoyment of sport. The six interventions that were remedial in nature included a cognitive restructuring component and single-subject design. In the remedial studies (e.g., Heyman, 1987), typically the athlete or coach came to the author with an anxiety or concentration problem, an evaluation was conducted, and an intervention was developed and then assessed.

Eighteen of the 23 interventions (78%) were multicomponent and included relaxation in the treatment. Most of these (67%) used progressive muscle relaxation; however, a few used EMG relaxation or Benson’s relaxation response. As Suinn (1984) has noted, the activity oriented tensing/relaxing process involved in progressive muscle relaxation may be more appealing to athletes than the more passive approach. Six of the nine relaxation studies employed visual–motor behavior rehearsal (VMBR) (Suinn, 1972). This is a procedure first described by Suinn and involves relaxation training, usually progressive relaxation, followed by rehearsal using imagery. The studies that incorporated a cognitive component into the intervention typically started with some type of explanation/education session that was then followed by relaxation training, visualization, and then some type of coping procedure such as positive self-instruction.

Few studies (22%) compared the efficacy of different types of interventions or variations within a treatment strategy. Among the five interventions using this design, three demonstrated the superiority of a combined treatment procedure (e.g., VMBR) over a single type of treatment (e.g., only visualization) (Hall & Erffmeyer, 1983; Lee & Hewitt, 1987; Weinberg et al., 1981). Specifically, these studies found that various combinations of some type of relaxation plus imagery, or imagery and modeling, were superior to either relaxation or imagery alone. For example, in the Weinberg et al. (1981) study, subjects were randomly assigned to either a VMBR, relaxation only, imagery only, or attention-placebo control condition. Unfortunately, the other two studies (Hall & Erffmeyer, 1983; Lee & Hewitt, 1987) did not have a motivational control group and thus no conclusion can be drawn about the absolute efficacy of their combination treatment. More studies are needed in which the separate elements of an intervention package are compared in order to determine the most efficient intervention procedures.
Research Design Characteristics

Of the 23 interventions, 65% included some form of control. That is, 39% employed some type of control group and 26% employed an appropriate single-subject design. Five of those interventions employing a control group used a pre-post design with a motivational control group, two used a pre-post design with a simple control group, and one compared two treatment groups to a control group using a posttest-only design. To control for placebo effects and enable one to conclude that performance changes are due to certain interventions, research designs involving control groups should include motivational rather than simple, or no-contact, control groups. In addition, appropriate single-subject designs should be encouraged as, according to Bryan (1987), they provide an effective way to evaluate treatment-produced effects, to detect small but significant changes in performance over time, and to demonstrate that the observed changes in performance are due to the interventions provided.

As stated above, there were only 11 interventions for which we could conclude that the intervention caused significant changes in athletes' performances. These interventions either contained a motivational control group (n = 5) or used an appropriate single-subject design (n = 6). The rest of the interventions produced results that were difficult to interpret due to the limited internal validity inherent in their methodology. Most of the interventions using single-subject designs showed significant improvements in performance. However, only two of the interventions employing motivational controls (Weinberg et al., 1981; Weinberg et al., 1982, #2) could demonstrate the efficacy of the treatment over and above placebo or expectancy effects.

Nine of the interventions were considered case studies because they either did not include a control group or did not utilize an appropriate single-subject design (Smith, 1988). Although often seen as less than desirable, research with individual athletes or intact teams is a critical source of information for the sport psychology intervention field; however, the use of appropriate methodology must be encouraged. Sport psychologists or consultants are most likely to be asked to work with those individuals or teams performing below par. It is therefore suggested that adequate single-subject research designs, although often less convenient than basic pre-post designs, are a practical means by which our body of knowledge can grow. Heyman (1987) reported an example of what may be required of consultants or service providers if we are to increase our working body of knowledge. Essentially, despite pressure from an athlete and his coach to do otherwise, Heyman would not proceed with any interventions until he was able to know more about the athlete and thus could develop a method to evaluate scientifically any interventions.

Of the 22 interventions for which a manipulation check would have been appropriate, 18% utilized a manipulation check we believed was at least adequate. It is difficult to dispute that there are differences in how individuals experience various interventions, especially those classified as primarily relaxation or cognitive restructuring. It is for this reason that the need for manipulation checks in the sport psychology intervention research is so great, yet 80% of the studies classified as relaxation or cognitive restructuring did not include a manipulation check that we considered at least adequate. As previously stated, a manipulation
check rated as adequate involved an attempt to assess the degree to which subjects were affected by each component of the intervention, not merely whether they found it helpful or were engaged in it. More detailed manipulation checks, however, may prove fruitful in identifying factors thought to be more believable and therefore likely more efficacious. In addition, detailed manipulation checks could help us understand exactly what does affect change in performance.

The only manipulation check we rated as detailed was used by Weinberg et al. (1981, 1982). Their manipulation check employed 11-point Likert scales and included questions such as “How relaxed were you?” “How vivid were your mental images?” and “During your imagery did you try to get inside your body and experience the sensations involved or [did] you try to get outside your body and view yourself as a coach or spectator might?” The 11-point Likert scales differed according to the question; for example, the first question was answered on a scale ranging from 1 “not relaxed at all” to 11 “extremely relaxed,” while the third question was answered on a scale ranging from 1 “exclusively internal” to 11 “exclusively external” (for more details, see Weinberg et al., 1981).

Their motivational designs, in which one or more treatments were compared with either an attention-placebo or strength training, provided a relatively high level of internal validity; consequently their results likely reflected true intervention effects. However, additional analyses using manipulation check “scores” to try to predict intervention effects might have increased even more the meaningfulness and applicability of their results. Such analyses could have addressed numerous unanswered questions, for example, whether a linear relationship exists between the vividness of subjects’ images and the effects of imagery. We also suggest that, whenever possible, both self-report and physiological measures be used as manipulation checks in the future, something none of the studies in this review included.

We are additionally concerned that the intervention research in sport psychology has virtually ignored four relevant issues: the possibility of a bias toward the publication of studies with positive results, the issue of ethnic and/or cultural affiliation of research participants, the effects of interventions on nontargeted performance areas, and the maintenance of treatment effects. We had great difficulty obtaining any unpublished studies and therefore are not prepared to make any definitive statements regarding journal editors’ publication biases; however, we are skeptical that 87% of the interventions meeting the criteria for inclusion into this review, all of which were reported in published studies, reported positive results. It is also possible that those researchers not obtaining positive results are not submitting their research for publication as often as those who do obtain positive results. However, it is critical that research be submitted, and accepted, for publication on the basis of scientific contribution. Information on which interventions do not work, with which athletes, under which circumstances, would greatly assist practitioners in deciding which are the best interventions to employ or avoid when working with certain athletes.

Currently it is widely believed that certain psychotherapeutic interventions are more effective with individuals of different ethnic and/or cultural groups (Acosta, Yamamoto, & Evans, 1982). None of the studies included in this review, however, addressed the ethnicity or cultural affiliation of either the research participants or those individuals providing the interventions.
Third, the effects of interventions on nontargeted performance areas were rarely addressed by the studies included in this review. Meyers et al. (1982) and Meyers and Schleser (1980) were the only studies that reported information on nontargeted performance areas affected by the interventions. Their interventions were designed to improve either field-goal or free-throw shooting in collegiate basketball players, and in addition they also assessed other performance areas such as percentage of team scoring, shots taken, and so forth. For example, their 1980 intervention was designed to improve an athlete’s field-goal shooting; however, free-throws attempted and made, total points per game, and percentage of team scoring were also assessed. Their 1982 intervention was designed to improve free-throw shooting; however, they also reported data on the athlete’s field-goal shooting. Their results suggested that interventions designed to improve either free-throw or field-goal shooting had little effect on the other skill. More intervention research is clearly needed to examine the effects of psychological interventions on nontargeted performance areas.

Finally, none of the studies in this review included a follow-up assessment beyond the posttest. There are those psychotherapy researchers (Galassi & Galassi, 1984; Latimer & Sweet, 1984) who believe that if psychotherapeutic gains are not maintained for at least 6 months, the value and effectiveness of the interventions producing those gains are questionable; the same position is applicable to the sport psychology intervention research. Future research is needed to assess the maintenance of the effects of those interventions we have identified as effective in enhancing performance.

**Conclusion**

It appears that, in general, educational relaxation-based interventions and remedial cognitive restructuring interventions are effective in improving the performance of collegiate and adult athletes in competitive situations. Positive intervention results were reported in only two of the four relaxation-based interventions in which we could infer causality; however, positive results were also reported in all five of the relaxation-based interventions for which inferring causality was questionable. Positive results were reported in all 11 cognitive restructuring interventions, four of which possessed the appropriate methodology to allow the authors to infer causality. Due to the small number (3) of studies examining the effectiveness of behavioral interventions, no conclusions can be reached at this time regarding their effectiveness. However, only 18% of the studies in this review included an adequate manipulation check; consequently our understanding of exactly what does affect change in performance is limited.

Despite the apparent interest in elite and young athletes, very few studies in this review used elite or young athletes as research participants. In addition, the ethnic and/or cultural affiliation of both research participants and those providing the interventions was not addressed by any of the studies included in this review. Clearly, more research is needed that addresses the effects of different psychological interventions with elite, young, and minority athletes. We are additionally concerned that the publication of only those studies presently appearing in journals may misrepresent, or overestimate, the effectiveness of psychological interventions with athletes.
The following recommendations are presented for future research addressing the effectiveness of psychological interventions on athletes’ competitive performances. First, it is important to understand that single-case studies with pre- and postmeasures are not sufficient to infer causality. The use of appropriate single-subject designs is essential, for example A-B-A-B, multiple baseline, or those employing placebo, or motivational, control groups. Second, it is important that different interventions be compared to each other within future research studies and that more treatment manuals (e.g., Suinn, 1986) be made available so that future intervention research can become more standardized. Third, future research studies need to assess nontargeted performance areas and other outcomes (e.g., cognitive changes) in addition to the targeted performance components. Finally, the use of follow-up assessments must increase if the field of sport psychology is to build an accurate body of knowledge regarding the immediate and long-term effects of different psychological interventions on athletes performing in competitive situations.

References


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