Evaluation of mental preparation strategies for the 200 meter run: A controlled outcome study

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EVALUATION OF MENTAL PREPARATION STRATEGIES FOR THE 200 METER RUN: A CONTROLLED OUTCOME STUDY

by

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Bachelor of Arts
University of Nevada Reno
1999

A thesis submitted in partial fulfillment of the requirements for the

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ABSTRACT

Evaluation of Mental Preparation Strategies for the 200 Meter Run: A Controlled Outcome Study

by

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Few studies have been conducted on improving anaerobic running performance. The present study evaluated the relative influence of several mental preparation strategies on performance in running 200 meters. Seventy-nine participants were recruited from the University of Nevada, Las Vegas Psychology Department Subject Pool. Baseline run times were established for the 200 meter run. One week later and immediately prior to running 200 meters again, participants were randomly assigned to one of three conditions: 1) statements delivered by research assistants related to technical skills and motivational statements, 2) questions related to what the participant is experiencing, and 3) statements expected to inhibit optimal performance. As compared with the aforementioned questions, the technical and motivational intervention statements were hypothesized to significantly improve performance, whereas administering inhibitory statements about performance was expected to worsen running performance. Results revealed no significant differences among these conditions. Future directions regarding mental preparation strategies are discussed in light of these findings.
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CHAPTER 1

INTRODUCTION & LITERATURE REVIEW

To be where we are, and to become what we are capable of becoming, is the only end in life.

-Robert Louis Stevenson

The aspiration of perfecting human performance has been a pervasive human endeavor from the Olympic Games of ancient Greece to the modern explosion of professional sports. Indeed, this aspiration is reflected by a multitude of historical and philosophical precedents in Western culture. The notion that one might be intrinsically motivated to strive for higher standards of performance as a process for its own sake, has been reflected by some of the most influential Western thinkers (e.g. Benjamin Franklin, Thomas Jefferson, Charles Darwin). Although the most recent iteration of this ideal can be found in the popular culture of self-improvement, improving performance has implications with universal human appeal. Whether the aim is to prevent decline, maintain competence, promote productivity, or strive for perfection, the improvement of human performance in sport and exercise activities is the fundamental objective of sport psychology interventions. The core of sport psychology is a logical outgrowth of this historical pursuit of growth and perfection.
The purpose of this section will be to review relevant cognitive-behavioral interventions in performance enhancement. We will begin with a concise description of the historical background behind these interventions.

The recent expansion of applied sport psychology and research has thrust performance enhancement to the forefront of mainstream psychology. Until recently, the burgeoning field of sport psychology was considered to be in its nascent state. Although sport psychology is commonly considered a newly emerging area within the field of psychology, its presence is not an entirely recent development. In actuality, the study of the person-performance relationship may be traced to the late 1800's, coinciding with the beginnings of the scientific investigation of human behavior and mental processes in psychology (Davis, Huss, & Becker, 1995). Despite the early beginnings of this specialty area, activity in performance enhancement was diminutive in comparison with the ensuing period. From 1950 to 1980, sport psychology research, literature, methods, and services expanded dramatically (Landers, 1995). Sport psychology made the transition from laboratory to field research as services were extended to coaches, athletes, and teams (Gould & Pick, 1995; Landers, 1995; McCullagh, 1995). During this time, the question of whether psychological interventions can enhance performance shifted to under what conditions can this be accomplished and for which tasks? One task for which measurable improvements have been particularly difficult to establish is performance in anaerobic running events (Caudill, Weinberg, & Jackson, 1983; Meyers, Whelan, Murphy, 1992) such as the 100 and 200 meter runs.

Interventions grounded in one theoretical perspective in particular have had a profound influence on the delivery of sport psychology services. The advent of cognitive-
behavioral interventions was at least as important in sport psychology as in the field of psychology as a whole. Once the Cognitive Revolution thrust the examination of mental processes to the forefront of mainstream psychology, cognitive strategies in sport psychology emerged. Beginning in the early 1980s, several researchers in sport psychology adopted the fundamental assumptions that 1) behavior is determined by the dynamics of thoughts and emotions and, 2) cognitive activity can be altered to facilitate desired performance behaviors. Albert Ellis (1982), as well as Williams and Leffingwell (1996), acknowledged the pervasiveness of irrational beliefs in sports, which are so common they have become clichés (e.g., “no pain, no gain,” “winning isn’t everything, it’s the only thing”). It was hypothesized that problematic cognitive patterns (e.g., irrational, distorted, negative thoughts) are at the heart of performance difficulties, and it was suggested that these patterns could be identified and restructured to form more accurate and optimistic patterns. Consistent with positive thoughts and emotions, desired behavior that facilitates performance would follow.

Thought content associated with optimal performance outcomes was thoroughly examined in several analyses, and interventions targeting thought content were constructed. Greenspan and Feltz’s (1989) review of treatment outcome studies suggests that successful athletes utilize cognitive strategies differently than do less successful athletes and that they consequently experience greater performance benefits. Gould, Eklund, and Jackson (1992) interviewed all 20 members of the 1988 Olympic wrestling team and found that wrestlers reported their best performances after using mental preparation techniques targeting confidence, optimal arousal, focusing attention, and...
tactics. In addition, golfers reported more self-confidence in tournament competition preceded by cognitive reinforcement strategies (Cohn, 1991).

Meyers, Whelan, and Murphy (1992) performed a meta-analysis of the efficacy of several of the rapidly proliferating cognitive-behavioral interventions, including goal setting, imagery and mental rehearsal, arousal management, and cognitive self-management. Goal setting emphasizes near term, midterm, and long term performance goals that are specific, concrete, and measurable. Challenging and realistic goals are evaluated in terms of attainment with emphasis on process and effort over the performance outcome. The effectiveness of goal setting strategies on performance has been equivocal. Imagery and mental rehearsal involves interventions incorporating strategies for visualizing specific factors assessed as essential to optimal performance. The diverse collection of practices that constitute imaginal rehearsal typically includes closing the eyes, visualizing motor skills, and can include using auditory, visual, and emotional stimuli (Suinn, 1993). Mixed results have been found for the effectiveness of imaginal rehearsal for increasing arousal. Research suggested that more experienced athletes benefit from mental practice when compared to novices (Suinn, 1993), however imaginal rehearsal has been shown to be more generally effective when combined with additional interventions. For example, rehearsal was effectively combined with relaxation and self-talk by Kendall, Hrycaiko, and Martin (1990) for basketball performance during games. Arousal management strategies incorporate either relaxation or “psych-up” techniques aimed at increasing arousal. Progressive muscle relaxation employs several exercises involving brief instructed muscular tension followed by relaxation of systematically targeted muscle groups. A review by Greenspan and Feltz (1989) reported
that positive effects of relaxation training on performance were found in two of nine interventions, whereas when causality was disputable, all the interventions demonstrated positive effects on performance (Gould & Udry, 1994). (Stress inoculation training and biofeedback techniques are also occasionally utilized, however performance benefits have not been firmly established.) Although the effectiveness of “psych-up” strategies remains tentative (Meyers, Whelan, & Murphy, 1992), several patterns have emerged. One key research finding has been that mental preparation involving arousal elevation techniques are more effective on strength (Tynes & McFatter, 1987), endurance, and sprinting than for motor tasks requiring more skill, timing, speed, and balance when compared to attentional focus, imagery, distraction tasks, and controls (Meyers, Whelan, & Murphy, 1992; Gould & Udry, 1994). Cognitive self-management interventions include attentional focus, self-instruction, self-monitoring, and cognitive restructuring. With the exception of attentional focus and self-instruction strategies, all interventions have demonstrated considerable efficacy when compared with controls, according to Meyers, Whelan, and Murphy (1992). In addition, multi-component interventions, consisting of a combination of the aforementioned interventions, have demonstrated efficacy in controlled studies. Thus both existing reviews of the literature supported the efficacy of several cognitive-behavioral interventions (Greenspan & Feltz’s, 1989; Meyers, Whelan, & Murphy, 1992) with athletes, including relaxation and cognitive restructuring.

Much has changed since the publication of these outcome studies. Today, sport psychologists work in closer contact with professional organizations, athletes, coaches, and teams. At nearly all competitive levels, athletes in both individual and team sports are
increasingly pursuing performance enhancement strategies by consulting with sport psychologists (Miller, Carlyle, & Pease, 1992; Sullivan & Hodge, 1991). To meet the increasing demand for performance enhancement services, an increasing number of sport psychology consultants provide assistance to athletes, coaches, and teams (Gordon, 1990). Consistent with this trend, the application of psychological skills-based training has become an essential component of sport psychology interventions (Hardy & Jones, 1994). Much of this trend can be attributed to the fact that interventions in sport psychology have demonstrated efficacy in enhancing performance. Simply put, sport psychology works. Performance enhancement strategies have increasingly demonstrated efficacy in a multitude of arenas. Nevertheless, these reviews may be misleading without considering that performance enhancement strategies seldom conform to one of the aforementioned intervention categories. In practice, interventions are rarely implemented as isolated components. Instead, multi-method combinations of interventions such as attentional focus, imaginal rehearsal, psyching-up, and relaxation techniques provide the framework for mental preparation and performance enhancement packages.

Despite the heterogeneity of strategies integrated within multi-component interventions, there exists a common element connecting most cognitive-behavior interventions in performance enhancement – the emphasis on self-talk. Self-talk may be defined as internal dialogue (e.g., self-statements) in which the individual interprets thoughts and feelings and responds with instructions and reinforcement (Hackfort & Schwenkmezger, 1993; Hardy, Gammage, & Hall, 2001). Investigations of interventions involving efforts to identify, evaluate, and modify self-talk prior to and during performance are rooted in the premise that positive self-talk results in affective
improvements such as reduced anxiety, increased effort, and higher self-confidence (Finn, 1985; Weinberg, 1988) with behavioral change (e.g., performance enhancement) as the ultimate end. Employment of positive self-statements prior to performance challenges is thought to improve physiological preparation (Rushall, 1982; 1984). Several studies attribute this activating effect to its positive influence on performance to facilitation of motivation, encouragement (Desiderato & Miller, 1979; Kirschenbaum & Bale, 1979; Rushall, 1975; Weinberg, Jackson, & Smith, 1984), and instructional assistance (Chorkawy, 1982; Rushall, 1975; Zinnser et al., 1998). Thus researchers have proposed that thought content prior to performance directed toward positive mood words and task-relevant content (Anderson, 1997) might improve performance. This notion appears to be gaining momentum. Two specific types of statements received prior to performance appear to improve performance. Motivational statements seem to inspire greater effort, generate a positive mood, and increase self-confidence, whereas task-relevant instructional statements may enhance performance by directing desired behavior on tasks through focusing on strategy execution (Hardy, Jones, & Gould, 1996).

Motivation and attention to technical skills appear to be key factors in performance enhancement efforts.

Theodorakis, Weinberg, Natsis, Douma, and Kazakas (2000) evaluated the potential performance effects of motivational and instructional “self-talk” utilizing an innovative design. Motivational and instructional conditions were separately compared to a control across four different performance tasks. This was carried out by conducting a series of four treatment outcome studies, each with a different sample. Significantly better performance was predicted for the instructional intervention (i.e., “I see the net, I see the
target,” “I move fast and strong”) in tasks involving greater technique skill, timing, and precision (i.e., soccer accuracy test, badminton service test). The motivational intervention (instructions to say “I can” immediately prior to the task) was predicted to lead to statistically significant improvements in strength and endurance tasks (i.e., knee extension test, isokinetic dynamometer). In the first study, 72 male high school soccer players were matched for accuracy in an empirically validated soccer passing test and subsequently assigned to the motivational condition, instructional condition, or a control condition in which they heard no self-talk instructions. After the matching trial, participants performed the soccer test a total of four more times. Consistent with predictions, instructional condition participants performed significantly more accurate passes than control and motivational participants. Forty-eight university students volunteered for the second study, which used a similar experimental design for performance on a badminton serve test. Consistent with the first study, instructional participants performed significantly better than participants in the other control and motivational conditions. Using a similar design, the third study examined the performance of 54 high school students on three minutes of sit-ups. No significant performance differences emerged, however motivational condition participants performed more sit-ups during the last trial than participants in the other conditions. The fourth and final study examined strength and endurance with 63 university students on a test measuring leg extension performance. After being matched for performance, participants were assigned to one of the three experimental conditions. Results of this study indicated that the motivational and instructional participants performed significantly better in the leg extension test than those in the control condition. In
summary, these four studies suggested that instructional interventions are indicated for tasks requiring fine motor movements and precision, whereas, for strength and endurance performance, instructional and motivational tasks are equally effective. Far from being an entirely novel notion, this conclusion is consistent with several studies that have demonstrated the effectiveness of instructional strategies for complicated technical tasks. Rushall and Shewchuk (1989), for example, reported performance improvements for swimmers following self-talk focused on task-relevant content, positive mood words, and other positive thinking strategies.

Even simple cues such as “step, swing” in tennis appear to stimulate cognitive associations that encourage the acquisition of appropriate task execution (Bunker, Williams, & Zinsser, 1993; Zinsser et al., 1998). Self-talk that is rehearsed prior to performance can improve speed and volume of work output for athletic tasks during practices, leading to improved skill execution in competition (Rushall, Hall, Roux, Sasseville, & Rushall, 1988). Despite the wealth of support for these strategies, the relative effectiveness of these strategies for use in particular athletic tasks such as short-distance runs and balancing is yet to be conclusively determined. Concomitantly, the methods of implementation (i.e., instructions from others, self-instructions) have varied across studies, and optimal methods have not been determined.

The overwhelming majority of mental preparation procedures aimed at enhancing athletic performance relies on individual athletes to self-administer the respective interventions (e.g., rehearsal of task-relevant self-talk or imagining optimal performance). Internal and external factors may interfere with the successful delivery of self-administered statements or imagery. Internal factors may include performance anxiety,
memory deficits, and lack of practice. The ideal amount of practice required for optimal self-implementation of statements or imagery may be difficult to determine as it may vary according to individual differences and may even be state dependent. Lack of practice may likely result in ineffectual treatment outcomes. Failure to encode, store, or retrieve information may lead to forgetting significant components of the prescribed intervention. A relatively significant challenge to effective performance is maintaining an optimal level of arousal. Anxiety related to performance may interfere with mental rehearsal, which may reciprocally increase performance anxiety. Deleterious external factors associated with the athletic event may include distractions from competitors, teammates, coaches, fans, officials, other environmental conditions (e.g., wind, rain, heat). Any and all of these internal and external processes may act alone or interact to impede mental preparation, and ultimately optimal performance. In addition, treatment integrity may be compromised and confounded by the fact that it is difficult to construct manipulation checks to measure the use and content of self-administered statements. Whether or not athletes or participants in experiments reliably self-administer statements becomes questionable. One common approach to this problem utilized by Theodorakis et al. (2000) asks subjects “Did you have in mind the content of the phrase you used?” Unfortunately, this strategy is fraught with potential unreliability and may be influenced by acquiescence and socially desirable responding patterns. A more direct, observable, standardized strategy seems warranted.

Donohue, Barnhart, Covassin, Carpin, and Korb (2001) conducted a preliminary study to improve upon the implementation of self-statements prior to competition in athletic events. Donohue et al. (2001) developed and evaluated the effectiveness of
interventions in which facilitators administered task-relevant or motivational statements to cross country runners during their warm-up exercises prior to running. Not only was it hypothesized that this would circumvent the aforementioned obstacles associated with self-administered statements, but also with the burden of self-administration removed, attention might be allocated to performance relevant internal processes. In addition, manipulation checks could be more directly measured (e.g., tape recorded statements announced aloud were measured for reliability). In this study, six NCAA Division 1 female cross country athletes were instructed to run 1000 meters to the best of their ability. Baseline run times were obtained for each runner. Participants then ran 1000 meters on three separate occasions. For each occasion, they were assigned to one of three interventions administered five minutes prior to running, while warming-up. Potential order effects were counterbalanced employing a Latin square design. The three interventions consisted of a facilitator repeating motivational statements (e.g., you’re the definition of speed), instructions to focus on specific running techniques (e.g., run through the finish line), or asking what the runner was thinking. This study was the first of its kind as it required each athlete to select their own statements from a broader list of statements generated by other competitive track athletes. Instructions to focus on task relevant content for optimal running performance appeared to be slightly more effective than motivational statements, however, both motivational and technical statements were relatively more effective than the control condition. Due to a small sample of participants and use of a quasi-controlled experimental design, definitive conclusions could not be drawn. Nevertheless, the results did suggest that mental preparation methods can be customized to meet the idiosyncratic needs of athletes, while maintaining a standardized
protocol that facilitates future replications. Finally, this study lends support to the proposition that mental performance strategies may be effectively implemented by trained non-athlete facilitators.

Immediacy, one of the more powerful ingredients of behavioral interventions, is a principle often overlooked in cognitive-behavioral performance enhancement strategies. In order to overcome the inherent limitations of memory, interventions must be administered in the appropriate moments preceding performance to effectively transfer to the competitive environment. Interventions administered immediately before competition that incorporate instructions to focus on being aroused, motivated, or specific task-relevant actions have been supported by several controlled outcome studies (e.g., Donohue, Barnhart, Covassin, Carpin, & Korb, 2001; Gould, Weinberg, & Jackson, 1980; Rushall, Hall, Roux, Sasseville, & Rushall, 1988; Shelton & Mahoney, 1978; Theodorakis, Weinberg, Natsis, Douma, & Kazakas, 2000; Weinberg, Gould, & Jackson, 1980). One significant obstacle to the timely delivery of interventions prior to performance is the potential interference with sport-specific preparatory activities (e.g., warm-up and team routines). Athletes may become too distracted by the events leading up to performance to self-administer an effective intervention, and failure to do so may even evoke undue anxiety. A reasonable alternative incorporates a trained sports psychology assistant. Interventions delivered by trained personnel prior to performance (e.g., Donohue, et al., 2001) have the dual advantage of temporal appropriateness along with minimal task intrusiveness.

It has been well established that an optimal level of arousal is essential for responding to competitive task demands. Nevertheless, maintaining sufficient levels of arousal
throughout the course of both training and competition may prove difficult for many athletes. Several strategies have emerged to increase levels of arousal. In an early controlled investigation of preparatory arousal by Shelton and Mahoney (1978), Olympic weight lifters were assigned to “psych themselves up” or to count backwards prior to squeezing a hand dynamometer. Subjects who received the psych-up intervention exhibited greater performance than those in the control condition (counting backwards).

Oxendine (1970) and Martens (1977) suggested a certain degree of arousal is required for performing conditioned speed and strength tasks. In addition, they proposed that arousal level prior to competition and practice can be optimized with mental preparation instructions (i.e., “psyching-up”). Weinberg, Jackson, and Seaboune (1985) demonstrated that athletes who use planned “psyching-up” routines before competing became more mentally and emotionally prepared. When compared with controls, sprinters and hurdlers ran faster when “psych-up” interventions were applied one minute prior to competition (Caudill, Weinberg, & Jackson, 1983).

In 1980, Weinberg, Gould, and Jackson evaluated the effects of a “psych-up” intervention with 20 college students across tasks requiring balance, speed-of-movement-ball-snatch, and leg extension exercise. All subjects participated in both a counting backwards condition and a “psych-up” procedure. The psych-up intervention led to significant improvements in leg extension strength only, which suggests psych-up procedures may be more effective in tasks requiring conditioned strength and endurance when compared with more complicated tasks involving greater skill and timing.

Without standardized sport psychology interventions, athletes commonly utilize strategies to increase arousal prior to performance. Gould, Weinberg, and Jackson (1980)
examined the particular strategies utilized during non-standardized “psych-up” interventions. Several strategies were most frequently used. These included attentional focus (self-administered instructions to narrow attention to task relevant movements and skills), imagery (visualizing optimal task performance), and preparatory arousal (“emotionally charging-up”) during the “psyching-up” period. Gould, Weinberg, and Jackson (1980) subsequently examined the relative effectiveness of these strategies in 15 male and 15 female undergraduate students. A Latin square design was utilized to examine the effects of five different mental preparatory conditions (i.e., attentional focus, preparatory arousal, imagery, counting backwards control, rest) on a leg-strength task. Of the mental preparatory conditions, preparatory arousal and imagery techniques led to significantly greater output than the other conditions. Performance in the arousal and imagery groups were not significantly different with regard to leg-strength.

Using a between groups experimental design, Gould, Weinberg, and Jackson (1980), randomly assigned 30 males and 30 females to the aforementioned preparatory arousal, imagery, and rest conditions. Significantly greater improvements in leg strength resulted from the preparatory arousal condition compared to controls. Once again, no significant differences in performance resulted between preparatory arousal and imagery interventions. Although preparatory arousal may lead to leg strength performance improvement, it appears to be no better than a relatively unsophisticated imagery technique (e.g., Donohue, et al., 2001).

One key research finding shows that mental preparation involving arousal elevation techniques is more effective on strength (Tynes & McFatter, 1987), endurance, and sprinting than for motor tasks requiring more skill, timing, speed, and balance when
compared to attentional focus, imagery, distraction tasks, and controls (Meyers, Whelan, & Murphy, 1992; Gould & Udry, 1994). Nevertheless, it is unclear whether arousal elevation techniques actually increase states of arousal or athletes’ perceptions of arousal (Meyers et al. 1992; Whelan et al., 1990). Several factors that may mediate the arousal-performance relationship have been cited. These may include the nature of the task, individual experience or task familiarity, and cognitive aspects of the task including attentional focus (Whelan et al., 1990). In summary, depending on the nature of the performance task, increasing levels of arousal alone may not be sufficient to enhance performance.

Purpose of the Present Study

Despite the abundance of literature supporting the effectiveness of the multitude of sport psychology interventions to enhance performance, there are many unanswered questions regarding the permutations of participant type, sport type, and sport task. As studies evaluating mental preparation packages have proliferated, relatively fewer controlled investigations have specifically compared the performance benefits of individualized mental preparation methods.

A recent trend in performance enhancement utilizes methods of matching treatment to the idiosyncratic needs of the individual athlete (Jones, 1993; Doyle & Parfitt, 1997). Bull (1991) called for sport psychology interventions to be tailored to meet the individual needs of athletes, and Gould, Murphy, Vance, and May (1991) reported requests by athletes for consultants to individualize interventions. This may be achieved via direct solicitation of relevant information from participants in the generation of mental preparation statements. In a preliminary study, Donohue, et al. (2001) allowed athletes to
assist in generating technical and motivational statements for interventions. A Latin Squares design was utilized to evaluate these standardized mental preparation strategies on a sample of 6 Division I female cross country runners immediately preceding 1,000 meter runs. Results suggested motivational and instructional interventions were most effective with respect to post-test run times when compared to a more benign attention control intervention simply asking athletes to report thoughts and feelings prior to performance. Several athletes suggested combining technical and motivational interventions following performance. Following this suggestion, the present study will combine technical and motivational statements and extend evaluation of performance to a primarily recreational sample.

Consistent with research findings supporting interventions administered immediately before competition, the present study seeks to maximize temporal efficiency and minimize the intrusiveness of interventions delivered immediately prior to performance. According to Gould, Medbery, Damarjian, and Lauer (1999), coaches reported a need for practical mental skills training exercises that could be taught relatively simply and quickly (e.g., 10-15 minutes). Similarly, Donohue, et al (2001) reported that athletes suggested reducing intervention times from 5 to 2.5 minutes. This emphasis on parsimony and temporal efficiency will be addressed in the present study by abbreviating all intervention times to 2.5 minutes.

Hardy and Jones (1994) called for the development of techniques for gathering and evaluating self-statements because, “given the apparently important role of self-talk in sports performance, the amount of research in this area is rather disappointing.” The present study will empirically evaluate motivational and technical statements (combined),
deleterious statements, and attention control conditions on 200 meter runs. Building on research by Donohue et al (2001) and Miller and Donohue (in press), a list of motivational and technical statements developed by track and cross-country runners will be administered to participants to evaluate the effects on consumer satisfaction and performance in 200 meter runs. Similar to Van Raalte, Brewer, Lewis, Linder, Wildman, and Kozimor (1995), this study will evaluate the effects of negative statements with the addition of a deleterious condition. Deleterious statements will be developed by track and cross country runners, and effects on consumer satisfaction and performance in 200 meter runs will be measured after administration. An intervention that asks participants to list thoughts, emotions, and experiences prior to performance will be utilized as an attention control condition.

Expressed throughout the performance enhancement literature is a call for increased methodological thoroughness, examination of the processes through which interventions operate, extension of outcome studies to the field, the need to consider multidimensional mediating individual factors, and the identification of effective mechanisms of instructing athlete populations in use of interventions (Gould & Udry, 1994). Frequently suggested throughout the literature is further evaluation of the conditions under which specific interventions may be indicated. Studies in performance profiling and treatment matching appear promising (Jones, 1993; Doyle & Gaynor, 1997). Along these lines, treatments that combine several interventions and provide participants with the opportunity to individualize the intervention may foster increased satisfaction as well as improvement in performance. Following suggestions by several researchers (Donohue, et al., 2001; Doyle & Parfitt, 1997; Gould, Murphy, Vance, & May, 1991; Jones, 1993), this study offers a
controlled investigation of the performance benefits of individualized mental preparation methods. As such, participants will be actively involved in development of their own interventions by rating motivational, technical, and deleterious statements based on expected effects on performance in 200 meter runs.

Although meta-analysis (Meyers, et al., 1992) of the cognitive-behavioral interventions utilized to enhance performance demonstrated the efficacy of several interventions, self-instructional strategies lacked efficacy at the time. Subsequent investigations have begun to show the effectiveness of these strategies. Future research is necessary to determine the relative performance benefits these interventions may provide alone or incorporated into combined interventions (e.g., combining motivational and technical statements).

Researchers have suggested the need for controlled outcome studies (Greenspan & Feltz, 1989, Miller & Donohue, in press) and direct comparison of different performance enhancement interventions (Greenspan & Feltz, 1989; Suinn, 1986; Theodorakis, et al., 2000). Few studies have investigated the influence of statements on speed tasks and anaerobic performance, an example of which is short distance running (Caudill, et al., 1983). Of the studies examining anaerobic running performance, few performance enhancement strategies have demonstrated efficacy (Meyers, et al., 1992). The present study sought to address the relative absence of research evaluating the effects of statements on speed tasks and anaerobic performance by incorporating 200 meter run times as a dependent measure.

In summary, the purpose of this study was to employ an individualized treatment strategy of motivational and technical and deleterious statements to evaluate the
effectiveness of these strategies against an attention control condition as well as the social validity of these interventions (i.e., consumer satisfaction). Unlike studies asking participants to rehearse statements privately, which may compromise intervention consistency among participants within the study, statements were read aloud to participants. Dependent measures included consumer satisfaction and performance in 200 meter runs.

Hypotheses

There were three hypotheses in this study. Hypothesis 1 was that performance in the 200 meter run would be significantly better for participants in the technical and motivational condition than in the deleterious and control conditions. Hypothesis 2 was that performance in the 200 meter run would be significantly better for participants in the control condition than in the deleterious condition. The technical and motivational intervention was hypothesized to improve performance by increasing positive thought and affective content (e.g., positive mood words, task relevant statements) and decreasing negative thinking patterns (e.g., negative mood words, irrational thoughts) associated with performance problems. The deleterious condition was hypothesized to worsen performance, similar to Van Raalte, Brewer, Lewis, Linder, Wildman, & Kozimor (1995), by increasing the probability of negative thought and affective content. The attention control condition was assumed to be a relatively benign condition, so it was hypothesized to be a suitable counterfactual representation from which to compare these interventions. Hypothesis 3 was that consumer satisfaction scores were expected to be significantly higher in the combined technical and motivational intervention than the attention control condition and deleterious conditions, and consumer satisfaction scores
were expected to be significantly higher in the control condition than the deleterious condition.
CHAPTER 2

STUDY 1

Methods

Participants

Ten participants were recruited to complete study 1 from the University of Nevada Las Vegas Track & Cross Country Team. Participants were athletes on the roster of the university women’s track & cross-country team. Participants were informed that they could participate if they were 18 years of age or older. Participants were 9 Caucasians, and 1 Hispanic/Latino. The mean age of the sample was 19.3 years (SD = 1.34).

Procedures

The purpose of this study was to solicit statements that athletes make to themselves that derogatorily influence running performance. Participants were sampled within a half hour of their workout to facilitate recall. All participants were given the same measures after completing the study consent form (see Appendix F). Participants were given a standard set of initial instructions regarding the completion of measures. Participants were asked to complete the Demographic Data Questionnaire (see Appendix C), and Competitiveness Questions (see Appendix E) respectively. Next, participants were asked to list statements they had heard or made to themselves that negatively influence their recent or past running performance. Once these statements were generated, a focus group was assembled consisting of the athletes and a facilitator from the research staff. The
purpose of this group was to discuss any additional statements they perceived as deleterious to running performance. Novel statements that emerged from the focus group not listed from the initial round were added to the original list. Finally, participants were provided the opportunity to ask questions. Qualitatively, athletes offered several anecdotal experiences in the focus group setting, providing examples to elaborate about the statements they generated (e.g., where they were, what was happening, and how they used or heard statements). Athletes also asked questions regarding the purpose of the study and how statements, thoughts, emotions, and sport psychology interventions might influence performance.

The final list of statements generated from this sample was used to develop the Sports Statements 3 (see Appendix B), which was used for the second stage of this study. Thirty statements were included to construct the Sports Statements 3 (see Appendix B). The statements from the initial list were modified to omit any profanity or reference to injury or harm to self or others. Pronouns were changed to increase the salience of statements to the sample in the second stage of the study (e.g., “I” was changed to “you”). Finally, verbs were changed to the future tense if appropriate (e.g., “you’re running too slow” was changed to “you’re going to run too slow”).

Measures

Two self-report measures were administered by trained research assistants: the Demographic Data Questionnaire (see Appendix C) and the Competitiveness Questions (see Appendix E).
This instrument asked for the following demographic characteristics from participants: age, gender, and race/ethnicity.

*Competitiveness Questions* (see Appendix E)

This instrument instructed participants to provide perceived competitiveness by responding to a 7-point scale ranging from 1 (extremely recreational) to 7 (extremely competitive). Participants were instructed to list general perceived competitiveness in athletic events as well as their perceived highest lifetime and current level of perceived competitiveness.

**Results**

Demographic was data collected from the first study with a sample of ten University of Nevada Las Vegas female cross country runners. Participants were 90% Caucasian, with one individual identifying as Hispanic/Latino. The mean age of the sample was 19.3 years of age with a standard deviation of 1.34 years (N = 10). Participants mean *lifetime* perceived competitiveness was 6.6 (analogous to extremely competitive) with a standard deviation of .52, whereas their responses to perceived *recent* level of perceived competitiveness resulted in a mean of 5.7 (analogous to very competitive) with a standard deviation of .95 (N = 10). The correlation between *lifetime* and *recent* perceived competitiveness ratings was \( r = 0.635 \), which was statistically significant (\( p < .05 \)).

After demographic and competitiveness data were gathered, responses were generated from the focus group. The final list of statements generated from this sample was used to develop the Sports Statements 3 form (see Appendix B), which was used for the second study. Thirty statements were included to construct the Sports Statements 3 form (see Appendix B). The statements from the initial list were modified to omit any profanity or
reference to injury or harm to self or others. Pronouns were changed to increase the
salience of statements from the participants in the first sample to those in the second
stage of the study (e.g., “I” was changed to “you”). Finally, verbs were changed to the
future tense if appropriate (e.g., “you’re running too slow” was changed to “you’re going
to run too slow”).

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CHAPTER 3

STUDY 2

Methods

Participants

Demographics

Demographic data was collected from the sample of 79 University of Nevada Las Vegas students. Participants were 69.6% males (N = 55) and 30.4% females (N = 24) between 18 and 25 years of age. The mean age of participants was 19.7 years, with a standard deviation of 1.48 years (N = 79). Participants mean lifetime perceived competitiveness was 5.4 (roughly analogous to “somewhat competitive”) with a standard deviation of 1.8, whereas their responses to perceived recent level of perceived competitiveness resulted in a mean of 4.0 (roughly analogous to equally competitive and recreational) with a standard deviation of 1.8. The correlation between lifetime and recent perceived competitiveness ratings was 0.541, which was statistically significant (p < .01).

In terms of race or ethnicity, participants identified as 53.2% Caucasian (N = 42), 17.7% Asian/Pacific Islander (N = 14), 15.2% African-American (N = 12), 11.4% Hispanic/Latino (N = 9), and 2.5% Other (N = 2).
Procedures

Recruitment

Participants were recruited from the University of Nevada Las Vegas Psychology Department Subject Pool. The standard recruitment statement listed in Appendix H, which briefly lists the aforementioned requirements, was posted on the recruitment website. These requirements are listed in more detail in the informed consent form (see Appendix G). Participants were informed that they may participate only if they are between 18 and 25 years of age and that full participation required attending two separate sessions one week apart. Participants were informed that they may not participate if they have any known medical condition that presents significant risk for injury or harm (e.g., asthma, pregnancy, heart condition, etc.).

Day One: Baseline Measurement

Participants arrived at the University of Nevada, Las Vegas Track the first day and were screened by trained research assistants to determine if they have appropriate attire and shoes for running. Upon satisfaction of this requirement, research assistants explained and discussed the informed consent form with participants. In addition, research assistants provided an opportunity for dialogue about the purpose and procedures of the study. Next, participants were asked to read the informed consent which explains the purpose and procedures of the study, as well as the pre-conditions of their participation, including being between 18 and 25 years old and not knowingly suffering from any medical condition that would put them at risk for injury or complications (see Appendix G). Next, participants were administered the Demographic Data Questionnaire (see Appendix C), Competitiveness Questions (see Appendix E),
Sports Statements 1 (see Appendix A), Sports Statements 2 (see Appendix A), and the Sports Statements 3 (see Appendix B) by research assistants.

Because it might differentially influence athletic performance (Butterfield, Lehnhard & Coladarci, 2002), body mass was calculated by measuring participants’ height and weight in an enclosed area to ensure confidentiality in the first session. In addition, an area was provided for research assistants to lead participants through a warm-up and stretching routine prior to running. Once participants were led through the warm-up, they were asked to run 200 meters to the best of their ability. More specifically, participants were instructed to run “as fast as you can” in groups of three divided by white lanes. Times were recorded by trained research assistants with Sportline® Translucent digital sports watches. Participants were instructed to return at the same scheduled time the following week.

Day Two: Experimental Conditions & Measurement

Approximately one week later, participants were led through a similar warm-up and stretching routine prior to running. Next, participants were randomly assigned to one of the following three experimental conditions.

Motivational and Technical Intervention. In this condition, the top 6 motivational and top 6 technical running statements endorsed from the Sports Statements 1 and 2 (see Appendix A) were read by trained research assistants to participants for 2.5 minutes prior to running 200 meters. Statements were read one at a time for the full 2.5 minutes. When the entire list was read completely, trained research assistants repeated statements, starting with the beginning of the list, until the full 2.5 minutes had elapsed.
Deleterious Statements Intervention. In this condition, the top 12 endorsed perceived negative statements endorsed from the Sports Statements 3 (see Appendix B) were read repeatedly to the participants by trained research assistants for 2.5 minutes prior to running. Consistent with the previous intervention, when the entire list was completed, trained research assistants repeated statements, starting with the beginning of the list, until the full 2.5 minutes had elapsed.

Attention Control Intervention. Participants were asked to provide their thoughts to trained research assistants once every 30 seconds prior to running for 2.5 minutes.

Upon being administered their respective interventions, all study participants were subsequently instructed to run 200 meters at fast as possible in groups of two or three (groups were matched by baseline run times such that runners that previously ran the fastest, slowest, and so on were be grouped together, running simultaneously). Participants were provided run times if desired, so long as they had completed the post intervention run. Finally, participants were asked to complete the Experiment Feedback Form (see Appendix I). Participants were provided with the opportunity for debriefing by trained research assistants.

Measures

Five self-report measures were administered by trained research assistants on day one. Measures of height and weight were taken. Run times were measured by trained research assistants immediately following interventions. After the final run, the fifth measure, the Experiment Feedback Form (see Appendix I), was administered.
Demographic Data Questionnaire (see Appendix C)

This instrument asked for the following demographic characteristics from participants: age, gender, and race/ethnicity.

Competitiveness Questions (see Appendix E)

The positive relationship between competitiveness and participation in sports has been noted (Eysenck, 1982). Participants with higher levels of competitiveness may be more motivated to participate in athletic events and may exert more effort in this study than those with relatively less competitiveness. In order to examine if intervention groups differ systematically by competitiveness prior to assignment to interventions, participants were instructed to provide perceived competitiveness by responding to a 7-point scale ranging from 1 (extremely recreational) to 7 (extremely competitive). Participants were instructed to list general perceived competitiveness in athletic and non-athletic events as well as their perceived highest lifetime and current highest level of perceived competitiveness.

Sports Statements 1 and 2 (see Appendix A)

Participants were provided with statements identified by athletes and coaches as helpful for running performance according to Donohue, Barnhart, Covassin, Carpin, & Korb (2001) and Miller and Donohue (in press). Instructions were provided to rate the degree to which several statements would motivate them to run their best according to 7-point scale ranging from 1 (influence me to run extremely faster) to 7 (influence me to run extremely slower). First, participants were provided with technical statements (e.g., “get an explosive start, focus on your running technique, take perfect strides”) and the preceding instructions. Next, they were instructed to circle the top 6 statements that
would lead them to run fastest. Second, participants were provided with motivational statements (e.g., “you’re going to dominate today, I believe in you, you can do it”) and the preceding instructions. Again, participants were instructed to circle the top 6 statements that would lead them to run fastest.

*Sports Statements 3 (see Appendix B)*

Participants were provided with statements that had been identified by athletes and coaches as having a negative effect on running performance from Study 1. Participants were instructed to rate the degree to which several statements would lead them to run their slowest according to a 7-point scale ranging from 1 (influence me to run extremely faster) to 7 (influence me to run extremely slower). First, participants were provided with negative statements (e.g., “the competition will pass you, you can’t do this”) and the preceding instructions. Next, they were instructed to circle the 12 statements they expected would lead them to run slowest. An “other” category was provided for any additional statements participants might have expected to influence running performance.

*Height & Weight*

Height and weight were measured on day one by trained research assistants. A Thinner® Glass SensorDisc™ Multiple-Load Cell Lithium Round Bath Scale, a digital scale with a 330 pound capacity, was used to measure body weight on a flat solid surface. Because all participants were asked to run with their shoes on, weight was measured while participants wore their shoes. Body mass index (BMI) was calculated using the ratio of height and weight using the following formula:

\[ \text{BMI} = \frac{\text{Weight in kg}}{\text{Height in meters}^2} \]
200 Meter Run Times.

Run times in the 200 meters were recorded by trained research assistants using Sportline® Translucent digital sports watches on the first day following warm-up, and immediately following interventions on the second day. Research assistants were trained in intervention administration as well. Research assistants were rotated among running lanes to record run times. In addition, research assistants were rotated among the three interventions. Research assistants recording run times were blind to the interventions with which participants were assigned. For the purpose of measuring inter-rater reliability of recorded run times, during the running trials, an additional research assistant was randomly assigned to record the run time for one lane. Thus a duplicate measure was recorded for one of the subjects. The intra-class correlation, which produces measures of consistency or agreement of values within cases, was used to measure consistency between research assistants measuring the same runner.

Experiment Feedback Form

After the final run, the Experiment Feedback form (see Appendix I) was administered. This measure served the dual purpose of consumer satisfaction and manipulation check assessment. Participants were asked to respond to a 7-point scale ranging from 1 (1 = strongly disagree; 7 = strongly agree). This self report form queried participants about the extent to which they 1) were thinking about what the facilitator said immediately before starting the run; 2) were thinking about what the facilitator said immediately during the run; 3) believed the statements helped them run faster; and 4) liked the statements. In other words, the Experiment Feedback Form measured self-
reported task preparatory cognitive processing, task concurrent cognitive processing, perceived statement effectiveness, and consumer satisfaction, respectively.

**Protocol Adherence**

To ascertain the degree of reliability in intervention implementation and protocol adherence, an additional research assistant intermittently observed intervention sessions. Using an independent form, the observer recorded the statements read to participants. Observer and assistants' statements were compared, and because all were college-educated individuals being asked to read brief statements of between 3 and 11 words with an average of 6.6 words per sentence, a task of relative ease (Flesch-Kincaid Grade Level 3.7), percentage agreement was used to measure adherence to protocol. A standard cutoff of 80% was used to ensure protocol adherence. Prior to measurement, it was decided that if less than 80% percent agreement were obtained, data would be discarded from subsequent analyses.

**Results**

**Frequently-Selected Motivational-Technical and Deleterious Statements**

Table 1 provides the technical and motivational statements most frequently selected as part of participants’ list of top 12 statements. The first column lists the 10 most frequently selected technical statements whereas the second column represents that number of participants who selected each motivational statement. Two subjects failed to fully complete Statement Forms 1 through 3, resulting in a sample of 77 individuals. For the technical statements, 62 of the 77 participants selected the technical statement “Get your body warmed up,” 54 chose “Stretch you muscles well,” and 40 endorsed “Get an explosive start.” The third and fourth columns of Table 1 list the 10 most frequently
selected motivational statements, and the corresponding number of subjects, respectively. For example, 33 participants selected the motivational statement “I believe in you, 31 chose “You’ve worked hard for this,” and 28 endorsed “This is what you’ve been training for.” Table 2 displays the most frequently selected deleterious statements (N = 77). Participants most frequently selected “You’re a terrible runner” (N = 49), “You’ll be tired before the end of the run” (N = 47), and “Your legs are weak” (N = 42). Additional frequently endorsed statements are displayed in Tables 1 and 2.

Protocol Adherence

For the three intervention conditions, research assistants used a checklist to ensure that the statements endorsed by participants and control questions were read completely. Percentage agreement exceeded the predetermined cutoff of 80% for all interventions. Fourteen administrations were observed by a second research assistant, and a total of 203 statements and control questions were administered. The percentage agreement obtained for statements administered within the combined technical and motivational statements intervention was 98.9% (N = 96), 100% (N = 35) for the attention control, and 98.6% (N = 72) for the deleterious statements. For the three interventions combined, the overall percentage agreement was 99.2% (N = 203).

Reliability of Run Time Measures

An intra-class correlation was used to measure consistency between research assistants measuring the same runner. The intra-class correlation was calculated for measurements of the pre- and post-intervention run times combined (N = 39). The single measure intra-class correlation coefficient was .958, which is extremely high.
Pre-intervention Comparisons Among Conditions

Age & Body Mass Index

Pre-intervention comparisons of the three groups subjected to the experimental conditions were conducted on age and body mass (continuous variables). Of the 79 individuals that participated in the experiment, 20 failed to show on the second day and were not included in these analyses, a 25.3% attrition rate. The one-way Analysis of Variance (ANOVA) test yielded no significant differences among experimental conditions in terms of age (N = 59), F (2, 56) = .982, p > .05. Of the 59 participants who were administered an intervention, body weight could not be measured for one individual due to equipment failure. As a result a one-way ANOVA was performed on body mass using data on the remaining 58 participants. Results indicated no significant differences among participants in the interventions with regard to body mass, (N = 58), F (2, 55) = .210, p > .05.

Gender & Race/Ethnicity

Chi-square tests were performed on gender and race/ethnicity (discontinuous variables), with the particular intervention received as the independent variable (e.g., control, motivational and technical statements, deleterious statements). Results indicated no significant differences among the experimental groups with regard to the number of males and females (N = 59), Chi-square = 0.945, p > .05. Similarly, results of a Chi-square test indicated no significant differences among the experimental groups in terms of race/ethnicity (N = 59), Chi-square = 8.07, p > .05.
Baseline Run Times

To assess potential pre-existing differences among the experimental groups on 200 meter baseline trial performance, an ANOVA was conducted utilizing the type of intervention received as the independent variable and time to run the 200 meter baseline trial as the dependent variable. Results yielded no significant differences among the experimental groups in their baseline run performance, $F(2, 56) = .670, p > .05$.

In summary, no significant pre-existing differences were detected between the three intervention conditions with regard to age, body mass, gender, race/ethnicity, and baseline trial run times.

Competitiveness

Pre-existing differences among the experimental groups in terms of highest level of perceived competitiveness in athletic events were examined using a one-way ANOVA. The experimental condition the participant received was the independent variable, whereas perceived competitiveness was the dependent variable. Two individuals failed to respond to questions regarding competitiveness over the last month, one from the control condition and one from the deleterious condition, resulting in 57 participants. No significant differences among the experimental groups were detected in perceived competitiveness for athletic events over the last month $F(2, 54) = 0.235, p > .05$.

Nevertheless, significant differences were found among the groups with regard to lifetime perceived competitiveness $F(2, 56) = 3.76, N = 59, p < .05$. Consequently, a Fisher-Hayter range test (Hayter, 1986) was conducted. Results indicated participants in the technical and motivational intervention reported significantly greater lifetime competitiveness than those assigned to the deleterious intervention ($p < .009$). As a result,
lifetime competitiveness was used as a covariate in the subsequent examination of experimental hypotheses regarding intervention effectiveness.

**Effectiveness of Interventions**

To examine the relative influence of the three experimental conditions on trial run performance, a repeated measures Analysis of Covariance (ANCOVA) was performed. The independent variable in this ANCOVA was type of experimental condition (motivational/running, attention control, negative statements). The dependent variable was run performance (time to run 200 meter baseline trial, time to run 200 meter post-intervention trial).

Using the ANCOVA, significant differences were found among the groups with regard to the covariate, lifetime perceived competitiveness (N = 59), F (1, 55) = 12.135, p < .001. Lifetime perceived competitiveness was significantly negatively correlated with baseline run times, r = -0.371, p < .01. In addition, lifetime perceived competitiveness was significantly negatively correlated with post-intervention run times, r = -0.364, p < .01. Finally, lifetime perceived competitiveness was significantly negatively correlated with the intervention to which participants were assigned, r = -0.343, p < .01. Results indicated no significant differences between participants’ (N = 59) baseline and post-intervention run times F (1, 55) = 3.02, p > .05.

The pre-post by intervention interaction was not significant with respect to run time, indicating no significant differences among the experimental groups in their run performance (N = 59), F (2, 55) = 0.77, p > .05.
Consumer Satisfaction

A one-way Analysis of Variance (ANOVA) using intervention type as an independent variable (i.e., combined statements, deleterious, and attention control interventions) was performed with the following dependent variables: 1) degree of participants’ perceived personal satisfaction, 2) perceived improvement in run performance, 3) cognitive processing of statements prior to running, and 4) cognitive processing of statements during to running. A total of 3 participants of the sample assigned to interventions (N = 59) failed to provide responses, 2 participants given the control questions and 1 person given the positive statements after leaving before they were instructed. As a result, 19 forms were completed by participants in the positive statements intervention, 18 by control participants, whereas all 19 positive were collected from the negative statements participants. No significant differences were detected among the three interventions with regard to participants’ perceived improvement in run performance, F (2, 55) = 2.84, p > .05. With respect to perceived satisfaction with the delivered statements, a significant difference was found among participants in the various interventions, F (2, 55) = 7.88, p < .001. A subsequent Fisher-Hayter range test (Hayter, 1986) indicated that participants assigned to the technical and motivational intervention reported significantly greater satisfaction (e.g., “I liked the statements) with statements than those of both the control (p < .003) and deleterious conditions (p < .0009). Table 3 displays the means and standard deviations of participant responses by intervention type.

Response to Interventions

As a manipulation check, a one-way Analysis of Variance (ANOVA) was performed on two items corresponding to participants’ cognitive processing of statements made by
the research assistants prior to and during post-intervention runs (dependent variables). This comparison utilized the combined statements, deleterious, and attention control interventions as independent variables. A total of 3 participants failed to provide responses, 2 participants who were administered the control questions and 1 person who was administered positive statements. As a result, 19 forms were completed by participants in the positive statements intervention, 18 by control participants, whereas all 19 positive were collected from the negative statements participants.

Significant differences were detected among the three interventions with regard to participants’ reported cognitive processing during experimental conditions and prior to running, $F(2, 54) = 8.44$, $p < .001$. A subsequent Fisher-Hayter range test (Hayter, 1986) indicated that participants assigned to the technical and motivational intervention reported significantly greater cognitive processing than those in the control condition ($p < .0002$). In addition, participants in the technical and motivational intervention reported significantly greater cognitive processing than those in the deleterious condition ($p < .03$). With respect to reported cognitive processing during the run, significant differences were found among participants in the various interventions, $F(2, 54) = 4.96$, $p < .02$. A Fisher-Hayter range test indicated that participants assigned to the technical and motivational intervention reported significantly greater cognitive processing than those in the control condition ($p < .005$). In contrast, participants in the technical and motivational intervention reported only marginally significantly greater cognitive processing than those in the deleterious condition ($p < .07$). Table 4 presents the means and standard deviations of participant responses by intervention type.
CHAPTER 4

SUMMARY, CONCLUSIONS, &
RECOMMENDATIONS

Results of Study 2 failed to support the original hypotheses. Compared to the attention control and deleterious interventions, the technical and motivational intervention was hypothesized to improve performance by increasing positive thought and affective content (e.g., positive mood words, task relevant statements) and decreasing negative thinking patterns (e.g., negative mood words, irrational thoughts). Compared to the attention control and technical and motivational interventions, the deleterious condition was hypothesized to worsen performance by increasing negative thought and affective content, consistent with Van Raalte, et al. (1995). No significant differences were found among the interventions with regard to running performance.

The two most parsimonious interpretations of these results are 1) technical and motivational interventions may not significantly improve performance for recreational individuals in the 200 meter run in comparison to deleterious statements and an attention control, or 2) participants were not sufficiently motivated to follow instructions to “run as fast as possible.” Indeed these and several other potential factors may potentially explain these nonsignificant findings. These factors may account for the findings alone or in combination with one another. Potential factors will be categorized as those initially anticipated as threats to validity or reliability of results and unanticipated factors. A priori

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attempts were made to measure anticipated factors, whereas the a posteriori unanticipated factors were obviously immeasurable.

Anticipated and unanticipated factors will be briefly identified here and subsequently addressed in additional detail. Anticipated factors included protocol adherence, reliability of run times, attrition, several pre-existing factors (e.g., age, body mass, gender, race/ethnicity, and baseline trial run times), and cognitive processing of interventions. Protocol adherence and reliability of run times were factors initially anticipated as potential threats. Results supported the integrity of interventions in terms of protocol adherence and the reliability of run times, the dependent measure of greatest interest. The high rate of attrition in the second study, however, may have rendered results less valid. Unanticipated factors that may have impacted results include environmental conditions, participants’ motivation, degree of rapport between research assistants and participants, differences between athletic and recreational samples, racial and ethnic differences between the participants in Study 1 and Study 2, the nature of the task (e.g., 200 meter anaerobic run), the possibility that participants’ are limited in predictive ability regarding statements that facilitate or inhibit optimal performance, or the possibility that technical and motivational interventions are not effective with regard to significantly improving performance for recreational individuals in the 200 meter run.

Protocol adherence and reliability of run time measurements were relatively high, far exceeding a priori cutoffs. Therefore, it is relatively unlikely that nonsignificant findings were substantially influenced by any failure to deliver statements in a reliable manner or failure to measure running times consistently. Consequently, the influence of treatment integrity and dependent measurement problems may be ruled out as threats.
The attrition rate for the second study was considerably high. Approximately 25% of participants failed to show for the second and final day of the study despite notification provided by research assistants that participants would be penalized by one half hour of research credit for failure to show up without 24 hour notice to the researcher, consistent with University of Nevada Las Vegas Psychology 101 Subject Pool policy. A significant amount of information was lost to attrition. It is possible that participants lost to attrition would have responded differently to interventions, changing the results of the study. It is arguably more likely, however, that remaining participants may have been more conscientious, which could have even increased the likelihood they would respond to interventions.

Significant differences were detected among the interventions with regard to cognitive processing of interventions immediately before running and during post-intervention runs. Participants in the combined technical and motivational intervention reported greater cognitive processing both prior to and during the 200 meter run in comparison to the control condition. Compared to the deleterious intervention, participants in the combined intervention reported greater cognitive processing prior to the 200 meter run as well. These results generally support the notion that participants processed the statements delivered in the experimental conditions, suggestive of good treatment integrity, however the degree to which social desirability may have influenced these positive reports is not known.

No significant pre-existing differences were detected among participants within the three intervention conditions with regard to age, body mass, gender, race/ethnicity, and baseline trial run times. It is therefore unlikely that run times were significantly
influenced by pre-existing differences with regard to these factors. Although a pre-existing difference was detected between participants assigned to the combined intervention compared to the deleterious intervention in terms of lifetime perceived competitiveness, an ANCOVA was conducted using this variable as a covariate to compensate for this finding.

Unanticipated factors may have also contributed to nonsignificant differences found among participants in the various intervention conditions. Environmental conditions differed substantially throughout the 3 month period during which the second study was conducted. This period included the months of February, March, and April, 2003. Considerable divergence in wind patterns were observed by research assistants and even commented upon by participants. The range of wind differences included no noticeable wind, mild but noticeable consistent breezes, mild but noticeable inconsistent breezes, moderately strong consistent wind, and moderately strong inconsistent wind (e.g., wind gusts). Unfortunately, these erratic patterns were present for some participants only on the pre-intervention baseline run day, others only on the post-intervention run day, and others on both days. Some participants, especially during the month of February, experienced no noticeable wind on either day. These unanticipated variable environmental conditions may have increased the variance of run times by directly impeding performance, indirectly by discouraging motivation, or both. Future studies may avoid the potential influence of variable environmental conditions such as wind by providing a more controlled or isolated environment (e.g., indoor track, gym).

Despite the instructions provided to all participants to run “as fast as possible” prior to both pre-intervention and post-intervention runs, widely divergent behaviors were
observed. Although no evident false starts were observed, as many as 5 participants were suspected to be demonstrating clear submaximal effort. These participants may be classified into two groups based on the nature of their behaviors – somatic complaints and other behavioral indicators of submaximal effort. Three individuals that ran significantly slower on the post-intervention runs later complained of muscle soreness or cramps. One individual in the technical and motivational statements condition demonstrating these behaviors ran well over 13 seconds slower on the second run compared with the pre-intervention baseline run. Another individual in the deleterious statements condition ran over 10 seconds slower on the second run. Two individuals exhibited another problematic set of behaviors. One of these individuals was suspected by several of the research assistants of simply jogging on both the pre- and post-intervention runs based on a finish of over 10 seconds slower than other individuals, relaxed facial features inconsistent with maximal effort and sprinting, and compacted stride, however this is difficult to substantiate. In a more obvious display of submaximal effort, the other of these individuals appeared to start normally, literally stopped running, adjusted his shoe, appeared to sprint, passed two participants, slowed down, and looked behind at the two other participants as he crossed the finish line. This individual was assigned to the control condition, and exhibited no substantial difference in performance on the post-intervention run, also suggesting lower effort on the pre-intervention run because he was matched with slower runners based on his pre-intervention run time. Given these relatively overt indicators of obstacles to optimal performance, results may not have been valid for these individuals. More problematic is the possibility that less obvious, covert problems may have influenced performance. In any event, because these
behaviors were unanticipated, no a priori exclusionary criteria were established or utilized.

As behavioral observations suggest, participants' motivation may have varied substantially among individuals assigned randomly to interventions. It is theoretically possible that participants may have initially followed instructions to run their fastest, but failed to exert similar efforts during the second run due to negative emotional and physical reactions (e.g., muscle soreness) learned from the first run, which is analogous to punishment. Supporting this is the finding that, contrary to predictions, no significant practice effect was observed. In other words regardless of intervention conditions, participants altogether did not demonstrate significant improvements in running performance. More likely is the possibility that participants may have also simply realized that the maximal effort would not be externally rewarded. Indeed, the primary external incentive for participation was fulfillment of the research requirement, and this would be given regardless of effort. Mere attendance on both days was sufficient for obtaining research credit regardless of effort. Higher variance among participants within the treatment conditions due to unexamined motivational factors may have eliminated potential effects associated with interventions. For instance, the individual who ran 13 seconds slower would have erased the effects of 6 participants who demonstrated improvements of 2 seconds each within the same technical and motivational intervention. Although widely divergent performance was observed in all experimental conditions, high variance is an obvious result, making the detection of significant differences among intervention conditions less likely. It is unlikely that merely increasing the sample size would correct for this problem if more participants demonstrated somatic complaints.
related to performance or submaximal effort. Future studies should be advised to incorporate measures of motivation and effort, relevant and sufficient incentives (e.g., generalized reinforcers such as money or increased research credit), a priori criteria for excluding participants with somatic complaints, and samples of participants with higher intrinsic motivation, such as athletes.

Whether or not participants exhibited pre-existing motivational inhibitions, or developed motivational problems during the experiment, results suggest motivation may not have been increased by the technical and motivational intervention to a degree at which relative performance gains could be measured. Nonsignificant differences among interventions with regard to running times support the interpretation that the technical and motivational intervention did not increase motivation to sufficient levels to demonstrate performance benefits in the 200 meter run as predicted. It remains possible that pre-existing motivational or other factors inherent in the sample may have limited amenability or receptiveness to interventions however.

Due to the brief nature of the interventions implemented by the second study, minimal efforts were made to foster rapport between research assistants and participants. Although research assistants were briefly introduced to participants prior to interventions, discussion with participants was limited to maintain standardized implementation of interventions without confounding influences. It is possible that participants were less receptive to interventions as a result of the brief nature of the interventions, and if so, future interventions may include more extensive efforts to facilitate rapport.

Although past investigations such as Donohue, et al. (2001) found promising effects for interventions incorporating motivational and technical statements with collegiate
athletes and youth athletes (Donohue & Miller, in press), differences between athlete samples and the largely recreational samples may have influenced results in this study. Of the potential differences, participants’ receptiveness to interventions, their motivation, and their level of commitment to athletic performance may have prevented performance gains from being realized. Indeed differences in competitiveness were found between the NCAA athlete sample used in Study 1 to develop the deleterious intervention and the participants in Study 2 (e.g., “very competitive” on average versus “somewhat competitive and recreational,” respectively), although several NCAA athletes participated in Study 2. Future studies may be better served by utilizing athlete samples or at least sample with higher reported competitiveness.

The extent to which deleterious statements influence individuals’ performance as a function of race is not known. Results supported the conclusion that statements identified as deleterious by the sample in Study 1 did not demonstrate a significantly negative effect on participants in Study 2 relative to other interventions. Whether or not this could be explained by race is beyond the scope of this study, however racial and ethnic differences did exist between the participants in Study 1 (e.g., 100% Caucasian, N = 10) and Study 2 (e.g., 53.2% Caucasian, N = 42). Future investigations are needed to examine the relationship of race, ethnicity, and culture on deleterious, technical, and motivational statements in performance enhancement intervention.

Previous research in performance enhancement has failed to demonstrate statistically significant performance improvements for interventions in short anaerobic runs such as the 100 and 200 meters (Meyers, Whelan, & Murphy, 1992). Although this was one of the primary rationales behind examining the influence of our intervention on performance
in the 200 meters, nonsignificant results counterindicated the benefits of performance enhancement interventions for this task. Interestingly, similar interventions as the technical and motivational intervention hypothesized to improve relative performance in Study 2 have demonstrated performance enhancing effects for other tasks (Donohue et al., 2001; Donohue & Miller, in press; Theodorakis, et al., 2000). It is possible that psychological approaches to improving performance are limited by the nature of the 200 meter run itself.

Another possible explanation for participants’ lack of significant relative improvement in running performance is related to the predictive ability of participants regarding statements that facilitate or inhibit optimal performance. The rationale behind allowing participants to endorse statements predicted to improve or inhibit their performance was based on the notion that individualizing treatment would increase treatment compliance, which stems from the recognition of individual differences in the delivery of psychologically-based interventions (Beutler & Hartwood, 2000; Doyle & Parfitt, 1997; Jones, 1993). Bull (1991) called for sport psychology interventions to be tailored to meet individual athletes needs, and Gould, Murphy, Vance, and May (1991) reported requests by athletes individualized interventions. Compared to athletes, more recreational individuals may be unable to accurately predict the relative influence of statements on performance in athletic tasks. If this was the case, participants may have merely endorsed items that would not influence their performance. Future investigations in idiographic treatment approaches should examine the influence of factors such as the process of decision-making as well as the relationship between client treatment expectations and the effectiveness of the intervention itself.
Although participants may have poorly predicted the relative influence of statements on task performance, consumer satisfaction results were consistent with hypotheses. Consumer satisfaction, measured in terms of the extent to which participants liked statements, was expected to be highest in the combined technical and motivational intervention, followed by the attention control, and the deleterious condition. Results affirmed this hypothesis, supporting the face validity of positive and negative statements.

To summarize, results of Study 2 failed to support the original hypothesis that participants in the technical and motivational intervention would exhibit performance improvement compared those in the attention control and deleterious interventions. In addition, the hypothesis that, compared to the attention control and technical and motivational interventions, participants given the deleterious statements would exhibit decrements in performance was not supported. In short, no significant differences were found among the interventions with regard to running performance. Although it is likely that many participants were not sufficiently motivated to follow instructions to “run as fast as possible,” the technical and motivational intervention was predicted to increase motivation by definition. Therefore, results support the interpretation that the technical and motivational intervention may not significantly improve performance for recreational individuals in the 200 meter run in comparison to deleterious statements and an attention control condition.

Despite the fact that the central hypotheses of Study 2 were not supported, the results of this study may inform the future development of individualized approaches to enhancing performance in anaerobic athletic tasks and guide the direction of subsequent investigations. Practical considerations such as the influence of variable environmental
conditions are encouraged to promote more controlled experimental procedures. Future studies should incorporate measures of motivation and effort, relevant and sufficient incentives, a priori criteria for excluding participants, and samples of participants with higher intrinsic motivation. Experiments in performance enhancement may be best suited by sampling athletes or other highly competitive individuals. The nature of the task and any potential inherent improvement limitations must be considered at the outset of investigations (e.g., ceiling effects). Finally, future investigations in idiographic treatment approaches should examine the influence of client variables, the treatment decision-making process, and the relationship between client treatment expectations and the effectiveness of the intervention itself.
### TABLE 1. MOST FREQUENTLY-SELECTED POSITIVE STATEMENTS

(N = 77)

<table>
<thead>
<tr>
<th>Technical Statements</th>
<th>N</th>
<th>Motivational Statements</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Get your body warmed up.</td>
<td>62</td>
<td>I believe in you.</td>
<td>33</td>
</tr>
<tr>
<td>Stretch your muscles well.</td>
<td>54</td>
<td>You've worked hard for this.</td>
<td>31</td>
</tr>
<tr>
<td>Get an explosive start.</td>
<td>40</td>
<td>This is what you've been training for.</td>
<td>28</td>
</tr>
<tr>
<td>Pump your arms.</td>
<td>36</td>
<td>You're ready and totally prepared.</td>
<td>22</td>
</tr>
<tr>
<td>Run through the finish line.</td>
<td>35</td>
<td>You're in the best shape of your life.</td>
<td>21</td>
</tr>
<tr>
<td>Breathe nice and relaxed.</td>
<td>31</td>
<td>You can do it.*</td>
<td>20</td>
</tr>
<tr>
<td>Focus on your running technique.*</td>
<td>21</td>
<td>You’re in control.*</td>
<td>20</td>
</tr>
<tr>
<td>Take perfect strides.*</td>
<td>21</td>
<td>You’ve earned the right to win.</td>
<td>19</td>
</tr>
<tr>
<td>Maintain a perfect pace.</td>
<td>19</td>
<td>You can go all the way.</td>
<td>16</td>
</tr>
<tr>
<td>Run on toes.</td>
<td>18</td>
<td>You’re strong and explosive.</td>
<td>15</td>
</tr>
</tbody>
</table>

*Indicates a tie.
# TABLE 2. MOST FREQUENTLY-SELECTED NEGATIVE STATEMENTS

(\(N = 77\))

<table>
<thead>
<tr>
<th>Deleterious Statements</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>You're a terrible runner.</td>
<td>49</td>
</tr>
<tr>
<td>You'll be tired before the end of the run.</td>
<td>47</td>
</tr>
<tr>
<td>Your legs are weak.</td>
<td>42</td>
</tr>
<tr>
<td>You're going to lose your form during the run.*</td>
<td>41</td>
</tr>
<tr>
<td>You’re tired.*</td>
<td>41</td>
</tr>
<tr>
<td>You can’t do this.</td>
<td>37</td>
</tr>
<tr>
<td>Just let the competition go; you can get ‘em next time.</td>
<td>36</td>
</tr>
<tr>
<td>You’re hurting.</td>
<td>35</td>
</tr>
<tr>
<td>You’re going to run too slow.</td>
<td>34</td>
</tr>
<tr>
<td>You're going to have a hard time breathing during the run.</td>
<td>33</td>
</tr>
</tbody>
</table>

*Indicates a tie.
TABLE 3. PERCEIVED IMPROVEMENT & INTERVENTION SATISFACTION

<table>
<thead>
<tr>
<th>Interventions</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical &amp; Motivational</td>
<td>19</td>
<td>3.84</td>
<td>1.71</td>
<td>5.00 (a***, b**)</td>
<td>1.05</td>
</tr>
<tr>
<td>Deleterious</td>
<td>18</td>
<td>2.56</td>
<td>1.62</td>
<td>3.28 (a***, b**)</td>
<td>1.56</td>
</tr>
<tr>
<td>Attention Control</td>
<td>19</td>
<td>3.74</td>
<td>2.08</td>
<td>3.11 (a***, b**)</td>
<td>2.08</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>56</td>
<td>3.39</td>
<td>1.88</td>
<td>3.80</td>
<td>1.81</td>
</tr>
</tbody>
</table>

* 1 to 7 Likert-like scale (1 = strongly agree, 7 = strongly disagree)

b The statements the facilitator said to me immediately prior to my run helped me run faster.

c I liked the statements said to me just before my run today.

Fisher-Hayter Range Test

a = technical & motivational > deleterious
b = technical & motivational > attention control
c = attention control > deleterious
d = technical & motivational < deleterious
e = technical & motivational < attention control
f = attention control < deleterious

* = p < .05
** = p < .01
*** = p < .001
**** = p < .0001
<table>
<thead>
<tr>
<th>Interventions</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical &amp; Motivational</td>
<td>19</td>
<td>5.42</td>
<td>1.64</td>
<td>4.74</td>
<td>1.52</td>
</tr>
<tr>
<td>Deleterious</td>
<td>18</td>
<td>3.00</td>
<td>1.78</td>
<td>3.00</td>
<td>1.61</td>
</tr>
<tr>
<td>Attention Control</td>
<td>19</td>
<td>4.05</td>
<td>1.96</td>
<td>3.68</td>
<td>1.92</td>
</tr>
<tr>
<td>Total</td>
<td>56</td>
<td>4.18</td>
<td>2.03</td>
<td>3.82</td>
<td>1.81</td>
</tr>
</tbody>
</table>

*1 to 7 Likert-like scale (1 = strongly agree, 7 = strongly disagree)*

**I was thinking about what the facilitator said to me immediately before starting to run.**

***During my run today, I was thinking the things that the facilitator said to me.***

Fisher-Hayter Range Test

- a = technical & motivational > deleterious
- b = technical & motivational > attention control
- c = attention control > deleterious
- d = technical & motivational < deleterious
- e = technical & motivational < attention control
- f = attention control < deleterious

* = p < .05  
** = p < .01  
*** = p < .001  
**** = p < .0001
APPENDIX A: SPORTS STATEMENTS

The following is a list of technical/instructional statements identified by athletes and coaches as helping them to do their best. Rate how each statement would influence your performance. Use the following scale to rate degree to which each of the following statements would influence your running performance (if the statement was made immediately prior to you running a race):

7 = influence me to run extremely slower
6 = influence me to run much slower
5 = influence me to run somewhat slower
4 = neutral (neither slower or faster)
3 = influence me to run somewhat faster
2 = influence me to run much faster
1 = influence me to run extremely faster

After rating each statement, please circle the top 6 that would lead you to run fastest.

1. Stretch your muscles well. _____
2. Get your body warmed up. _____
3. Plan a good strategy for your run. _____
4. Stick with your plan. _____
5. Get an explosive start. _____
6. Get a good position at the start. _____
7. Keep mouth opened and relaxed. _____
8. Keep hands open and relaxed. _____
9. Drop your shoulders while you run. _____
10. High knee lift. _____
11. Run on toes. _____
12. Pump your arms. _____
13. Take deep breaths before making any major moves. _____
14. Relax each muscle in your body. _____
15. Focus on your running technique. _____
16. Strike your heels against ground softly. _____
17. Point your toes straight ahead. _____
18. Breathe nice and relaxed. _____
19. Take perfect strides. _____
20. Maintain a perfect pace. _____
21. Start your kick at the right time. _____
22. Get your body in perfect rhythm. _____
23. Keep your head still. _____
24. Swing your arms effortlessly. _____
25. Keep your eyes focused straight ahead. _____
26. Run through the finish line. _____
27. Other: __________________________________________________________
28. Other: __________________________________________________________

Stop! Now go back and circle the top 6 that would lead you to run fastest.
APPENDIX A: SPORTS STATEMENTS 2

The following is a list of technical/instructional statements identified by athletes and coaches as helping them to do their best. Use the following scale to rate how each statement would influence your performance (if made just before running a race):

7 = influence me to run extremely slower
6 = influence me to run much slower
5 = influence me to run somewhat slower
4 = neutral (neither slower or faster)
3 = influence me to run somewhat faster
2 = influence me to run much faster
1 = influence me to run extremely faster

After rating each statement, please circle the top 6 that would lead you to run fastest.

1. It’s time to kick butt. ______ 22. This will be your best performance ever. ______
2. It’s time to go to work. ______ 23. Let’s go, let’s do it. ______
3. You’re in control. ______ 24. No one’s in your class today. ______
4. You’re going to dominate today. ______ 25. You’ve got the power today. ______
5. This is what you’ve been training for. ______ 26. You own the competition. ______
6. It’s the best day of your life. ______ 27. You can go all the way. ______
7. You’ve worked hard for this. ______ 28. No one’s going to deny you today. ______
8. You’re ready and totally prepared. ______ 29. This is your moment. ______
9. You’re strong and explosive. ______ 30. This is your playground. ______
10. You’re the definition of speed. ______ 31. I believe in you. ______
11. You’re in an elite class, 2nd to none. ______ 32. The competition wishes they were you. ______
12. You respect all, but fear none. ______ 33. You run the show. ______
13. It’s your destiny to win. ______ 34. This is your time to shine. ______
14. You feel the need for speed. ______ 35. This is the day of your dreams. ______
15. Today is your day. ______ 36. You’re in the best shape of your life. ______
16. Nobody can keep up with you today. ______ 37. You’ve earned the right to win. ______
17. You’re going to shatter the records today. ______ 38. Let them feel your power and strength. ______
18. You’re a force today. ______ 39. Let them feel what it is to be dominated. ______
19. You can do it. ______ 40. Nobody’s going to take away your glory today. ______
20. You’re going to destroy the competition. ______ 41. Other: ______________________
21. You’re a champ; a winner. ______ 42. Other: ______________________

Stop! Now go back and circle the top 6 that would lead you to run fastest.
APPENDIX B: SPORTS STATEMENTS

The following is a list of statements that athletes and coaches associate with negative performance. Use the following scale to rate how each statement would influence your performance (if made just before running a race):

7 = influence me to run **extremely** slower
6 = influence me to run **much** slower
5 = influence me to run **somewhat** slower
4 = neutral (neither slower or faster)
3 = influence me to run **somewhat** faster
2 = influence me to run **much** faster
1 = influence me to run **extremely** faster

After rating each statement, please circle the top 12 that would lead you to run slowest.

1. You're a terrible runner. ____
2. You're going to lose your form during the run. ____
3. You'll be tired before the end of the run. ____
4. You're going to run too slow. ____
5. The weather isn't right for running. ____
6. Why are you doing this run? ____
7. You could be sleeping now. ____
8. Your legs are weak. ____
9. The competition will pass you. ____
10. The competition will catch you. ____
11. It's going to hurt to push yourself. ____
12. Just let the competition go; you can get 'em next time. ____
13. You're going to have a hard time breathing during the run. ____
14. These running conditions are terrible. ____
15. You can't do this. ____
16. You look weak. ____
17. The competition looks strong. ____
18. You're going to let an inferior competitor beat you. ____
19. Your clothes don't fit right. ____
20. You're not strong enough. ____
21. You have bad form. ____
22. You're tired. ____
23. You're hurting. ____
24. The competition is faster than you. ____
25. Your arms are tight. ____
26. Your back hurts. ____
27. Your pace will be too slow. ____
28. You won't be able to speed up. ____
29. You're out of contention. ____
30. You won't get your personal best time today. ____

Stop! Now go back and circle the top 12 that would lead you to run slowest.
APPENDIX C: DEMOGRAPHIC QUESTIONS FOR SPORTS

Directions: Please answer the following questions. When appropriate, fill in the blank spaces. When a blank space is not provided, circle the letter that identifies your answer.

1. Age ______________
2. Gender
   1. Female
   2. Male
3. What best describes your race/ethnicity?
   1. Asian/Pacific Islander
   2. African American
   3. Caucasian/White
   4. Hispanic/Latino
   5. Native American
   6. Biracial/Multicultural
   7. Other: ____________________
APPENDIX E: COMPETITIVENESS QUESTIONS

Directions: Read each question, and circle the number next to the statement that best describes your level of competitiveness.

1. In your lifetime, what has been your highest level of competitiveness in athletic events?
   1. Extremely recreational
   2. Very recreational
   3. Somewhat recreational
   4. Equally recreational and competitive
   5. Somewhat competitive
   6. Very competitive
   7. Extremely competitive

2. During the last month, what has been your highest level of competitiveness in athletic events?
   1. Extremely recreational
   2. Very recreational
   3. Somewhat recreational
   4. Equally recreational and competitive
   5. Somewhat competitive
   6. Very competitive
   7. Extremely competitive
APPENDIX F: ATHLETE INFORMED CONSENT

UNLV

University of Nevada Las Vegas

Athlete Informed Consent

Yani Dickens, B.A., a Ph.D. student in the Clinical Psychology department at the University of Nevada Las Vegas, is the primary investigator in this study. Dr. Brad Donohue, a faculty member of the UNLV department of psychology, is the supervisor of this study. Participants are invited to participate in this study, which examines ways of enhancing running performance.

Description

Participants will be given a standard set of questionnaires after completing this consent form. Results will be used for the future development of running performance interventions. Completion of this study should be approximately one hour, the expected time necessary to complete the questionnaires and answer subsequent questions.

Risks and Benefits

There are inherent risks in every study. Only minimal risk is anticipated in this study, which may include feeling uncomfortable when responding to some of the questions asked. Any question may be skipped if you feel uncomfortable answering it. Risks of participating in this study may include your confidentiality, although measures will be taken to protect confidentiality. If you are uncomfortable for any reason, you may terminate participation in the experiment at any time.

Benefits may be gained but cannot be guaranteed. Benefits include the opportunity to assist in improving running performance and contribute to the body of knowledge in sport psychology and performance enhancement. If you are a student currently enrolled in Psychology 101, you will have the opportunity to earn one hour of research credit for participation in this study.

Any questions or concerns about participation in this study will be answered by Yani Dickens at (702) 895-2468, or Dr. Donohue, at (702) 895-0181. For information regarding the rights of human subjects contact Office for the Protection of Research Subjects at (702) 895-2794.

Costs and Payments

The primary cost to you will be your time. Approximately one hour will be required to complete forms and have questions answered if desired.

Confidentiality

Information gathered from questionnaires will be coded with an identification number, and your name will not be associated with your responses. All materials gathered during this study will be kept in a locked file at UNLV. You will not be personally identified in any reports or publications resulting from this study. Data collected from this study will be maintained for a period of 4 years.

Right to Withdraw at Any Time

You may refuse to participate or withdraw from this study at any time without penalty. If you wish to earn research credit for Psychology 101, research credit hours will be given for the number of hours of participation in the study. In addition, partial

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credit will be given for partial participation. If the study design or use of the data is to be changed, you will be informed and your consent re-obtained. You may be told of any significant new findings developed during the course of the study that may relate to your willingness to continue participation.

Voluntary Consent

I have read the information above and agree to its contents. I am 18 years or older. All of my questions concerning this research have been answered. If I have any questions in the future about this study, Yani Dickens or Dr. Donohue will answer them. A copy of this form will be given to me.

Signature of Participant: ____________________________________ Date: ____________________

Printed Name: ____________________________________________

College of Liberal Arts
Department of Psychology
4505 Maryland Parkway, Box 455030, Las Vegas, Nv. 889154-5030
(702) 895-3305 FAX (702) 8895-0195
APPENDIX G: PSYCHOLOGY 101 STUDENTS INFORMED CONSENT

UNLV
University of Nevada Las Vegas

Participant Informed Consent
Yani Dickens, B.A., a Ph.D. student in the Clinical Psychology department at the University of Nevada Las Vegas, is the primary investigator in this study. Dr. Brad Donohue, a faculty member of the UNLV department of psychology, is the supervisor of this study. Participants are invited to participate in this study, which examines ways of enhancing running performance.

Description
This form will be read and explained by research assistants before participants sign this document. Participants will be asked their age, gender, race, sports experience, and satisfaction with the study. Participants will be asked to rate statements that may influence performance. Measures of height and weight will be obtained confidentially. Participants will be asked to run 200 meters on two separate occasions approximately one week apart. Immediately prior to running the 2nd 200 meter run, participants will receive 2.5 minutes of instructions that are thought to influence run performance, or will be asked to report spontaneous thoughts that are experienced at that time. After completion of the second 200 meter run, participants will be asked to complete a consumer satisfaction questionnaire and will have the opportunity for debriefing if requested. Results will be used for the future development of running performance interventions. Completion of this study is expected to require about 2.5 hours.

Risks and Benefits
There are inherent risks in every study. Risks of participating in this study, as with any type of exercise, include the risk of injury. Risk of injury is expected to be no greater than that of most forms of running. Space and time to warm-up and stretch will be provided. If you have a an existing injury, heart condition, are pregnant, or have any other medical condition that may put you at significant risk for injury or harm, you may not participate in this study. Risks of participating in this study may also include others observing your participation in this study, although measures will be taken to protect your confidentiality. If you are uncomfortable for any reason, you may terminate participation in the experiment at any time.

Benefits may be gained but cannot be guaranteed. Benefits include the opportunity to assist in improving running performance and contribute to the body of knowledge in sport psychology and performance enhancement. If you are a student currently enrolled in Psychology 101, you will have the opportunity to earn up to three hours of research credit for participation in this study. Any questions or concerns about participation in this study will be answered by Yani Dickens at (702) 895-2468, or Dr. Donohue, at (702) 895-0181. For information regarding the rights of human subjects contact Office for the Protection of Research Subjects at (702) 895-2794.

Costs and Payments
The primary cost to you will be your time. Approximately two hours will be required to complete forms and have questions answered if desired.

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Confidentiality

Information gathered from questionnaires will be coded with an identification number, and your name will not be associated with your responses. Information will remain confidential unless it is reportable as mandated by law due to the knowledge of child abuse, elder abuse, or the intent to harm self or others, none of which are directly assessed in this study. All materials gathered during this study will be kept in a locked file at UNLV. You will not be personally identified in any reports or publications resulting from this study. Data collected from this study will be maintained for a period of 4 years.

Right to Withdraw at Any Time

You may refuse to participate or withdraw from this study at any time without penalty. If you wish to earn research credit for Psychology 101, research credit hours will be given for the number of hours of participation in the study. In addition, partial credit will be given for partial participation. If the study design or use of the data is to be changed, you will be informed and your consent re-obtained. You may be told of any significant new findings developed during the course of the study that may relate to your willingness to continue participation.

Voluntary Consent

I have read the information above and agree to its contents. I am older than 18 years of age and no older than 25 years of age. All of my questions concerning this research have been answered. If I have any questions in the future about this study, Yani Dickens or Dr. Donohue will answer them. A copy of this form will be given to me.

Signature of Participant: ___________________________ Date: ___________________________

Printed Name: ____________________________________________

College of Liberal Arts
Department of Psychology
4505 Maryland Parkway, Box 455030, Las Vegas, NV 889154-5030
(702) 895-3305 FAX (702) 8895-0195
Running for Research Credit

Students enrolled in Psychology 101 courses are invited to participate in this study, which examines ways of enhancing running performance in the 200 meters. You must be between the ages of 18 and 25 to participate. If you have a heart condition, asthma, are pregnant, or have any other medical condition that may put you at significant risk for injury, you must not participate in this study. This experiment is expected to take 2 hours to complete. Full participation consists of attending and completing participation in this study, which will be conducted at the UNLV track (see map) on two different days one week apart. Questionnaires will be administered and measures of height and weight will be taken. Participants will need to bring appropriate attire for running including shorts or sweats, a T-shirt, and running shoes.
APPENDIX I: EXPERIMENT FEEDBACK FORM

Directions: Below are a series of questions about the experiment in which you participated. Please indicate your level of agreement with the following statements by circling the corresponding number.

<table>
<thead>
<tr>
<th>SD</th>
<th>D</th>
<th>MD</th>
<th>N</th>
<th>MA</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

Strongly Disagree | Disagree | Moderately Disagree | Neutral | Moderately Agree | Agree | Strongly Agree

<table>
<thead>
<tr>
<th>Question</th>
<th>SD</th>
<th>D</th>
<th>MD</th>
<th>N</th>
<th>A</th>
<th>MA</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I was thinking about what the facilitator said to me immediately before starting to run.</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| 2. During my run today, I was thinking the things that the facilitator said to me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Comments: |

| 3. The statements the facilitator said to me immediately prior to my run helped me run faster. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Comments: |

| 4. I liked the statements said to me just before my run today. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Comments: |

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