Self-Efficacy and Athletic Performance: From Theory to Practice

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LOYOLA UNIVERSITY CHICAGO

SELF-EFFICACY AND ATHLETIC PERFORMANCE:
FROM THEORY TO PRACTICE

A THESIS SUBMITTED TO
THE FACULTY OF THE GRADUATE SCHOOL
IN CANDIDACY FOR THE DEGREE OF
MASTER OF ARTS

DEPARTMENT OF COUNSELING PSYCHOLOGY

BY
JEFFREY A. KATULA

CHICAGO, ILLINOIS
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CHAPTER I

INTRODUCTION

In the past 15 years, the psychological research focusing on sport has gravitated toward a cognitive orientation (McAuley, 1992). One theory that has received considerable attention in the sports psychology literature is Bandura's theory of self-efficacy (Bandura, 1977, 1986a). Self-efficacy theory is predominantly concerned with the mediational role played by perceptions of personal agency in affecting behavior. Self-efficacy is defined as an individual's strength of conviction that one can successfully execute a certain behavior to achieve a desired outcome.

Despite the research generated by sport psychologists, it is difficult to find data about the use of psychological training in sports (Seiler, 1992). In measuring the prevalence of psychological training in sports, Seiler cites Gabler, Janssen, and Nitsch's (1990) finding that 95% of 162 athletes and 85% of 49 coaches only had a vague idea of what psychological training is. Seiler (1992) concludes that the low prevalence rates are due to factors including resistance
by most athletes to acknowledge the use of a psychologist and the tendency of many sport psychologists to not report unsuccessful attempts.

Anyone who has participated in athletics can attest to the importance of being "mentally prepared." Whether the techniques employed focus on imagery, anxiety management, pain tolerance, or simply clearing one's mind, mental preparation can have significant effects on performance outcome. As Bandura (1990) has noted, "Where everyone is highly skilled, small variations in adeptness of execution can spell the difference between triumph and defeat" (p. 152).

The primary objective of this study is to examine the relationship of self-efficacy to athletic performance and its implications for sports psychological training. A brief overview of Bandura's (1977, 1986a) self-efficacy theory will be presented first, followed by empirical studies that examine self-efficacy theory and athletic performance, implications for the practical application of self-efficacy theory in athletics, and finally, future research considerations.
CHAPTER II
THEORETICAL OVERVIEW

Bandura's self-efficacy theory (1977, 1986a) was developed to account for behavioral change resulting from diverse modes of treatment. The principle assumption is that "psychological procedures, whatever their form, serve as a means of creating and strengthening expectations of personal efficacy" (Bandura, 1977, p. 193). Self-efficacy is defined as the conviction that one can successfully execute a behavior required to produce a specific outcome. Outcome expectations, however, are the individual's estimate of the consequences of executing the specific behavior. Therefore, self-efficacy reflects the individual's perceptions of his/her capabilities to execute a certain behavior. As a common cognitive mechanism, this perception is theorized to mediate affect, thought patterns, and behavior patterns (Bandura, 1986a). People tend to avoid activities they feel they cannot successfully execute, while readily participate in activities they feel capable of handling. Furthermore, self-efficacy also determines how much effort one will
expend and how long to persist in that effort when faced with obstacles. However, self-efficacy alone is not the sole determinant of behavior. One must also possess the appropriate skills and the adequate incentives to perform a task in order for self-efficacy to influence performance (Bandura, 1986a).

Perceptions of self-efficacy are based on four sources of information: performance accomplishments, vicarious experience, verbal persuasion, and physiological states (Bandura, 1977). Performance accomplishments provide the most powerful source of efficacy information because they are based on personal mastery experiences. Mastery expectations are raised by successes and lowered by failures. Failures have a lesser effect on efficacy when they are preceded by a series of successes. Therefore, the timing and sequence of outcomes must be considered. The influence of performance accomplishments on self-efficacy will vary depending on to what the individual attributes success. Accomplishments attributed to skill and require less effort will reinforce a strong sense of efficacy whereas those attributed to sustained or extreme effort will exert a weaker effect on self-efficacy (Bandura, 1986a). Additional information used in judging self-efficacy
includes the rate and pattern of attainments. Self-efficacy raised by personal accomplishments tend to be generalized to other situations in which performance was debilitated by thoughts of personal inadequacies.

Vicarious experience provides another source of efficacy information. While expectations induced by modeling are more vulnerable to change than those induced by performance accomplishments, seeing others perform dangerous activities with success can generate expectations in observers that they too will succeed if they intensify and persist in their efforts. Modeled behavior that displays determined effort, uses a variety of models, and results in clear, unambiguous outcomes provide the best source of vicarious experience. Other factors include the model's characteristics (adeptness, perseverance, age, expertness, etc.), the similarity between models and observers, the difficulty of the performance tasks, the situational arrangements under which the modeled achievements occur, and the diversity of modeled attainments (Bandura, 1986a).

Self-efficacy can also be influenced through verbal persuasion. Verbal persuasion must be followed by success, however, or the source of the verbal persuasion will be discredited and self-efficacy undermined. As with vicarious
experience, the impact of efficacy information attained through verbal persuasion varies depending on characteristics of the persuader: credibility, prestige, trustworthiness, expertise, and conviction (Bandura, 1986a).

Finally, people judge their self-efficacy partly on their emotional arousal to a given situation. People generally will expect success when they are not emotionally aroused since high arousal usually debilitates performance. Again, cognitive appraisals of efficacy information will dictate the relative impact of the information (Bandura, 1986a). For example, a weight lifter may interpret physiological arousal as being psyched and ready for competition while a diver may interpret physiological arousal as fear. Arousal perceived as stemming from personal inadequacies will tend lower self-efficacy more than arousal attributed to situational factors. In addition, a preoccupation to internal arousal can result in further arousal (Bandura, 1986a).

These sources of self-efficacy exert influence in a bidirectional manner. For example, past performance influences self-efficacy which influences future performance. Figure 1 (Feltz, 1992) schematically depicts the theorized relationships.
According to Bandura (1977, 1986) the measurement of self-efficacy should be done in a microanalytic fashion by assessing the level, strength, and generality of self-efficacy. Level of self-efficacy refers to and individual's expected performance attainment or the number of tasks he or she can perform. For example, a gymnast's floor routine
requires a number of subskills that make up the entire routine. These subskills represent the level of self-efficacy. The strength of self-efficacy refers to an individual's degree of certainty that he or she can attain different levels of performance. Generality refers to the number of domains of functioning in which people judge themselves to be efficacious.

Self-efficacy assessment instruments have traditionally been constructed by listing a series of tasks, typically varying in difficulty, complexity, and stressfulness (Feltz, 1988). Subjects are asked to indicate which tasks they believe they can execute (level of self-efficacy). They then rate their degree of certainty for each of the tasks designated (strength of self-efficacy) on a 100-point probability scale ranging from highly uncertain to complete certainty (Feltz, 1988). According to Feltz (1988), the self-efficacy researchers in sport psychology have typically correlated aggregate self-efficacy scores with aggregate performance scores rather than examining the congruence between self-efficacy and performance at the level of individual tasks. Feltz (1988) suggests that this is due to the fact that in most sports studies, self-efficacy expectations are assessed in terms of performing a specific
task at a certain level or duration, rather than in terms of approach/avoidance to a series of tasks increasing in difficulty.

An omnibus measure of physical self-efficacy was developed by Ryckman, Robbins, Thornton, and Cantrell (1982). Known as the Physical Self-efficacy Scale (Ryckman et al., 1982), this scale assesses two factors: a perceived physical ability factor and a physical self-presentation confidence factor that reflects confidence in the presentation of physical skills. The developers of the scale (Ryckman et al., 1982) found significant correlations between performance on a reaction-time task and a motor coordination task, total physical self-efficacy scores, perceived physical abilities. Predictive validity for the scale was found for competitive marathon running performance (Gayton, Mathews, & Burchstead, 1986), however, McAuley and Gill (1983) found that this global measure of physical self-efficacy was less predictive of skilled performance than more task specific measures (McAuley and Gill, 1983). McAuley (1992) observed that Ryckman and colleagues' approach to the measure of self-efficacy was somewhat contrary to Bandura's (1986) assertion that task-specific
measures are more predictive of behavior and offer more explanatory power than global measures.

McAuley and Gill (1983) assessed the validity and reliability of the Physical Self-efficacy Scale (Ryckman, Robbins, Thornton, & Cantrell, 1982) in a competitive sports setting. Using 52 collegiate female gymnasts, McAuley and Gill found the PSE to be a reliable and valid measure of general physical self-efficacy. However, it was not found to be a significant predictor of performance in sport skills. The individual's knowledge, experience, and past accomplishments formed the most accurate representation of event-specific efficacy expectations than did the measures constructed by researchers. The task-specific efficacy measures and the athletes' predicted scores accounted for substantial amounts of the variance in performance.
CHAPTER III
RESEARCH EXAMINING THE RELATIONSHIP OF SELF-EFFICACY TO ATHLETIC PERFORMANCE

Feltz (1988) observed that the majority of self-efficacy research in sport and motor performance have focused on the relationship of self-efficacy and performance and the effects of various methods of manipulating self-efficacy on performance. The treatment techniques used to influence self-efficacy have been based on the four sources of efficacy information suggested by Bandura (1977). The studies examining the relationship between self-efficacy and performance have been conducted in both laboratory (Weinburg, Gould, & Jackson, 1979; Weinburg, Yukelson, & Jackson, 1980; Weinburg, Gould, Yukelson, & Jackson, 1981; Gould & Weiss, 1981; McAuley & Gill, 1983; McAuley, 1985; Feltz, 1982; Feltz & Mugno, 1983) and field settings (Lee, 1982; Okwumabua, 1985; LaGuardia & Labbe, 1993; George, 1994). Further, these studies provide both correlational evidence (Weinburg et al., 1979; Weinburg et al., 1980; Weinburg et al., 1981; Gould & Weiss, 1981; McAuley & Gill, 1983; Lee, 1982; Okwumabua, 1985; LaGuardia & Labbe, 1993).
and causal evidence (McAuley, 1985; Feltz, 1982; Feltz & Mugno, 1983; George, 1994) that a significant relationship exists between self-efficacy and athletic performance.

Weinberg, Gould, and Jackson (1979) were among the first to test Bandura's theory empirically in terms of athletic performance. In a 2x2x2 design, Weinberg et al. (1979) asked sixty subjects, thirty male and thirty female, to extend their leg above a specified height for as long as they could. In one treatment condition, subjects were told they were competing against a confederate with strained knee ligaments (high self-efficacy) while the other treatment condition paired subjects with a confederate reportedly on the track team (low self-efficacy). Each condition participated in two trials and each trial was rigged so the subject always lost. Self-efficacy was determined by asking subjects two questions privately, to prevent demand characteristics, before the competition. The first question asked, "What do you think your chances are of winning?" from 0% (definitely lose) to 100% (definitely win). The second question asked, "How confident are you in the above prediction?" from 0% confidence to 100% confidence.

Results indicated that high-efficacy subjects extended their legs significantly longer than subjects in the low-
efficacy condition, which supports self-efficacy predictions in a competitive motor performance situation. The efficacy by trials interaction revealed that subjects in the high-efficacy condition extended their legs longer in Trial 2, while low-efficacy subjects extended their legs for a shorter period of time in Trial 2 after failing in Trial 1. As Bandura (1977) predicted, the high-efficacy subjects exhibited an increase in persistence in the face of an aversive situation, failure, whereas low-efficacy subjects displayed a decrease in persistence.

Modifying the above experiment, Weinberg, Yukelson, and Jackson (1980) attempted to measure the effect of public and private efficacy expectations on competitive performance. Self-efficacy was manipulated by asking the subjects to perform in a similar task, an isokinetic machine, against a confederate that either had strained knee ligaments or was a member of the track team and subjects were given bogus feedback. Therefore, the subjects in the high-manipulated self-efficacy condition were performing against a subject with weak ligaments and a knee injury who demonstrated lesser objective performance on a related task. The subjects in the low self-efficacy condition performed against a varsity athlete who displayed a higher performance
on a related leg-strength task. In addition, subjects were placed in a public or private condition. Subjects were asked to respond to questions about their feelings and strategies about the task and competition. The subjects in the private condition simply wrote their responses on a questionnaire while subjects in the public condition were asked to state their answers out loud. In addition, subjects competed back-to-back in relation to the confederate.

Results indicated that high-efficacy subjects extended their legs significantly longer than low-efficacy subjects which support self-efficacy predictions as well as extend Weinberg et al.'s (1979) findings to a back-to-back situation. The researchers also found that face-to-face competition produced significantly better performance than the back-to-back competition in both high-efficacy and low-efficacy conditions. In their first study, Weinburg, Gould, and Jackson (1979) reported a correlation of +.68 (p < .001) while their second study (Weinburg et al., 1980), using the same task, produced a correlation of +.19 (p < .05). This inconsistency could be due to the procedural differences in the two studies. The face-to-face competition increases the saliency of the competitive situation, sensitizing subjects
to efficacy cues as well as enhancing performance in general. The public versus private manipulation did not produce any significant performance effects. The authors attribute this to methodological problems rather than concede a lack of interaction.

Weinberg, Gould, Yukelson, and Jackson (1981) combined the above procedures in examining the effect of preexisting and manipulated self-efficacy on a competitive muscular endurance task. Weinberg et al. (1981) used the preexisting self-efficacy measure used in Weinberg et al.'s (1979) study and manipulated self-efficacy by using the isokinetic machine described in Weinberg et al. (1980). This study used a 2x2x2 (sex by self-efficacy by manipulated efficacy) design. Results indicated that changes in efficacy expectations were accompanied by corresponding changes in performance, with high preexisting and manipulated self-efficacy subjects extending their legs significantly longer than subjects in the low preexisting and manipulated self-efficacy subjects. These findings support those found in Weinberg et al.'s (1979, 1980) investigations as well as supporting Bandura's (1977) prediction that efficacy expectations will influence an individual's effort and
persistence in the face of adversity (Weinberg et al., 1981). In addition, it was found that performance accomplishments can modify self-efficacy.

Sex differences were found in all three studies (Weinberg et al. 1979, 1980, 1981). The authors cite Deaux's (1976) argument that males and females exhibit different expectations in achievement-related situations, males being motivated by the need to maintain a positive self-image, whereas females perceive that they do not have the ability to win or that winning and femininity are incompatible. This effect is particularly evident in tasks that are perceived as masculine.

Expanding on the procedures used by Weinberg et al. (1979, 1980, 1981), Gould and Weiss (1981) attempted to test vicarious experience as a source of efficacy information (Bandura, 1977). Gould and Weiss (1981) designed their study to determine if observing a similar or dissimilar model who makes varying self-efficacy statements will influence an observers self-efficacy and muscular endurance performance. Results indicate that the subjects in the similar-model condition displayed significantly more muscular endurance than subjects in the dissimilar-model condition and the no-model condition control group.
Significant correlations were also found between level and strength of self-efficacy and performance, and provide further support for Bandura's (1977, 1986) self-efficacy theory. However, Gould and Weiss suggest that self-efficacy may not have acted alone. Subjects in the similar-model condition reported that they competed with models more than the subjects in the dissimilar-model condition, implying that perceived similarity between the model and the observer may increase performance, not only by raising self-efficacy, but also by increasing observer motivation.

The above studies provide excellent support for Bandura's self-efficacy theory in laboratory conditions. While the researchers were able to exhibit control over many variables and provide sensitive treatment conditions, the tasks used to measure athletic performance are not generalizable to most athletic activities. These studies can only be generalized to other simple, gross motor activities, such as weight lifting. The next group of studies I will present have applied Bandura's theory to more complex motor activities such as gymnastics (Lee, 1982; McAuley, 1985), diving (Feltz, 1982; Feltz & Mugno, 1983),
long-distance running (Okwumabua, 1985; LaGuardia & Labbe, 1993), and competitive baseball (George, 1994).

Using a stepwise multiple regression analysis, Lee (1982) examined self-efficacy as a predictor of performance in competitive gymnastics. Subjects consisted of fourteen girls ages seven to twelve (m = 9.7). The variables analyzed included coach's estimate of performance, number of previous competitions, previous scores, years involved in gymnastics, time with this coach, age, and the gymnast's estimate of her own performance. Scores received during a particular competition were used as a performance measure and the gymnasts' estimated scores served as a measure of self-efficacy. Results indicate that self-efficacy is a good predictor of performance. Subjects with the most experience and ability were the most accurate predictors. The coach was the best predictor of performance, but this reflects nothing of the self-efficacy of the athletes. While this study provides support for the predictive scope of self-efficacy in a skilled athletic competition, the results should be taken with caution due to the small sample size, lack of sex differences, and inexperience of the subjects, performance levels may be less erratic at higher levels of competition.
In a correlational study examining the psychological and physical performance of ninety middle-aged, middle class male runners completing their second marathon (Okwumabua, 1985), self-efficacy was measured by asking runners to respond to nine questions assessing whether they believed they had the ability to complete the marathon in a specific time. Pearson product-moment correlations indicated that finishing time was related to a number of training variables, past race performance, and measures of self-efficacy. Regression analysis indicated that strength of self-efficacy accounted for over 40% of the variance in marathon finishing time, supporting the correlational results. In addition to strength of self-efficacy, the set of variables that produced the most accurate prediction equation for marathon finishing time included expected pain, best previous ten kilometer race time, and number of weeks training for this marathon. The finding that mediational variables, past performance, and training history contribute significantly to present marathon performance is consistent with Bandura's (1977) social learning argument that any performance is best understood as a process of reciprocal interaction involving the individual's physical abilities, behavioral skills and cognitive processes (Okwumabua, 1985).
In a more recent study, LaGuardia and Labbe (1993) examined the validity of task-specific and general measures of physical self-efficacy in a competitive sports setting and how these measures relate to anxiety and actual running performance. Subjects from a local running club and university track team were asked to complete the Physical Self-efficacy Scale (Ryckman et al., 1982), a task specific self-efficacy scale developed by the authors and the Spielberger State-Trait Anxiety Inventory. Analyses indicated that race performance was significantly related to predicted race performance, average miles run per day, the task-specific self-efficacy measure, and number of years running. Runners with higher self-efficacy scores had faster pace times than runners with lower scores. The fact that task-specific self-efficacy, predicted performance, and training history contribute significantly to race performance is consistent with Okwumabua's (1985) support of Bandura's social learning argument.

The above studies provide evidence that a significant relationship exists between self-efficacy and performance in competitive athletics, however, due to the correlational nature of these studies, no causal relationships can be
made. Feltz (1988) provides a summary table of the correlational coefficients found in a number of studies examining the relationship between self-efficacy and motor performance (see Table 1).

Using path analytic techniques, Feltz (1982) investigated the role of self-efficacy as a mediating variable in the performance of a high-avoidance diving task (a modified back-dive) over trials. An alternative anxiety-based model that excluded self-efficacy as an

<table>
<thead>
<tr>
<th>Study</th>
<th>N</th>
<th>Performance Task</th>
<th>Self-efficacy Measure</th>
<th>$r$</th>
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<tr>
<td>Barling and Abel (1983)</td>
<td>40</td>
<td>Subjective rating tennis performance</td>
<td>strength</td>
<td>0.53</td>
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<td>Ewart, Stewart, Gillian, &amp; Keleman (1986)</td>
<td>40</td>
<td>Arm strength Aerobic endurance</td>
<td>strength</td>
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<td>Ewart, Taylor, Reese, &amp; DeBusk (1983)</td>
<td>40</td>
<td>Treadmill test performance</td>
<td>strength</td>
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<td>Feltz (1982)</td>
<td>80</td>
<td>Back dive attempts</td>
<td>strength</td>
<td>0.63 (trial 1)</td>
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<tr>
<td>Feltz, Landers, &amp; Raeder (1979)</td>
<td>60</td>
<td>Back dive performance</td>
<td>strength</td>
<td>0.29 (trial 1)</td>
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<tr>
<td>Feltz &amp; Mugno (1983)</td>
<td>80</td>
<td>Back dive attempts</td>
<td>strength</td>
<td>0.59 (trial 1)</td>
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<td>Gayton, Matthews, &amp; Burchstead (1986)</td>
<td>33</td>
<td>Marathon running Leg extension endurance</td>
<td>PPA Level Strength</td>
<td>0.55 0.31 0.26</td>
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<tr>
<td>Gould &amp; Weiss (1981)</td>
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<td>Gymnastics competition performance</td>
<td>Performance estimate</td>
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<tr>
<td>Lee (1982)</td>
<td>14</td>
<td>Gymnastics balance beam test</td>
<td>Strength</td>
<td>0.71</td>
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TABLE 1

<table>
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<tr>
<th>Source</th>
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<th>Variable</th>
<th>Correlation</th>
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<td>McAuley &amp; Gill (1983)</td>
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<td>Gymnastics-vault beam</td>
<td>Strength</td>
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<td>0.43</td>
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<tr>
<td>Ryckman, Robbins, Thornton, &amp; Cantrell (1982)</td>
<td>22</td>
<td>Reaction time</td>
<td>PPA</td>
<td>0.40</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>0.40</td>
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<tr>
<td>Weinburg, Gould, &amp; Jackson (1979)</td>
<td>60</td>
<td>Leg extension endurance</td>
<td>Strength</td>
<td>0.68</td>
</tr>
<tr>
<td>Weinburg, Yulkeson, &amp; Jackson (1980)</td>
<td>112</td>
<td>Leg extension endurance</td>
<td>Strength</td>
<td>0.19</td>
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<tr>
<td>Woolfolk, Murphy, Gottesfeld, &amp; Aiken (1985)</td>
<td>66</td>
<td>Golf putt accuracy</td>
<td>Level</td>
<td>0.26</td>
</tr>
</tbody>
</table>

interacting variable and included the direct influences of cognitive anxiety, physiological arousal, and previous performances was also examined. Heart rate was used as the measure of physical arousal, self-report questionnaires served as measures of self-efficacy, and performance was rated by a trained observer. Results offer little support for either Bandura's model or the anxiety-based model. Self-efficacy was neither just an effect nor the primary direct influence of back-diving performance. Self-efficacy was the best predictor of the first diving attempt, however. Furthermore, heart rate did not consistently affect self-efficacy as proposed by Bandura's theory, and when self-efficacy did significantly affect heart rate, it was in the
wrong direction. Feltz (1982) argues that changes may have occurred during the intervening period between the time self-efficacy was measured and the time when heart rate and performance measured. In addition, a reciprocal relationship was found between self-efficacy and performance. However, they were not equally reciprocal. As subjects progressed over trials, performance became a stronger influence on self-efficacy than self-efficacy became on performance. Based on these findings, Feltz proposed a respecified model, including previous performance and self-efficacy as dual predictors of motor performance. Subsequent research has provided support for the respecified model (Feltz & Mugno, 1983; Fitzsimmons, Landers, Thomas, & van der Mars, 1991).

McAuley (1985) also employed path analytic techniques in examining the relationship between self-efficacy and athletic performance. Like Feltz (1982), McAuley tested the self-efficacy model and an anxiety-based model in explaining performance. However, McAuley used a gymnastics task as a performance measure. In addition, McAuley tested the affects of two different modeling conditions, Aided Participant Modeling and Unaided Participant Modeling versus a control group, on self-efficacy and subsequent performance. Results indicated that subjects in the modeling groups expressing
stronger efficacy expectations and lower levels of anxiety, as well as performing better the gymnastic task than the control group. Consistent with Feltz (1982), however, it was found that neither model fit the data, although the self-efficacy model provided a better fit than the anxiety-based model. These findings, together with those of Feltz (1982) and Feltz and Mugno (1983) suggest that, while self-efficacy cannot account for all change in motor performance, self-efficacy has consistently been found to be an important cognitive mechanism in explaining athletic performance.

While the above studies provide both support and contrasts to Bandura's (1977, 1986) theory, it is important to note several limitations. First of all, the studies took place in highly controlled, invariant conditions. Feltz (1988) suggests that "predicting repetitive performance under the invariant conditions of these studies may not be the most informative paradigm for testing the relative contributions of self-efficacy, anxiety, and performance (p. 432)." It is possible that the relationship between self-efficacy and performance may be more salient in real-life sports settings where conditions are dynamic and variable. In addition, Weinburg and associates (1979) found the
relationship between self-efficacy and performance to be stronger in competitive situations.

Second, it has been noted that the tasks employed in previous research examining the causal relationship between self-efficacy and performance have been "closed skills" where the subject has a great deal of control over performance (George, 1994). Although some sports are similar (archery, diving), many sports employ open skills that are much less controllable and unpredictable (football, golf) (George, 1994).

Third, whereas Bandura (1977, 1986) suggested that self-efficacy determines behavior when sufficient incentives and the required skills are present, McAuley (1985) used subjects "who had had no previous gymnastics experience (p. 284)." While this was done to provide a sufficiently anxious sample and to test skill acquisition, it limits the generalizability of this study to competitive athletics. It is plausible to suggest that competitive athletes possess much higher incentives to perform as compared to undergraduates in a physical education class. In addition, it is possible that experienced athletes differ in cognitions than non-experienced athletes. As George (1994) suggests, experienced athletes may understand that
performances vary, especially in relation to the quality of the opponent, and may not weigh past performance as heavily as non-experienced athletes.

George (1994), recognizing the above limitations, investigated the self-efficacy/performance relationship in an actual sport setting using experienced athletes over a period of time. He proposed that past performance and anxiety exert direct effects on self-efficacy. Self-efficacy was hypothesized to predict effort, and both self-efficacy and effort were hypothesized to predict subsequent performance. Subjects consisted of 25 collegiate and 28 high school baseball players. Subjects completed self-efficacy, anxiety, and effort questionnaires on nine successive game days scheduled over a three week period. Hitting performance, serving as the dependent variable, was assessed objectively using contact percentage.

Path analyses provided support for each of the proposed hypotheses. In terms of self-efficacy, both cognitive and somatic anxiety were negatively related to self-efficacy, stronger previous hitting was associated with higher percepts of self-efficacy, and previous hitting performance was a stronger and more consistent predictor of self-efficacy than was cognitive or somatic anxiety. However,
due to variations in the strength of this relationship, the author (George, 1994) contends that contextual factors, such as the ability of the opponent, may influence self-efficacy.

In terms of effort, stronger percepts of efficacy were predictive of higher effort expenditure while hitting and self-efficacy was found to be the strongest and most consistent predictor of effort in the model. Again, due to variations in path coefficients, George (1994) suggests that other variables may account for some of the variance in effort. Moderate support for the model was found in that self-efficacy was a significant predictor of hitting performance. To test the hypothesis that self-efficacy and effort were the only predictors of performance, the hypothesized model was compared to the fully recursive model. The chi-square goodness-of-fit test was significant and the $Q$ coefficient was .13, indicating that other variables other than self-efficacy and effort were explaining some of the variance in hitting performance. In contrast with Feltz (1982) and Feltz and Mugno (1983), past performance was not found to be a significant predictor of future performance. Consistent with past research (Feltz, 1982; Feltz & Mugno, 1983), however, an unequal reciprocal relationship was found between self-efficacy and
performance, with performance exerting a greater influence on self-efficacy than self-efficacy exerted on performance.

In support of Bandura's theory (1977, 1986) self-efficacy was found to be the strongest and most consistent predictor of performance.

While several studies support Bandura's theory in the laboratory (Weinberg et al. 1979, 1980, 1981; Gould & Weiss, 1981) and several studies offer correlational support in terms of a complex athletic setting (LaGuardia & Labbe, 1993; Lee, 1982; McAuley & Gill, 1983; Okwumabua, 1985), a few studies (Feltz, 1982; Feltz & Mugno, 1983; McAuley, 1985) found significant, though modest, causal evidence for Bandura's full model in a controlled setting. George's study (1994) provides support for the predictive ability of self-efficacy theory under the variable conditions of an actual sport setting. The causal evidence is somewhat inconsistent, however, indicating that other mechanisms may be involved in explaining performance. The relationship between self-efficacy and performance is heavily supported. High self-efficacy is related to high performance and low-self efficacy is related to lower levels of performance.

A consistent finding was that athletes' own predictions of performance were the most accurate predictors
of performance (LaGuardia & Labbe, 1993; Lee, 1982; McAuley & Gill, 1983; Okwumabua, 1985). Laguardia and Labbe (1993) suggest that the individual's knowledge, experience, and past accomplishments, all sources of self-efficacy information, may have combined to form a more accurate representation of event-specific efficacy expectations than did the measures used. This indicates that more sensitive measures of self-efficacy are needed to discover the depth and degree of the self-efficacy/performance relationship. Further, research must continue to employ field studies to facilitate the understanding of these cognitive processes in actual sports settings. In addition, as George (1994) suggested, contextual factors may be involved in the formation of self-efficacy. Future research is needed to determine the influence of such factors as the subjects' experience with the performance task, the type of task involved, and the temporal spacing of performance trials.
CHAPTER IV
RESEARCH EXAMINING THE DIFFERENTIAL EFFECTS
OF THE SOURCES OF SELF-EFFICACY

The second group of studies investigating the self-efficacy/performance relationship have examined the effects of differential sources of information on efficacy expectations and performance. Can self-efficacy be manipulated or enhanced, and will that manipulation influence performance? Several methods of manipulating self-efficacy have been investigated and have been focused on the four sources of self-efficacy: performance accomplishments, vicarious experience, physiological arousal, and verbal persuasion.

Performance accomplishments provide the most influential source of information on which to base self-precepts of efficacy because they are based on one’s mastery experiences (Bandura, 1986). The research in sport and motor skills has demonstrated that techniques based on performance accomplishments are effective in enhancing both self-efficacy and subsequent performance (Brody, Hatfield, & Spalding, 1988; Feltz, Landers, & Raeder, 1979; Hogan &
Santomier, 1984; McAuley, 1985; Weinberg, et al., 1981). For example, Weinberg and his associates (1981), as mentioned previously, measured preexisting self-efficacy and manipulated self-efficacy by having the subject perform against a confederate on an isokinetic machine. Results indicated that changes in self-efficacy were accompanied by corresponding changes in performance, with high preexisting and manipulated self-efficacy subjects demonstrating longer muscular endurance. In addition, studies have demonstrated the superiority of performance based information over other sources of efficacy information (Feltz et al., 1979; Feltz & Riessinger, 1990; McAuley, 1985). Feltz and associates (1979) compared the effectiveness of a treatment involving participant modeling (performance accomplishments) to two types of vicarious experiences (live and videotaped modeling) on the learning of a diving task. The participant modeling condition, which included guided participation and successful experiences, produced significantly more successful dives and stronger expectations of self-efficacy than either of the two modeling groups (Feltz et al., 1979).

Research has consistently shown that information gained through vicarious experience can influence self-efficacy and subsequent performance (Feltz, 1992). Increased self-

Bandura (1986) suggested that model characteristics will influence the effectiveness of the model on influencing self-efficacy and performance. Several studies have investigated the differential saliency of model characteristics (George et al., 1992; Gould & Weiss, 1981; Lirgg & Feltz, 1991; McCullagh, 1987). Gould and Weiss (1981), as mentioned previously, found that subjects who viewed a similar model performed the task better and judged efficacy higher than students who observed dissimilar models. However, this study did not allow the researchers to determine which similarity characteristic was most salient. Lirgg and Feltz (1991) had sixth-grade girls observe a videotape of a skilled or unskilled teacher or...
peer model demonstrate a ladder-climbing task while control subjects did not observe a model. Results indicated that subjects perform better on a ladder-climbing task after observing a skilled model, adult or peer, than after watching an unskilled model, implying that skill is a more salient similarity cue than age. Skilled model subjects also reported higher self-efficacy. George and associates (1992) had college students observe an athletic or unathletic male or female model perform a leg-extension endurance task. The researchers found that among unskilled observers, model ability was a more important similarity cue than gender. Taken together, the above studies indicate that the skill of the model is the most salient similarity cue. However, whereas Lirgg and Feltz (1991) found that children preferred the skilled model, George and associates found that unskilled college students performed better after watching an unskilled (unathletic) model. Comparing these two studies is problematic because of the different tasks employed and the age of the subjects.

The research investigating the effectiveness of verbal persuasion as a facilitator of self-efficacy has been inconsistent (McAuley, 1992). The few studies that have investigated this area have employed techniques such as
positive self-talk (Weinburg, 1985; Wilkes & Summers, 1984), imagery (Feltz & Riessinger, 1990), reinterpretation of arousal (Yan Lan & Gill, 1984), and motivational cues (Carnahan, Shea, & Davis, 1989) as sources of efficacy information. Weinburg (1985) used dissociation and positive self-talk strategies and found no effect on endurance performance. Yan Lan and Gill (1984) employed cognitive feedback manipulation to lead individuals to believe that their agitated arousal was a typical and useful physiological arousal pattern of good competitors. The results did not reveal any manipulation effects. Carnahan and associates (1989) used both verbal and visual motivational cues to enhance self-efficacy in a bench press task. Results revealed that number of completed lifts for the verbal cue condition and the no cue condition was equivalent. In addition, it was found that the number of completed lifts was significantly greater in the verbal and visual cue condition than the no cue condition, suggesting that a combination of verbal and visual cues may have some utility as a motivational technique in muscular endurance. In contrast to the above studies, Wilkes and Summers (1984) found confidence and arousal persuasions to influence strength performance, but self-efficacy did not appear to
mediate the effect. Further, Feltz and Riessinger (1990) found that in vivo imagery had significant effects on endurance performance with corresponding effects on self-efficacy.

Feltz (1992) offers two explanations for the inconsistency of the above studies. First, each study varied to the extent that they actually persuaded the subjects. Weinburg (1985) did not inform subjects that the cognitive strategy would enhance performance, whereas Wilkes and Summers (1984) instructed subjects to persuade themselves that they were confident (Feltz, 1992). Second, Feltz (1992) suggests that actual performance may have confounded the treatment effects. Since all of the above studies used multiple performance trials, it is possible that previous performance may have overshadowed the effects of the cognitive strategies on self-efficacy. Feltz and Riessinger (1990) found that the significant effect for endurance performance and self-efficacy dissipated after a failure, supporting Feltz's (1992) above explanation.

The influence of physiological states on self-efficacy has received very little attention in the sports psychology literature (Feltz, 1988, 1992; McAuley, 1992). Yan Lan and Gill (1984) demonstrated that individuals performing a high
efficacious task reported significantly lower cognitive worry and somatic anxiety than when they were performing a low efficacious task. However, these findings indicate the influence of self-efficacy on physiological states, not vice versa. Feltz (1982) found perceived autonomic arousal to be a significant predictor of self-efficacy, though not as strong of a predictor than previous performance, and actual physiological arousal was not a significant predictor. Kavanagh and Hausfield (1986) found that mood and self-efficacy were related, however, mood was not found to influence self-efficacy in any consistent manner.

In summary, the sport psychology literature has produced consistent findings to support the influence of performance accomplishments and vicarious experience on self-efficacy and subsequent performance. The research has also determined that performance accomplishments are a more influential source of efficacy information than vicarious experience, verbal persuasion, and physiological arousal. In addition, it has also been found that several model characteristic determine the effectiveness of the model, with similarity and skill being the most salient characteristics. The research investigating the influence of verbal persuasion and physiological arousal has been
inconsistent and no significant conclusions can be made. It is possible that the multiple trial design of the above studies may confound treatment effects. Resolving this confound would require studies to span longer time periods to allow differential treatment techniques time to influence self-efficacy (McAuley, 1992). Further, perceptions of self-efficacy are dynamic and task specific. In most sport situations, conditions vary greatly from the experience of the athlete to the difficulty of the task to the quality of the opponent. Self-efficacy also has the potential to vary with each situation. Therefore, assessment of self-efficacy in the future should employ multiple assessment points and should be done in more complex sport situations before we can fully understand the cognitive relationships involved in sport (McAuley, 1992).

Thus far this study has examined Bandura’s self-efficacy theory (1977, 1986a), empirical evidence testing the relationships proposed by the theory in the sport domain, and research pertaining to the sources of information on which perceptions of self-efficacy are based. The next section will demonstrate the implications that the above research findings have for instruction and training. Suggestions from Bandura (1990) on the use of self-efficacy
theory in competitive sports, several implications of self-efficacy theory in learning and skill acquisition offered by Schunk (1995), and research examining the use of self-efficacy enhancing techniques used by the coaches of elite athletes (Gould, Hodge, Peterson, & Giannini, 1989) will be presented next.
CHAPTER V

IMPLICATIONS FOR THE UTILITY OF

SELF-EFFICACY THEORY IN PRACTICE

Bandura (1990) offers a discussion of the uses of self-efficacy in competitive sports. He contends that self-efficacy is crucial in overcoming obstacles and adversity. "A measure of successful athletes is their ability to handle adversity and setbacks with an unshakable sense of efficacy (p. 152)."

Self-efficacy also plays a role in thought control. An athlete's self-efficacy will not allow internal or external distractions to interfere with performance, "Self-efficacious athletes do not exacerbate the problem by disruptive emotional reactions and interfering thought patterns. Rather they dissociate each new attempt from how they performed before and approach it with a task-oriented focus (p. 153)."

Bandura (1986) has also found that perceived self-efficacy makes pain easier to manage. The stronger the instated perceived coping efficacy the higher the pain tolerance and the less dysfunction it produces.
Bandura (1990) also suggests ways to develop resilient self-efficacy in sports. This is achieved through graduated mastery experiences. Trainers must avoid placing athletes prematurely in situations where they are likely to fail while providing structured tasks for developing athletes in ways that bring success. However, some experience in mastering difficulties through perseverance is also needed. Easy successes lead athletes to expect quick and easy success and their self-efficacy is easily undermined by failure. Setbacks and failures serve as tool for teaching that success requires sustained effort.

Since most of the research on self-efficacy has been with individual athletes, such as the studies presented here, Bandura (1990) suggests that research be done on the collective efficacy (Bandura, 1986a) of teams. "Perceived collective efficacy is likely to influence how much effort players put forth together, their ability to remain perseverant and task oriented during periods when the team is struggling, and their capability to bounce back from wrenching defeats (p. 154)." His informal observations indicate that successful teams have a strong sense of efficacy and resiliency. This is illustrated by teams that do not collapse when they fall behind in the score. With
determined effort they are able to perform comebacks in high pressure situations, or fantastic finishes. Bandura suggests two versions of collective efficacy that await development of a sensitive methodology: an aggregate of the players judgments of their own self-efficacy, and an aggregate of the players' judgment of the perceived efficacy of the team as a whole.

Feltz, Bandura, and Lirgg (1989, as cited in Feltz, 1992) compared the relationship of self-efficacy to team performance and team efficacy to team performance with seven intercollegiate ice hockey teams across a 32 game season. Subjects completed questionnaires on individual self-efficacy, perceived team rankings, and team efficacy approximately 24 hours before each game. Results indicated that team efficacy was slightly more related to team performance than was individual efficacy. In addition, the players' predictions of their team's ranking were more predictive of team performance than team or individual rankings (Feltz, 1992).

Schunk (1995) recently published an article discussing the relation of self-efficacy to motivation and performance in cognitive and sport domains. While this article (Schunk, 1995) is based primarily on his work with children in
academic settings, Schunk offers several implications of self-efficacy theory and research in education and training in sports and physical activity.

First, the procedures used in training and practice must be assessed as to how they affect a broad range of outcomes including performance, self-efficacy, and motivation (Schunk, 1995). For example, while skill acquisition may be aided by extensive assistance from coaches, that assistance may actually undermine self-efficacy if performance is attributed to assistance rather than skill. Periods of mastery and independent practice must be included to build self-efficacy. This suggestion is related to Bandura's (1990) notion of graduated mastery experiences discussed above.

Schunk also recommends that peers be used as models. As we have seen (e.g. Lirgg & Feltz, 1991) model ability is a critical in raising self-efficacy. However, Schunk (1995) contends that in problem situations (i.e. students or athletes who have experienced prior difficulty) students may not relate to the highly skilled model. Peer models who are perceived by the problem student or athlete as similar in skill may facilitate building self-efficacy better than highly skilled models. In addition, it is suggested that
multiple models be used to ensure that students perceive themselves as similar to at least one of the models and to illustrate that the task can be done (Bandura, 1986; Schunk, 1995).

Schunk (1995) also advocates the use of goals to enhance self-efficacy and increase performance. He contends that the properties of the goals and the manner in which goals are used to guide behavior and assess progress are more important than the goals themselves. For goals to affect performance, they should be perceived as challenging yet attainable, broken into manageable subtasks, clearly defined, and students and athletes must be committed to the goals specified. Further, goal properties allow individuals to determine progress by comparing present performance versus stated goals. Lack of progress will not undermine self-efficacy if the individual believes that increased effort or different strategies will increase performance (Schunk, 1995).

Weinberg (1992) reviewed the literature concerning goal-setting and motor performance. Variables such as task complexity, type of setting, goal difficult, spontaneous goal-setting, and competition have all been examined as potential mediators of use of goals to increase performance.
Weinberg (1992) concluded that the literature has produced equivocal findings and discrepancies in methodology and procedures were noted, indicating that this area requires further research before firm conclusions and implications can be made.

Finally, Schunk (1995) recommends the use of credible and specific feedback to enhance self-efficacy. The athlete or student must know how specific feedback relates to improved performance. In addition, attributional feedback must be related to outcomes and consistent to the individual's perceptions. For example, praising an athlete for hard work may undermine self-efficacy if the athlete feels he/she is not trying as hard as previously. The issues of attributions and attributional feedback warrant further research and will be addressed again as a possible future direction for research.

As mentioned, Schunk's (1995) article is based primarily on research done with children in academic settings and is more relevant to skill acquisition and learning. Gould and associates (1989) conducted a dual study that assessed strategies elite coaches use to enhance self-efficacy in athletes. The first study surveyed 101 intercollegiate wrestling coaches as to the strategies they
use to enhance self-efficacy in their athletes. Results indicate that the strategies most often used were instruction-drilling, modeling confidence oneself, encouraging positive talk, and employing hard physical conditioning drills. Instruction-drilling, modeling confidence oneself, liberal use of reward statements, and positive talk were rated as the most effective strategies by the sample of coaches.

The second study (Gould et al., 1989) used 124 national team coaches representing 30 Olympic sports as the sample. Results were similar to those of the first study in that the most often used strategies were instruction-drilling, modeling confidence oneself, encouraging positive talk, and emphasizing technique improvements while downplaying outcomes. In addition, the techniques rated as most effective were instruction-drilling, encouraging positive talk, modeling confidence oneself, and liberal use of reward statements. In addition, results revealed no differences between successful versus less successful coaches, more experienced versus less experienced, male versus female, or open versus closed sport. However, team-sport coaches more often used the technique of instruction drilling and modeling confidence oneself than individual-sport coaches.
The survey nature of this study limits the strength of the above findings (Gould et al., 1989) because the investigators were not able to observe coaches' use of techniques and assess their behavioral effectiveness.

In summary, self-efficacy appears to have much utility in the sport and physical activity domains. Bandura (1990) contends that self-efficacy is critical in overcoming obstacles and adversity, preventing distractions, pain management, and recommends a program of graduated mastery experiences to build resilient self-efficacy. Schunk (1995) makes several recommendations for building self-efficacy in motor performance such as assessing how training procedures affect variety of outcomes (i.e. skill acquisition, motivation, self-efficacy, performance), the use of peers as models, the use of goals, and the use of specific and credible progress and attributional feedback. Finally, Gould et al. (1989) found that elite coaches most often use instruction-drilling, modeling confidence oneself, and positive self-talk to enhance or build self-efficacy. The next section will address future research considerations for the use of self-efficacy in sport in terms of assessment, population differences, and interrelations between attributions, motivation, and self-efficacy.
CHAPTER VI
SUGGESTIONS FOR FUTURE RESEARCH

Bandura suggested a microanalytic approach to assessing self-efficacy, which includes strength, level, and generality. A consistent finding was that athletes predictions of their own performance were more predictive of performance than were the self-efficacy measures (LaGuardia & Labbe, 1993; Lee, 1982; McAuley & Gill, 1983; Okwumabua, 1985). This finding can be construed as either a limit of the predictiveness of the self-efficacy construct, or as a limitation of the assessment measures. Perhaps including the athlete's own prediction of performance in the assessment measure will add to the predictive power and validity of the measure. Further research is needed to determine how an athlete's own prediction of performance is related to self-efficacy. In addition, it is possible that situational and contextual factors, such as the level of opponent or the weather conditions, may affect self-efficacy in an athletic contest (George, 1994). Schunk (1995) offers a model of achievement behavior highlighting the role of self-efficacy which includes situational and contextual
factors. Figure 2 schematically depicts the relationships proposed by Schunk (1995).

Future research should attempt to conduct field studies to determine and measure such situational and contextual factors as proposed by Schunk's model.

Several researchers have suggested that a one-time measure of self-efficacy is inadequate given the dynamic nature of sporting events (Feltz, 1988; George, 1994). While George (1995) assessed self-efficacy several times (before each game), situations change during games which
could influence self-efficacy. Future research should make efforts to assess self-efficacy at different points within a competition. While this may cause much intrusion during the contest in question, some sports allow for data collection between performances (i.e. golf, bowling). Assessing self-efficacy before each hole in a golf competition would give an indication of how self-efficacy fluctuates during a contest.

Further, future research is needed to determine if self-efficacy and performance are related differently in specific populations and different tasks. Do experienced athletes process cognitions differently than inexperienced athletes (George, 1994)? Research has shown that experts in physics and chess process cognitions differently than novices. In addition, Bandura suggested that self-efficacy will affect performance only when proper incentives are present. As mentioned previously, most studies have examined self-efficacy and performance in physical education classes rather than in an actual sports competition. Controlling for incentives may reveal more about the self-efficacy/performance relationship (Feltz, 1992). In terms of different tasks, research is needed to determine if the self-efficacy/performance relationship differentiates in terms of whether the task used as the performance measure
entails skill acquisition or enhanced performance of a mastered skill. In studies where skill acquisition is employed, self-efficacy of learning may be a more accurate assessment of self-efficacy (Schunk, 1995).

Research is needed to further clarify the relationships and definitions of self-efficacy, attributions, and motivation. Motivation is often defined by such things as effort, choice of activities, persistence, and performance, the same things self-efficacy is proposed to affect (Roberts, 1992). Roberts (1992) contends that self-efficacy is one variable within a motivation process. He further contends that to look at one variable in isolation lends one to a "myopic and static view of the motivation process" (p. 22).

Bandura (1986) proposed that self-efficacy beliefs influence causal attributions. In a review of the literature concerning the relationship between self-efficacy and attributions in physical activity, McAuley (1992) concluded that "these two theoretical approaches are intimately related in a reciprocally determining manner" (p. 115). Attributions made for performance influence perceptions of self-efficacy, which influence future causal attributions. Self-efficacy is enhanced by attributing positive sport performance to factors that are
perceived of as controllable, internal, and relatively stable. Highly efficacious individuals are likely to attribute future outcomes to factors within the individual's control (Duncan & McAuley, 1987; McAuley, 1992; McAuley, Duncan, & McElroy, 1989). McAuley (1992) further suggests that self-efficacy and attributions should be studied as interdependent rather than as separate entities.

In conclusion, this paper reviewed the research examining the relationship between self-efficacy theory and athletic performance. An overview of the theory was presented first, followed by research establishing a relationship between self-efficacy and performance in both laboratory settings and field settings using various statistical procedures. Research testing the influence of various techniques employed to manipulate self-efficacy was presented next. Suggestions made by leading cognitive researchers as to the utility of self-efficacy in the sport domain and recommendations for employing self-efficacy strategies were offered followed by research investigating the use of self-efficacy building strategies used by coaches of elite athletes. Finally, considerations for future research were presented. In closing, the research has demonstrated a consistently significant relationship between
self-efficacy and performance. Future research should continue to examine this complex relationship and develop implications for the use of self-efficacy theory in applied settings. Field studies are needed to understand the dynamic and variable nature of competitive sports.
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The final copies have been examined by the director of the thesis and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the thesis is now given final approval by the Committee with reference to content and form.

The thesis is therefore accepted in partial fulfillment of the requirements for the degree of Master of the Arts.

Date

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