XI CONGRESO NACIONAL DE PSICOLOGÍA DE LA ACTIVIDAD FÍSICA Y EL DEPORTE

F.E.P.D. Federación Española de Psicología del Deporte
UNIVERSIDAD PABLO DE OLAVIDE SEVILLA
apda ASOCIACIÓN DE PSICOLOGÍA DEL DEPORTE DE ANDALUCÍA

Self-efficacy Beliefs of Athletes, Teams, and Coaches

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(2001). In R. N. Singer, H. A. Hausenblas, & C. Janelle (Eds.), *Handbook of Sport Psychology, 2nd ed*. (pp. 340-361). New York: John Wiley & Sons.

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Chapter: Self-efficacy Beliefs of Athletes, Teams, and Coaches

The self-efficacy construct is one of the most influential psychological constructs thought to affect achievement strivings in sport (Feltz, 1988). Gould and his colleagues found that self-efficacy and team efficacy were chief among that factors that US Olympic athletes reported to influence their performance at the Nagano Olympic games (Gould, Greenleaf, Lauer, & Chung, 1999). Bandura (1977, 1986, 1997) defined self-efficacy as the belief one has in being able to execute a specific task successfully (e.g., a pitcher striking out a batter) in order to obtain a certain outcome (e.g., self-satisfaction or coach recognition). Since the first publication of the self-efficacy concept (Bandura, 1977), there have been over 60 research articles published on self-efficacy related specifically to sport performance (Moritz, Feltz, Mack, & Fahrbach, in press). This chapter provides an overview of the self-efficacy concept and its measurement, a review of relevant research on athletes, athletic teams, and coaches, and future directions for research in this field.

Self-efficacy Theory

Bandura's (1977) theory of self-efficacy theory was developed within the framework of social cognitive theory. Although, originally, the theory was proposed to account for the different results achieved by diverse methods used in clinical psychology for the treatment of anxiety, it has since been expanded and applied to other domains of psychosocial functioning including health and exercise behavior (McAuley, 1992; McAuley & Mihalko 1998; O'Leary, 1985), and sport and motor performance (Feltz, 1988).

Self-efficacy beliefs are not judgments about one's skills, objectively speaking, but rather about one's judgments of what one can accomplish with those skills (Bandura, 1986). In other words, self-efficacy judgments are about what one thinks one can do, not what one has. These judgments are a product of a complex process of self-appraisal and self-persuasion that relies on cognitive processing of diverse sources of efficacy information (Bandura, 1990). Bandura (1977, 1986) categorized these sources as past performance accomplishments, vicarious experiences, verbal persuasion, and physiological states. Others have added separate categories for emotional states and imaginal experiences (Maddux, 1995; Schunk, 1995).

Performance accomplishments have proved to be the most influential source of efficacy information because they are based on one's own mastery experiences (Bandura, 1997). One's mastery experiences affect self-efficacy beliefs through the cognitive processing of such information. If one has repeatedly viewed these experiences as successes, self-efficacy beliefs will increase; if these experiences were viewed as failures, self-efficacy beliefs will decrease. Furthermore, the self-monitoring or focus on successes should provide more encouragement and enhance self-efficacy more than the self-monitoring of one's failures. One must be careful, however, not to become complacent by one's success. Bandura (1997) suggests that letdowns after easy successes and intensifications after failure are common sequences in competitive struggles. The continued setting of challenging goals and the positive reactions to substandard performances help to elevate the intensity and level of motivation.

The influence of past performance experiences on self-efficacy beliefs also depends on the perceived difficulty of the performance, the effort expended, the amount of guidance received, the temporal pattern of success and failure, and the individual's conception of a particular "ability" as a skill that can be acquired versus an inherent aptitude (Bandura, 1986; Lirgg, George, Chase, & Ferguson, 1996). Bandura has argued that performance accomplishments on difficult tasks, tasks attempted without external assistance, and tasks accomplished with only occasional failures carry greater efficacy value than tasks that are easily accomplished, tasks accomplished with external help, or tasks in which repeated failures are experienced with little sign of progress. Miller (1993) found a negative relationship between high self-efficacy perceptions of competitive swimmers and their motivation when they were given unchallenging goals.

Efficacy information can also be derived through a social comparison process with others. This process involves observing the performance of one or more other individuals, noting the consequence of their performance, and then using this information to form judgments about one's own performance (Maddux, 1995). Vicarious sources of efficacy information are thought to be generally weaker than performance accomplishments; however, their influence on self-efficacy can be enhanced by a number of factors. For example, the less experience people have had with performance situations, the more they will rely on others in judging their own capabilities. The effectiveness of modeling procedures on one's self-efficacy judgments has also been shown to be enhanced by perceived similarities to a model in terms of performance or personal characteristics (George, Feltz, & Chase, 1992; Weiss, McCullagh, Smith, & Berlant, 1998).

One particular mode of modeling influence that has been suggested to enhance one's sense of efficacy and performance in sport is self-modeling (Dowrick, 1991; Franks & Maile, 1991). Self-modeling consists of the individual repeatedly observing the correct or best parts of his or her own past performance, and using that as a model for future performance (Dowrick & Dove, 1980). Bandura (1997) suggests that self-modeling affects performance through its impact on efficacy belief. The little research in sport on this topic is equivocal (Singleton & Feltz, 1999; Winfrey & Weeks, 1993). Winfrey and Weeks (1993) found no effects on self-efficacy or balance-beam performance using self-modeling videotapes with female gymnasts. However, they did not measure self-efficacy according to Bandura's recommended procedures and had a very small sample. Singleton and Feltz (1999), using a 5-item, skill specific self-efficacy scale, found that collegiate hockey players exposed to several weeks of self-modeling videotapes showed greater shooting accuracy and higher self-efficacy for game performance compared to controls.

Persuasive techniques are widely used by coaches, managers, parents, and peers in attempting to influence an athlete's self-perceptions of efficacy. These techniques include verbal persuasion, evaluative feedback, expectations by others, self-talk, positive imagery, and other cognitive strategies. Self-efficacy beliefs based on persuasive sources are also likely to be weaker than those based on one's accomplishments, according to the theory. However, Bandura (1997) indicates that the debilitating effects of persuasory information are more powerful than the enabling effects. Individuals tend to avoid challenging activities in which they have been persuaded that they lack the capabilities or they give up quickly. It is harder to instill strong beliefs of self-efficacy by persuasory means only.

The extent of the persuasive influence on self-efficacy has also been hypothesized to depend on the prestige, credibility, expertise, and trustworthiness of the persuader. Coaches are usually believed to be credible sources of their athletes' capabilities. In addition to providing inspirational messages, effective coaches also structure activities for their athletes that bring success and avoid placing them prematurely in situations that are likely to bring repeated failures (Bandura, 1997). Credible coaches also encourage their athletes to measure their successes in terms of self-improvement rather than outcome.

Efficacy information can also be obtained from a person's physiological state or condition. Physiological information includes autonomic arousal that is associated with fear and self-doubt or with being psyched-up and ready for performance, as well as one's level of fitness, fatigue, and pain (in strength and endurance activities). Physiological information has been shown to be a more important source of efficacy information with respect to sport and physical activity tasks than in the case of nonphysical tasks (Chase, Feltz, Tully, & Lirgg, 1994; Feltz & Riessinger, 1990).

Similar to physiological information, one's emotional state can be an additional source of information in forming efficacy perceptions. Positive affect, such as happiness, exhilaration, and tranquility, are more likely to enhance efficacy judgments than are negative affective states, such as sadness, anxiety, and depression (Maddux & Meier, 1995; Treasure, Monson, & Lox, 1996). Schunk (1995) suggested that emotional symptoms that signal anxiety might be interpreted by an individual to mean that he or she lacks the requisite skills to perform a certain task, which in turn, influences efficacy judgments.

Lastly, Maddux (1995) introduced imaginal experiences as a separate source of efficacy information. People can generate efficacy beliefs by imagining themselves or others behaving successfully or unsuccessfully in anticipated performance situations. Bandura (1997) refers to this as cognitive self-modeling (or cognitive enactment) and describes it as a form of modeling influence. Imagining oneself winning against an opponent has been shown to raise efficacy judgments and endurance performance (Feltz & Riessinger, 1990). Other cognitive simulations, such as mental rehearsal strategies have also been shown to enhance competition efficacy beliefs and competitive performance (Garza & Feltz, 1998).

These categories of efficacy information, based on Bandura's theory of self-efficacy (1977, 1986, 1997), are not mutually exclusive in terms of the information they provide, though some are more influential than others. How various sources of information are weighted and processed to make judgments on different tasks, in different situations, and for individuals' skills is still unknown. The consequences of these judgments, however, have been shown to determine people's levels of motivation, as reflected in the challenges they undertake, the effort they expend in the activity, and their perseverance in the face of difficulties (Bandura, 1997). In addition, individuals' self-efficacy judgments also have been shown to influence certain thought patterns (e.g., goal intentions, worries, causal attributions) and emotional reactions (e.g., pride, shame, happiness, sadness) that also influence motivation (Bandura, 1997).

Furthermore, the relationship between self-efficacy judgments and performance accomplishments is believed to be temporally recursive: "Mastery expectations influence performance and are, in turn, altered by the cumulative effect of one's efforts." (Bandura, 1977, p. 194). Bandura (1990) has emphasized the recursive nature of the relationship between self-efficacy and thought patterns as well. Figure 1 presents the relationships between the major sources of efficacy information, efficacy judgments, and consequences as predicted by Bandura's theory and the additional determinants proposed by Maddux (1995).

Bandura (1977, 1986, 1997) has provided some qualifiers to the predictiveness of self-efficacy judgments. Self-efficacy beliefs are a major determinant of behavior only when people have sufficient incentives to act on their self-perception of efficacy and when they possess the requisite skills. Self-efficacy beliefs will exceed actual performance when there is little incentive to perform the activity or when physical or social constraints are imposed on performance. Some people may have the necessary skill and high self-efficacy beliefs, but no incentive to perform. According to Bandura, discrepancies between efficacy beliefs and performance will also occur when tasks or circumstances are ambiguous or when one has little information on which to base efficacy judgments, such as when one is first learning a skill.

Self-efficacy expectations should not be confused with outcome expectations. Outcome expectancies are defined as the belief that certain behaviors will lead to certain outcomes. Self-efficacy, on the other hand, is the belief in one's ability to successfully perform the behavior in question successfully (Bandura, 1977). In essence, outcome expectations are concerned with beliefs about one's environment and efficacy expectations are concerned with beliefs about one's competence. Some sport psychology researchers confuse performance markers, such as “winning an event,” with an outcome expectation. Bandura (1997) describes the three major forms that outcome expectations can take: physical effects, social effects, and self-evaluative effects. “Behavior and the effects it produces are different classes of events.” (p. 22). That is, examples of physical outcome effects are positive/negative sensory experiences; examples of social outcome effects are approval/disapproval and monetary compensation/deprivation of privileges; and examples of self-evaluative outcome effects are self-sanctions/self-satisfaction. An athlete’s position in a competition or winning does not fit this class of effects. An athlete’s position in a competition --first, second, third, etc.-- is a performance marker. Feltz and Chase (1998) have labeled this “competitive” or “comparative” efficacy. An outcome expectation of winning a competitive event might be a high level of self-satisfaction, approval from one’s coach, and money or a trophy. Although both self-efficacy beliefs and outcome expectations can influence behavior in sport situations according to Bandura (1997), outcome expectations are highly dependent on self-efficacy judgments and thus do not predict much beyond what is predicted by self-efficacy.

The Measurement of Self-Efficacy

Bandura (1977, 1986, 1997) has always advocated using self-efficacy measures that are specific to particular domains of functioning, rather than ones that assess global expectations of performance. This means using a microanalytic approach, which requires a detailed assessment of the level, strength, and generality of self-efficacy beliefs. Level of self-efficacy is defined as one's belief about the magnitude or level of performance possible. Strength is defined as the certainty that one can attain a given level of performance. Generality refers to the number of domains in which an individual believes he/she is efficacious. Measures of generality of self-efficacy are rarely included in research studies on sport.

A microanalytic approach allows one to analyze the degree of congruence between self-efficacy and performance at the level of individual tasks (Bandura, 1997). Analyzing the degree of congruence involves a computation of the percentage of items for which an efficacy judgment and performance agree. As Wurtele (1986) noted, this type of analysis has not been conducted in studies in sport psychology. Rather, researchers in sport psychology have typically correlated aggregate self-efficacy level or strength scores with aggregate performance scores (Feltz & Chase, 1998).

In sport studies, self-efficacy measures typically are constructed by listing a series of tasks that vary in difficulty, complexity, or stressfulness. These are called hierarchical self-efficacy measures. Participants are asked to designate (yes or no) the tasks they believe they can perform (efficacy level). For each task designated as "yes," they rate their degree of certainty (efficacy strength) that they can execute it on a near-continuous scale from total uncertainty to total certainty, with scale ranges from zero to 10, in one-unit increments, or zero to 100, in 10-unit increments. Most hierarchical scales are constructed by listing tasks in increasing order of difficulty, such as landing your most difficult figure skating jump from 1 out of 10 to 10 out of 10 times (Garza & Feltz, 1998).

In constructing nonhierarchical scales, a conceptual analysis of the subskills needed to perform in a given domain is conducted, along with a contextual analysis of the level of situational demands. Such a scale for wrestling might include escape, get reversal, get back points, pin opponent, not get take down, get take down by throw, get take down single leg, ride opponent, get take down double leg, and not be pinned (Treasure et al., 1996). Researchers using nonhierarchical scales should determine and report the internal consistency if they are using an aggregated score to represent self-efficacy (Feltz & Chase, 1998).

Some research studies have used one-item questions in which participants rate how certain they are of their performance or beating an opponent's performance. However, one-item scales have been subject to problems with reliability and validity, especially in competitive situations when several factors influence the outcome (Feltz & Chase, 1998). In these situations, the correlations between self-efficacy and performance outcome have been shown to be much smaller than when using multiple items (Moritz et al., in press).

Although most of the self-efficacy scales have been constructed for a specific study, Ryckman and his colleagues (Ryckman, Robbins, Thornton, & Cantrell, 1982) constructed the Physical Self-Efficacy Scale (PSE), with two subscales, to provide a more generalized measure of self-efficacy in the sport and physical activity realm. The Perceived Physical Ability subscale (PPA) measures perceptions about one's general physical ability, and a Physical Self-Presentation Confidence subscale (PSC) reflects perceived efficacy in the display of physical skills. Rather than being on a probability scale, items are on a 6-point Likert scale, with response alternatives ranging from *strongly agree* to *strongly disagree.* Although predictive validity has been found for the PSE in competitive sports contexts (Gayton, Matthews, Borchstead, 1986), others have found task-specific scales to be better predictors of specific tasks (LaGuardia & Labbé, 1993; McAuley & Gill, 1983; Slanger & Rudestam, 1997). The concept of the PSE as a self-efficacy measure has also been questioned because the items were not developed within a goal-striving context and seem to represent more of a self-concept measure (Feltz & Chase, 1998; Maddux & Meier, 1995).

Two other measures that have been used to tap self-appraisals of people's capability in sport are Vealey's (1986) sport confidence measure and the self-confidence subscale of the Competitive Sport Anxiety Inventory-2 (CSAI-2: Martens, Burton, Vealey, Bump, & Smith, 1990). Sport confidence is a more broadly defined concept that assesses one's trait and state perceptions to be successful in one's sport. Self-confidence, as measured on the CSAI-2, also has a broader focus regarding one's capability to perform successfully in competition. Details regarding the use of these measures are described in Vealey's chapter [this volume] and Hardy and Woodman's chapter [this volume].

Regardless of how the self-efficacy measure is constructed, it is most useful in explaining motivated behavior and sport performance when the measures have been constructed within the tenets of the theory. Thus, research participants should have the proper incentives to perform, measures that are specific to the performance domain should be used, self-efficacy and performance measures should be concordant, and self-efficacy and performance measures should be assessed closely in time. Of particular importance, Bandura (1997) stated that a proper assessment of the structure of the relationship between efficacy beliefs and action requires that both measures should match. In a meta-analysis of the relationship between self-efficacy and sport performance, Moritz et al. (in press) found that when the self-efficacy and performance measures were not concordant, the correlations between the two were not as strong (r = .26) as when both measures tapped similar capabilities (r = .43). A lack of concordance would be evident if one assessed wrestling moves microanalytically (i.e., escapes, get reversals, pin opponents, etc.), but then used the wrestler's overall score as the performance measure.

The time lapse from self-efficacy assessment to performance is also important according to Bandura (1986). If self-efficacy and performance measures are not assessed closely in time, one's efficacy beliefs could be altered by an intervening experience (Bandura 1986). Wiggins (1998) found, however, that efficacy expectations for athletes remained very stable within 24 hr. to competition. For a more thorough discussion on how to construct self-efficacy scales and the measurement issues surrounding self-efficacy, the reader is directed to Feltz and Chase (1998).

Self-efficacy Research on Athletes

Much of the evidence for the effectiveness of self-efficacy as an influential mechanism in sport performance comes from studies using nonathlete populations and contrived settings (Feltz, 1992). That research has demonstrated consistent evidence that people's perceptions of their performance capability significantly affect their motivation and performance (Feltz, 1994). The research reviewed in this section contains only studies that examined the self-efficacy of athletes using self-efficacy scales. Studies using solely sport confidence (Vealey, 1986) or CSAI-2 measures are not included here because they are covered in other chapters.

Of the 45 studies that were reviewed in the Moritz et al. (in press) meta-analysis on self-efficacy, only 10 studies examined the self-efficacy and sport performance relationship with athletes. We found an additional 15 studies that either used children and youth (Moritz et al. did not include samples under 16 years of age), did not employ a performance measure, or were published after the meta-analysis was conducted. A summary of all 24 studies is contained in Table 1.

Studies ranged from a focus on youth and high school athletes to extreme sport athletes and athletes with disabilities. Feltz and Chase (1998) caution researchers about the format and appropriateness of measures used in assessing self-efficacy in children. The typical format with measures of strength and level of self-efficacy, may be too difficult for children under 9 years of age. In addition, children under 9 years are not as accurate in their self-assessments of capabilities as are older children and adults. Some of the studies we found for this chapter used athletes younger than 9 years of age (Lee, 1982, 1986; Watkins, Garcia, & Turek, 1994; Weiss, Wiess, & Klint, 1989; Winfrey & Weeks, 1993.

In terms of measures used, all but two studies (Gayton et al., 1986; Ryckman & Hamel, 1993) used task specific self-efficacy scales. However, approximately only one-half of the studies measured self-efficacy in accord with Bandura's (1977) recommendations and administering within 24 hours of performance measures. For studies that examined performance, 11 used competitive outcomes, such as finish times, win/loss percentages, and scores on judged competitions. In other studies, specific contests were constructed, such as penalty shooting contests, in which number of shots made constituted the performance measure.

Most of the studies (n = 18) that investigated self-efficacy beliefs of athletes examined the self-efficacy-performance relationship. Some of these studies also made comparisons with other predictors of performance. Most of these studies showed a significant and at least moderate relationship between self-efficacy and performance. Investigations that showed low correlations between the two measures either used a nontraditional measure of self-efficacy, had a long time-lag between measures, or had a low concordance between their self-efficacy and performance measure. For instance, in the Lee (1988) study of collegiate female hockey players, there was an unspecified time period between self-efficacy and performance, self-efficacy was not assessed prior to matches, and the self-efficacy scale (based on individual hockey skills) was not concordant with the performance measure (based on team winning percentage).

In addition to examining the relationship of self-efficacy to performance, 14 studies also compared self-efficacy beliefs with other predictors of performance. Various other predictors included general self-efficacy measures, response-outcome, valance, anxiety, worry, affect, perceived control, personal goals and goal importance, competitive orientation, sport confidence, and past performance/experience/training history. Most of these studies found self-efficacy beliefs to have predictive superiority over other variables or have similar predictive strength. For instance, George (1994) found self-efficacy and anxiety (cognitive and somatic) to equally predict hitting performance in the first of a 9-game series. Kane et al. (1996) found that prior performance predicted the percentage of wrestling matches won, but that self-efficacy contributed most strongly to overtime performance. LaGuardia & Labbé (1993) demonstrated that runners' predicted times, training mileage, and self-efficacy beliefs all predicted pace times for 3 races.

In only three studies were other variables found to be stronger predictors of performance than self-efficacy beliefs. Lee (1982) found that although gymnasts' self-efficacy was more related to performance than previous performance, only the coach's estimate of the gymnast's performance and, to a lesser extent, the number of previous competitions were significant predictors of performance score. Wurtele (1986), however, pointed out a number of methodological problems with the study that limit generalizations: "(1) Subjects were quite young (ages 7-12 years) and may not have understood the task; (2) not all of the subjects had been in previous competition; (3) only subjects' strength was assessed, and not level of self-efficacy; and (4) self-efficacy judgment were made 1 week prior to competition." (p. 292). Although the measurement of self-efficacy level (or magnitude) is not essential (Feltz & Chase, 1998), the use of a public estimation of one's performance score as a measure of self-efficacy strength is of questionable validity.

In a subsequent study, Lee (1988) found team goal setting to have a stronger direct relationship with the teams' winning percentages than players' self-efficacy beliefs. In addition to the problems noted earlier in this chapter with the way in which self-efficacy was measured, Feltz and Lirgg (1998) have demonstrated that team performance is more strongly related to team beliefs than to individual beliefs.

Lastly, Watkins et al. (1994) did not find self-efficacy beliefs of youth baseball players to predict batting cage performance as well as previous performance. Baseball hitters in this study performed under invariant conditions for four trials. As Bandura points out (1997), the predictiveness of prior performance is inflated under this condition and is not realistic to batting under competitive conditions. When batting was performed within baseball games, George (1994) found self-efficacy beliefs, but not prior performance to predict subsequent performance.

Some studies have examined the antecedents of self-efficacy judgments. Performance variables such as prior performance, training history, playing experience, have been investigated as predictors of self-efficacy expectations in accord with Bandura's (1986, 1997) predictions, as well as cognitive variables such as anxiety, affective states, competitive orientation, goal importance, and trait sport confidence. All of the studies that investigated performance variables as predictors of self-efficacy found strong relationships between the two measures (George, 1994; Haney & Long, 1995; Kane, Marks, Zaccaro, & Blair, 1996; Okumabua, 1986; Watkins et al., 1994). In addition, the studies that have measured this relationship over trials, through path analysis (e.g., George, 1994; Haney & Long, 1995; Kane et al., 1996), have found support for the recursive pattern that Bandura (1977) emphasized between performance and self-efficacy. Even so, performance variables typically were found to be stronger predictors of self-efficacy than self-efficacy was of performance, which supports previous path analyses with nonathletes (e.g., Feltz, 1982; Feltz & Mugno, 1983), and corroborates the findings in the meta-analysis by Moritz et al. (in press). Given the complex nature of sport performance, however, self-efficacy should not be expected to be as strong of a variable in the efficacy – performance relationship (Bandura, 1986, 1990). If performance measures are used where factors beyond one's control are partially responsible for the performance score, such as contact percentage, winning percentage, and finish place, self-efficacy will not be as strong of a predictor of performance as performance is of self-efficacy (Feltz, 1992).

The cognitive variables most strongly associated with self-efficacy expectations of athletes are anxiety, positive and negative affective states, one's goal orientation to win, and trait sport confidence. George (1994) and Treasure et al. (1996) found significant negative relationships between self-efficacy and state anxiety (cognitive and somatic). Treasure and his colleagues also found self-efficacy to be negatively correlated with negative affect (e.g., jittery, nervous, upset) and positively correlated with positive affect (e.g., alert, determined, inspired). Thus, not only do more efficacious athletes have lower levels of cognitive and somatic anxiety prior to competition, they maintain a more positive affective state, as Treasure et al. suggested.

The competitive orientations of athletes (i.e., desire to win or perform better than others or perform well relative to one's own standard) have been thought to be related to their efficacy expectations (Martin & Gill, 1991; 1995a, 1995b). In particular, outcome goals, based on a win orientation, are reasoned to undermine self-efficacy expectations because they are considered less controllable and flexible than performance goals. Performance goals, based on a goal orientation, are suggested to enhance efficacy expectations (Martin & Gill, 1991). In a series of studies, Martin and Gill examined the competitive orientations and self-efficacy beliefs for 'placing' (outcome) and for 'finish time' (performance) of distance runners. They found that a win orientation was positively associated with efficacy beliefs for placing; whereas, a goal orientation was positively associated with beliefs for finish time. However, the outcome efficacy – win orientation relationship was much stronger than the performance efficacy – goal orientation. In their second study (Martin & Gill, 1995a), they also found that runners with a strong win orientation chose important place goals that also predicted outcome efficacy beliefs. The results suggest that rather than outcome goals being negatively associated with self-efficacy, they may be based on realistic appraisals of one's capability compared with other competitors. The authors also admit that their performance time efficacy measure was not conceptually consistent with their goal importance measure.

Lastly, we found only three studies that applied interventions with athletes to enhance self-efficacy expectations. Interventions are typically based on one or more sources of efficacy information within Bandura's (1977) theory. Singleton and Feltz (1999) investigated the use of self-modeling techniques to enhance the self-efficacy beliefs and back-hand shots of collegiate hockey players. As mentioned earlier in this chapter, they found that players exposed to several weeks of self-modeling videotapes showed greater shooting accuracy and higher self-efficacy for game performance compared to controls. A second study, with a much smaller sample, also investigated the use of self-modeling techniques with gymnasts, but failed to find self-efficacy or performance effects (Winfrey & Weeks, 1993). They also failed to measure self-efficacy appropriately.

The third study involved the use of two selected mental practice techniques in an effort to enhance the self-efficacy beliefs, competition confidence, and performance ratings of competitive figure skaters (Garza & Feltz, 1998). Junior figure skaters, who were members of the United States Figure Skating Association, were randomly assigned to one of two mental practice interventions (drawing one's freestyle routine on paper or walking through one's routine on the floor) or a stretching control group. The home-based interventions took place over 4 weeks and included procedural reliability and manipulations checks. Upon completion of the intervention training, the skaters competed in their club's annual competition. Coaches rated their skaters' current skating ability prior to the intervention and after the competition.

Self-efficacy was measured by constructing individualized figure-skating self-efficacy scales to emphasize the skaters' own current skating levels of ability in the areas of jumps, spins, and steps/connecting moves. Skaters were asked "What is the most difficult jump or combination jump, spin or spin combination, and step/connecting move in your skating routine?" Skaters were then asked to rate their confidence in performing each skill from 1 out of 10 to 10 out of 10 times on an 11-point probability scale. Competition self-confidence was measured using the self-confidence subscale of Martens et al.'s (1990) CSAI-2.

Both mental practice groups significantly improved their performance ratings and their competition confidence compared to the stretching control group. All groups improved in their self-efficacy judgments, including the stretching group, but the walk through group showed higher improvements in spin self-efficacy compared to the other two groups. The authors noted that self-efficacy assessment was not concordant with the treatment intervention. That is, the intervention was designed to improve one's entire freestyle routine rather than just jumps, spins, and connecting moves.

It is surprising that so few intervention studies have been conducted with self-efficacy as a dependent variable. Perhaps the reason is due to the emphasis on performance as the primary variable in competitive sport. Nonetheless, research is needed to examine other promising interventions to enhance and maintain self-efficacy beliefs over time. As Schunk (1995) noted, studies are typically conducted over brief periods and may not examine maintenance of self-efficacy beliefs at all.

Overall, the research on the self-efficacy beliefs of athletes has shown self-efficacy to be a reliable predictor of sport performance and useful in combination with other cognitive and training variables in accounting for performance variance. High self-efficacy expectations have also been shown to be accompanied by low precompetitive anxiety, positive affect, strong goal importance and high personal goals, and high trait sport confidence in athletes. In studies where self-efficacy was not found to be a significant predictor of performance, and where interventions were not fully successful in enhancing efficacy beliefs, measurement problems were readily apparent.

Collective Efficacy Research on Teams: An Extension of Self-Efficacy Theory

Although many research studies have examined the relationship between a performer's self-efficacy and subsequent performance, only recently has the relationship between a group's collective confidence and its performance been studied. Sport coaches and spectators alike are often baffled by teams who are composed of talented individuals but who perform poorly. In contrast, some overachieving teams frequently are characterized by a togetherness that overshadows any individual performer. Other overachieving teams win in spite of within-group problems. The confidence group members have in their collective abilities (collective efficacy) may begin to explain these inconsistencies.

Definitions. Conceptual distinctions need to be made between collective efficacy as defined by Bandura (1997) and other related constructs. Bandura (1997) defines collective efficacy as a group's shared beliefs in its capacities to organize and execute actions to produce a desired goal. Therefore, collective efficacy, as well as self-efficacy, is seen as task-specific. Bandura asserts that merely summing a group's individual assessments of personal efficacy is insufficient to represent the coordinative dynamics of its members. In other words, groups may be composed of high or low efficacious persons; however, how members perceive their group's ability as a whole is more salient than how they perceive their individual capabilities. According to Zaccaro, Blair, Peterson, and Zazanis (1995), because groups inherently require coordination, interaction, and integration, a summing of individuals' judgments about their individual abilities ignores these components. Collective efficacy refers not only to how well each and every group member can use his or her individual resources, but also how well those resources can be coordinated and combined.

Although Bandura (1995) considers perceptions of a team's capability to perform a task to encompass the coordination and interaction influences operating within a team, some authors consider these resources to measure to separate factors of collective efficacy percpetions (Mischel & Northcraft, 1997; Paskevich, 1995; Zaccaro et al., 1995). Mischel and Northcraft, for instance, define *collective task efficacy* as "members' beliefs that their group has the task-related knowledge, skill, and abilities (KSAs) to successfully perform a specific task," and *collective interdependence efficacy* as "members' beliefs that their group has the knowledge, skills, and abilities (KSAs) to interact effectively in performing a specific task." (p. 184). These separate dimensions are also hypothesized to be influenced by different moderators. Perceived task complexity is proposed to moderate collective task efficacy; whereas, perceived task interdependence is proposed to moderate collective interdependence efficacy.

A related concept to collective efficacy, group "potency," has been defined as the shared belief of a group that it can be effective (Guzzo, Yost, Campbell, & Shea, 1993). However, group potency suggests generalized beliefs whereas collective efficacy is task-specific (Mulvey & Klein, 1998). While collective efficacy is typically a measure of individuals, those individuals are, by necessity, influenced by other group members. Collective efficacy, then, may have both individual and group level components (Kenny & LaVoie, 1985; Zaccaro, Zazanis, Diana, & Greathouse, 1994).

Because Bandura (1997) places the construct of collective efficacy at the group level, the averaging of individual data for use as group means can be arguable. For example, Gibson, Randel, and Early (1996) use the term "group efficacy" to denote a group's consensus about that group's abilities. Group efficacy, in this sense, would be comprised of one rating, agreed upon by all members of the group. The drawback to this method is that social persuasion by a few leaders within the group may lead to a forced consensus that is not representative of most of the group's members (Bandura, 1997). However, Rousseau (1985) suggests that perceptions at the level of the individual can be aggregated to a higher level construct and the mean used to represent this collective interpretation when the two variables are functionally equivalent. This condition is met when perceptual consensus has been demonstrated (James, 1982; Kozlowski & Hattrup, 1992). Perceptual consensus exists when group members perceive the team or their abilities within the team to function in the same way. Within-group differences in collective efficacy may be the result of self-efficacy beliefs, personalities of the individuals in the group, or different perceptions or exposure to group stimuli within the group (Watson & Chemers, 1998). If within-group variabilities are not taken into account, aggregating data at the individual level to represent a higher level of analysis may result in aggregation bias (James, 1982). Therefore, studies in collective efficacy should first consider the research question in order to determine the proper level of analysis. Consensus should be demonstrated if a group-level analysis is deemed appropriate (see Feltz & Chase, 1998, for a complete discussion of measurement issues for collective efficacy).

However, Bandura (1997) suggests that in groups where interdependence among group members is low (for example, a golf team), an aggregate of individual efficacies may have sufficient predictive power for group outcomes. When interdependence is high (e.g., a basketball team), an aggregate of individuals' judgments about group efficacy would be the better predictor. Some evidence, using sport tasks, exists to support this contention (Moritz, 1998). Bandura also contends that individuals who play different positions in the group may view that group's efficacy differently, based on those positions. It would be rare for a group to have unanimity of beliefs across members. However, as the group continues together sharing experiences and outcomes, collective efficacy beliefs should reflect group consensus over time.

Zaccaro et al. (1994) suggest that the degree to which collective efficacy is made at the group level is dependent upon whether team members have a sufficient base of common experiences. Results from Zaccaro et al. (1994) support this premise. They assigned Army soldiers to teams of 10-12 persons and asked them to complete a series of physical exercises that required substantial coordination of movement. Results showed that collective efficacy beliefs become more homogeneous within the teams over their lifespan. In sport, there may be new team members from season to season, but brand new teams form much less frequently. Thus, most sports team have some shared congruence at the onset of a season. Watson and Chemers (1998) studied 28 Division III basketball teams and found collective efficacy to be stable from beginning to end of season, but they also found smaller within-group variance at the end of the season than at the beginning.

Sources of collective efficacy. Because collective efficacy is rooted in self-efficacy (Bandura, 1997), at least some of the sources of collective efficacy should be similar to self-efficacy. Of course, these sources should be focused at the group level. Thus, enactive mastery experiences would be based on team masteries, vicarious experience might involve watching a similar team in a similar situation, verbal persuasion would be directed to the group, and physiological and affective states might involve perceptions of the group's nervousness. While these may indeed affect individuals' perceptions of their team's efficacy, other influences may be important.

Watson and Chemers (1998) suggest that three group level influences are most important: (a) group composition, (b) previous group experiences, and (c) leader's effectiveness. First, the group's composition may contribute to high or low perceptions of collective efficacy. The authors reason that composition influences actually could go either way. Large groups may experience coordination difficulties and those difficulties may be reflected in low perceived collective efficacy. However, large groups may also contain more resources, which may strengthen collective efficacy beliefs. If coordination is the problem, collective efficacy may increase across a season as the team learns to work together (Watson & Chemers, 1998; Zaccaro et al., 1994).

Past experience has been shown to be the strongest source of efficacy for individuals. Likewise, a group's previous experiences should have a powerful effect on a team's collective efficacy. Using structural equation modeling, Riggs and Knight (1994) tested the effects of a group's success or failure in a work environment on personal and collective efficacy as well as personal and collective outcome expectancy. They found that success/failure played a direct and dominant role in all four variables. They believe that these results suggest that "success breeds success and that failure must surely be difficult to overcome" (p. 762).

Watson and Chemers (1998) added leader effectiveness to the list of sources of collective efficacy. They suggest that a group's collective efficacy will be influenced by exceptional leadership (Shamir, House, & Arthur, 1992). Leaders have the opportunity to contribute to their team's smooth functioning, and to eliminate or minimize coordination problems for performance. They can also enhance efficacy by modeling confidence. A well-respected leader may verbally be able to persuade his or her charges that they indeed have the resources necessary to achieve a goal. By contrast, a negative coach could demoralize a team by constantly belittling the group.

George and Feltz (1995) speculate that spectators or the media may similarly provide relevant feedback to teams that may influence their collective efficacy. A booing home crowd or negative hometown newspaper may be as demoralizing as the coach who constantly berates his or her team, whereas a supportive home crowd, even in times where the going is tough, may lift that team's confidence in itself. It is obvious that research in discerning sources of collective efficacy is much needed so that coaches can use the information to strengthen their team's confidence levels.

Collective efficacy research in sport. To date, only a few studies have been conducted for the specific purpose of studying the relationship between collective efficacy and performance in sport. In the most extensive study, Feltz and Lirgg (1998) followed six intercollegiate male ice hockey teams across the season. Individual and collective efficacy were assessed before each game; team performance statistics from each game were also obtained. Results were in agreement with Bandura's (1997) suggestion that collective efficacy, rather than aggregated self-efficacy, should hold more predictive power in relation to team performance for highly interdependent teams, as collective efficacy emerged as the stronger predictor of team performance. In addition, when wins and losses were analyzed across a season, collective efficacy was affected by performance outcome but not self-efficacy. Team efficacy increased after a win and decreased after a loss.

Spink (1990) was primarily interested in the relationship between team cohesion and collective efficacy. He recruited volleyball players playing in a volleyball tournament for either elite teams or recreational teams. They were asked to complete the Group Environment Questionnaire (Widemeyer, Brawley, & Carron, 1985), a cohesion measure, as well as responding to questions devised to measure collective efficacy. Individuals were asked what placing they expected for their teams and also how confident they were in those placings. Elite and recreational teams were similarly confident in their ratings. Results showed that, for elite teams only, high collective efficacy teams scored higher on Individual Attractions to the Group-Task (e.g., an individual's feelings toward involvement with the group's task, productivity, goals, and objectives) and the shared social interests of the team than did low efficacy teams. No differences between high and low collective efficacy groups were found among the recreational players. Spink also found that high collective efficacy teams placed higher than did low collective efficacy teams. Spink argued that the difference in the finding between elite and recreational teams could have been a result of greater the emphasis on winning by the elite teams (the reward was monetary for the elite tournament only). He suggested that group goals may moderate the relationship between collective efficacy and team cohesion.

Paskevich (1995) also examined the collective efficacy and cohesion relationship tp performance in volleyball teams. His collective efficacy scales were moe elaborate than that of Spink's 1990), including eight scales, and efficacy values were measured over the course of a season. Results showed that perceived collective efficacy and cohesion increased over the course of the season and that collective efficacy mediated the relationship between task-oriented cohesion and team performance at early season but not later season. There was also evidence for the independent effects of collective efficacy and cohesion on performance. The mediation effect supports Bandura's (1986, 1997) contention that collective efficacy acts as a mediator between cohesion and performance. However, as Paskevich noted, the independent effects of these variables on performance at different points in the season suggests that a more complex relationship was operating.

Watson and Chemers (1998) measured 28 male and female intercollegiate basketball team members concerning their collective and self-efficacy beliefs and their optimism. Team captains, or other team leaders, were also asked to rate their leadership confidence. Measures were taken before the season began and before post-season play. Previous team performance (last year's won-loss record), season team and individual performances, and leader evaluations made by team members were also examined. Before the season, players who had higher optimism scores also had higher collective efficacy beliefs. By the end of the season, this relationship was not apparent. Also, at the beginning of the season, collective and self-efficacy were positively related, but only for high self-efficacy teams. Low self-efficacy teams showed a negative relationship between collective and self-efficacy. However, at the end of the season, this relationship was positive. Beginning-of-season collective efficacy predicted end-of-season collective efficacy. In addition, Watson and Chemers also found that beginning efficacy expectations predicted end-of-season performance. Finally, leader evaluation was positively related to collective efficacy, but more so for teams that were unsuccessful in the previous season; in previously unsuccessful teams, players who believed they had effective leaders were more confident in their teams. This last finding may be especially relevant to coaches who find themselves inheriting losing teams. If leadership abilities are apparent to their charges, they may be also increasing the collective efficacy of their teams.

Two additional studies on collective efficacy used contrived teams or tasks to examine, experimentally, the collective efficacy and performance relationship. Using a novel physical task, Hodges and Carron (1989) assigned individuals to teams and gave bogus feedback on a hand dynamometer task concerning the team's ability. One team was led to believe that they were inferior in team strength to a confederate group; the other team was led to believe that they were superior. Team members were then shown the competitive task in which they would participate: a medicine ball task where groups would be asked to hold the ball up with one arm as long as possible with that arm fully extended at shoulder level. A manipulation check confirmed that this bogus manipulation was enough to affect collective efficacy, as the inferior team recorded lower collective efficacy scores than did the superior team before the task was even attempted. After one trial of the task, both teams were told that they had been beaten by their respective confederate teams. However, after this failure, the high collective efficacy team actually improved their performance on a second trial while the low collective efficacy team showed a decrement in performance. Similar to self-efficacy, high efficacious teams may be more likely to put forth more effort in the face of failure to achieve a goal than would low efficacious teams.

Lichacz and Partington (1996) also manipulated collective efficacy. They created three- and four-member groups composed either of members of basketball or rowing teams (true teams) or ad hoc groups (non-team members). Subjects were asked to participate in a rope-pulling task, where individual pulls and group pulls could be recorded. Collective efficacy was manipulated by telling teams that their collective pulls were either 10% below standards set by high level athletes (low efficacy) or 10% above standards set by non-athletes (high efficacy). Results showed that high efficacy groups rated their collective efficacy higher than did low efficacy groups. In terms of performance, an interaction between group history (true versus ad hoc teams) and performance feedback was found. For all groups, except the rowers, high efficacy teams outperformed low efficacy teams. However, the two groups of rowers (high and low collective efficacy) did not differ in performance. The authors suggest that a task that is both salient and challenging to experienced performers may, in fact, motivate them to do their best work. That is, in terms of task characteristics, pulling may be more similar to rowing performance than to basketball performance. However, it is possible that preexisting efficacy beliefs may not have been tapped, especially in the case of the rowers, and those beliefs may have influenced the results of this study.

In an effort to examine the relationships among self-efficacy, collective efficacy, and team performance in both more and less interdependent tasks, Moritz (1997) randomly assigned participants in bowling classes to two-person teams. For half of the teams, the team score was represented by the sum of their two scores (less interdependent). The other half of the teams performed "Scotch Bowling," where bowlers alternated balls and the team scores were reflected by one score for the team (more interdependence). However, each bowler started in alternating frames, whether or not they were the last person to bowl in the previous frame. The performance measure used in the analyses was the average number of pins dropped on each first ball divided by 10 frames. Individual efficacy was an aggregate measure of both bowlers' efficacy scores. Consensus analyses were conducted to ensure that this aggregation was justified. For collective efficacy (or 'group efficacy' as used by Gibson et al., 1996), both bowlers together agreed upon a team efficacy rating. Results showed that the predictiveness of collective efficacy to performance was moderated by task type (i.e., bowling condition). For the less interdependent condition, collective efficacy was not a predictor of team performance; however, it was for the more interdependent condition. Task type did not moderate the relationship between aggregated self-efficacy and team performance. For more interdependent tasks, then, collective efficacy is a stronger predictor of team performance than it is for less interdependent tasks, at least with two-persons teams.

Self-Efficacy Research on Coaches

In addition to the paucity of research on collective efficacy in sport, few studies have investigated the role that coaches play in building the efficacy beliefs of their athletes and teams nor the efficacy beliefs of coaches themselves to carry out their roles. Three studies have examined the strategies that coaches use most to develop self-efficacy in athletes (Gould, Hodge, Peterson, & Giannini, 1989; Weinberg, Grove, & Jackson, 1992; Weinberg & Jackson, 1990). At the elite coaching level, intercollegiate wrestling coaches and United States national coaches reported encouraging positive as opposed to negative self-talk, modeling confidence themselves, using instruction and drills to ensure performance improvements, and using rewarding statements liberally to be most the effective ways to enhance self-efficacy in their athletes (Gould et al., 1989). High school and age-group coaches reported using similar techniques to enhance self-efficacy and also reported using verbal persuasion (Weinberg et al., 1992; Weinberg & Jackson, 1990). These strategies are all based on the major sources of efficacy information as identified in Bandura's (1977) theory: performance accomplishments, vicarious experiences (modeling), and verbal and self-persuasion. As the authors of this research have noted, however, observations of coaches were not conducted to determine the actual use of the self-efficacy techniques or whether these techniques were effective in enhancing the confidence of their athletes and improving performance.

The coach's efficacy expectations of the athlete or team may also play a role in determining the efficacy beliefs of their athletes. When US Olympic athletes were asked to list the best coaching actions to enhance athletes' performance, providing support and confidence were ranked second (Gould et al., 1999). Chase, Lirgg, and Feltz (1997) specifically examined the relationship between coaches' efficacy for their teams and team performance. Coaches of four intercollegiate women's basketball teams were queried before their games as to their confidence in their teams' abilities to perform specific basketball skills (i.e., shoot field goals and free throws, rebound, commit turnovers, etc.). Coaches were also asked to rate the importance they placed on these skills, the perceived control they felt over the outcome, and opponent ability. Coaches who had higher efficacy beliefs for their teams perceived themselves to have higher control over their teams' outcomes. Also, the higher the perceived ability of the opponent, the lower the coach's efficacy in her team. In terms of coach's efficacy in the team and team performance, only free throws and turnover performance could be predicted.

A second purpose of the study was to determine what coaches used as a basis in forming their efficacy judgments of their teams. Inductive content analysis was used to identify both high and low efficacy sources. Factors that resulted in high efficacy expectations included good past game and practice performances, favorable comparison with opponents, return of an injured player, and hearing negative comments from players on the opposing team. Coaches also identified good performance preparation by either themselves, their staff, or their players as contributing to high efficacy expectations in their teams. One interesting finding was that many coaches cited past poor performance as a reason that they were confident in their teams because they believed in their teams' ability to bounce back. Low efficacy factors were similar to those of high efficacy factors: past poor game and practice performance, injured or tired players, and comparisons to better opponents. Other factors that contributed to a coach's low efficacy expectation for their team included coaches' perceptions that the players themselves had low efficacy and a team's inconsistent prior performances. The researchers reasoned that if indeed players are aware of the efficacy expectations coaches have for their teams, a situation similar to the *Pygmalion Effect* might occur. According to this effect, a coach first forms expectations of his or her team. He or she then acts in ways that are consistent with those expectations. Athletes then perceive and interpret those actions and respond in a way that reinforces the original expectations. If this happens, coaches with low efficacy expectations for their teams may inadvertently be contributing to low player efficacy while those believing their teams are capable may convey that attitude to their players.

Another line of research is the examination of the efficacy beliefs of coaches in their own coaching. As Bandura (1997) suggests, the development of resilient self-efficacy in athletes is heavily influenced by the managerial efficacy of coaches. Coaching efficacy has been defined as the extent to which coaches believe they have the capacity to affect the learning and performance of their athletes (Feltz, Chase, Moritz, & Sullivan, 1999). Feltz et al. (1999) conceptualized a model of coaching efficacy based on Bandura's (1977, 1986, 1997) writings and Denham and Michael's (1981) model of teacher efficacy. Their concept of coaching efficacy comprised four dimensions: motivation, technique, game strategy, and character building efficacy. Motivation efficacy was defined as the confidence coaches have in their ability to affect the psychological skills and motivational states of their athletes. Technique efficacy was defined as the belief coaches have in their instructional/diagnostic skills. Game strategy efficacy was defined as the confidence coaches have in their ability to coach during competition and lead their team to a successful performance. Lastly, character-building efficacy involved the confidence coaches have in their ability to influence a positive attitude towards sport in their athletes.

In line with Bandura's concept of self-efficacy, Feltz et al. (1999) proposed that the four dimensions of coaching efficacy are influenced by one's past performance and experience (e.g., coaching experience, coaching preparation, previous won-lost record), the perceived ability of one's athletes, and perceived social support (e.g., school, community, and parental support). They also proposed, in turn, that coaching efficacy has an influence on one's coaching behavior, player satisfaction of the coach, the performance of one's athletes (as measured by winning percentage in their study), and player efficacy levels. Figure 2 illustrates the model of coaching efficacy as conceptualized by Feltz et al.

In addition to the model, Feltz et al. (1999) developed the Coaching Efficacy Scale (CES) to measure the multidimensional aspects of coaching efficacy. They found the psychometric properties of the CES to be sound. Their confirmatory factor analysis supported the four factor solution structure and, in addition, marginal support for one overall coaching efficacy factor using various global fit indices.

Feltz et al. (1999) also tested the proposed sources and outcomes of CES using high school basketball coaches. They found support for their model of coaching efficacy, in that past winning percentage, years in coaching, perceived team ability, community support and parental support were significantly predictive of coaching efficacy. The most important sources of coaching efficacy were years of coaching experience and community support. They also found that higher efficacy coaches had significantly higher winning percentages, greater player satisfaction, used more praise and encouragement behaviors, and used fewer instructional and organizational behaviors than lower efficacy coaches. However, the sources of coaching efficacy accounted for only 13% of coaching efficacy beliefs, and their correlational design did not allow for tests of causal effects between any of the variables within the model

This study was followed by two additional studies that provided support for the concept of coaching efficacy (Chase, Hayashi, & Feltz, 1999; Malete & Feltz, in press). In the first, 12 of 30 high school basketball coaches observed in the ‘outcome’ portion of the Feltz et al. (1999) study were randomly selected from the high and low efficacy groups and interviewed to identify sources of coaching efficacy information from a coach’s perspective. Major sources of efficacy themes supported and delineated the sources presented in the Feltz et al. (1999) model. Basketball coaches reinforced the importance of coaching development in terms of education, preparation, philosophy, experience, and knowledge of the game. Coaches also identified information supplied by their players in terms of players’ confidence in them, players’ enjoyment of the sport, and player development. A coach’s past success or performance accomplishments may be more related to player development, which is more under the coach’s control, than to won-lost records. The third major efficacy source theme was self-assessment, in terms of analyzing one’s own coaching performance and one’s leadership skills. This supports Bandura’s (1997) contention that past performance, by itself, does not provide sufficient information to judge one’s ability. Self-appraisal of one’s effectiveness includes assessments of one’s effort, task difficulty, and situational circumstance. This requires the integration of multiple sources of efficacy information.

Although Feltz et al. (1999) assessed coaching experience in terms of years in coaching, they did not assess the extent of one’s coaching preparation. Malete and Feltz (in press) examined the effect of participation in a 12-hour coaching education program on coaches’ perceived coaching efficacy. Results showed a small but significant improvement in coaching efficacy based on the educational program compared to the efficacy levels of control coaches. This study adds further support for coaching preparation as a source of coach efficacy information. The most effective coaching education programs should be ones that use approaches that help increase one’s confidence in coaching (e.g., mastery experiences, challenging and reachable goals, observational learning, and simulated learning components).

Barber (1998) also examined the sources of coaching efficacy information and coaching efficacy levels of male and female high school coaches within a perceived competence framework. Using a Sources of Coaching Competence Information Scale and a Perceived Coaching Competence Questionnaire, developed specifically for the study, Barber found that male and female coaches showed few differences in preferences for sources of coaching competence information. Female coaches placed greater importance on the improvement observed in their athletes and improvement they observed in their own coaching skills as sources of coaching competence than did male coaches, but all coaches viewed these as the top two sources. In terms of perceived coaching competence, of the seven competency areas surveyed, the only gender difference was in teaching sport skills, where female coaches perceived themselves to be more competent than male coaches.

Barber (1998) was also interested in coaches' perceptions of factors that might influence a future decision to discontinue coaching. Of the three categories of reasons offered – 'time demands', 'perceptions of coaching competence', and lack of administrative support', - gender differences were found on two. Males cited 'lack of administrative support' as a more important reason for retiring from coaching; whereas, females reported 'low perceived coaching competence' as more important. This finding suggests the importance of developing and maintaining coaching efficacy in terms of coaching motivation, especially for women.

Future Directions for Research

Since Feltz's (1992) commentary on self-efficacy and motivation in sport, more research has moved from laboratory settings to field settings with athletes in competition. However, as previously called for, more research is needed in how athletes process multidimensional efficacy information; the study of efficacy beliefs over time and in different situations; efficacy beliefs regarding the cognitive and emotional aspects of performance; the resiliency of efficacy beliefs; how various interventions can enhance efficacy beliefs; and a comprehensive examination of efficacy beliefs in teams that would include individual beliefs, team beliefs, and beliefs of coaches and leaders (Feltz, 1992, 1994).

Research has not been conducted on how athletes process multidimensional efficacy information and the heuristics they use in weighting and integrating these sources of information in forming their efficacy perceptions. Athletes across situations and in different sports may vary in the importance they place on different sources of efficacy information. For instance, as mentioned earlier in this chapter, physiological information was a more important source of efficacy information for female collegiate athletes than was social comparison or persuasive information (Chase et al., 1994). However, how these athletes derived the weightings of their sources and how they integrated them into an efficacy judgment was not determined. That is, was the information available used in an additive way? Did some information override other sources? Answers to such questions as whether or how a coach's persuasive techniques can outweigh an athlete's or team's previous performance defeats in forming efficacy expectations for subsequent performance would be of great importance to coaches. The use of qualitative analyses may be necessary to determine some of these answers.

The majority of the research on self- and collective efficacy in sport has been approached in a static way. Athletes, however, usually perform over time and across seasons. Many athletes are also members of teams, which are dynamic in nature (Carron & Hausenblas, 1998). The sources of efficacy information may change over time for individual athletes and teams, and the influence of self- and collective efficacy perceptions, in combination with other cognitions, may change. For instance, a recent gold medalist at the Nagano Olympic games reported that knowing he was the strongest and fittest person in the event had always been his source of efficacy information in the past, but that was not the case at these Olympic games. He, therefore, worked on his mental skills to provide him with the level of efficacy he needed (Gould et al., 1999).

Athletic performance is influenced by cognitive and emotional skills as well as physical skills. Some athletes have stronger perceptions of efficacy than others in the mental aspects of performance. As Bandura (1997) has noted, athletic efficacy involves control of disruptive thinking and affective states as well as physical performance. Furthermore, Gould and his colleagues (Gould et al., 1999) found that successful Olympic performance required extensive planning and flexibility to deal with numerous unexpected events and distractions. Research is needed to examine the influence on performance of efficacy beliefs regarding one's attention/concentration skills, one's ability to set and work toward goals, one's ability to manage stress and disruptive thought processes, and one's ability to make the right decisions, unhesitatingly.

Bandura (1997) has also suggested that athletes must have a resilient sense of self-efficacy to sustain perseverant effort in the face of failure and competitive pressure. According to Bandura, experience with failures and setbacks helps in developing this robust sense of personal efficacy. Future research might examine how different patterns of success and failure influence the development of a robust sense of efficacy. In addition, Bandura notes that some individuals and teams recover from setbacks more quickly that others. Knowing how and why some individual athletes and teams are able to regain their sense of efficacy more quickly than others would be a valuable information for designing interventions that would help efficacy recovery.

As stated previously in this chapter, few interventions studies have been conducted with athletes and teams to enhance their efficacy perceptions in their physical or mental performance. Two procedures based on Bandura's (1977) sources of efficacy information are worthy of examination. One uses computer technology and the other is based on social comparison information. The use of computer graphics and virtual reality technology is becoming more popular as a teaching tool among coaches. However, whether these techniques can enhance and maintain efficacy beliefs overtime has not yet been investigated. Before athletic programs invest large sums of money in expensive equipment, they should determine if the technology has any long lasting influence on efficacy beliefs.

The use of social comparison information also has not been investigated with athletes. Whether upward comparisons have a negative effect on self-efficacy beliefs or a motivating and challenging effect to surpass the comparative standard has not been tested. Evidence from nonathletes suggests that upward comparisons have negative effects (George et al., 1992). However, athletes, who generally have a more robust sense of efficacy may use the upward comparative information as a challenge. There is some evidence that high self-esteem individuals are more likely to make upward comparisons (Collins, 1996). Coaches and sport psychologists would benefit from knowing what specific models or comparative others athletes rely on to build their confidence, when left to their own choices, and how they use that information.

In terms of collective efficacy specifically, a comprehensive examination of efficacy beliefs in teams that would include individual beliefs, team beliefs, and beliefs of coaches and leaders is needed along with other team related variables in order to better understand the dynamics of teams. Sources of collective efficacy that are unique at the level of team needs further investigation as does how the collective efficacy beliefs of team members change as team membership changes and team leadership changes (Mischel & Northcraft, 1997). In addition, the concepts of collective task and collective interdependence efficacy, as separate dimensions could be examined in relation to their proposed moderators: task complexity and task interdependence perceptions (Mischel & Northcraft).

Further research could include other conceptual and theoretical perspectives of group motivation. For example, relationships between collective efficacy and team attributions, desire for team success, team goals, communication in teams, and team cohesion have received little to no attention. These variables should be examined over the course of a competitive season.

Lastly, the influence of coaches on the collective efficacy judgments of athletic teams warrants further investigation. What characteristics of coaches and what coaching behaviors provide the strongest efficacy beliefs in athletes and teams? In addition to the confidence that coaches have in their players and teams, their own perceived managerial efficacy may influence the team's performance. Research outside of sport suggests that there is evidence for this influence (Wood & Bandura, 1989).

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Study	Sample	Purpose	Self-efficacy Measure	Performance Measure	Results
Barling & Abel (1983)	32 league & 8 nonleague tennis athletes M age = 26.6 yr. USA.	Examine relationship between SE, response-outcome, valence, and tennis performance	10-item SE strength on 5 pt. Scale for tennis skills (α = N/A) TTP: 3 hr after performance rating	37-item external rating scale – 12 categories.	1. Efficacy strength related to 12 performance categories. 2. Lower correlations with response-outcome and valence.
Garza & Feltz (1998)	27 female members of US Figure Skating Assoc. Pre-preliminary - novice M age = 12.37 yr. USA	Intervention to compare effectiveness of mental practice (MP) techniques on SE, competition self-confidence (CSAI-2), and performance	Three 10-item SE strength on 11-pt. probability scales (jumps, spins, moves). (hierarchical) TTP: 1 week after competition	3 external 6-pt. rating scales: 16-item jump scale, 10-item spin scale, 5-item moves scale	1. Both MP techniques improved performance and competition confidence (CSAI-2). 2. All groups improved in SE.
Gayton et al. (1986)	33 marathon runners (22 men, 11 women) M age = 38.6 yr. USA	Test the validity of the PSE	PSE and Perceived Physical Ability (PPA) subscale. (α = N/A) TTP: less than 1 hr.	Finish time	PSE and PPA were related to finish time.
George (1994)	25 collegiate and 28 high school baseball athletes. M age = 20.7 yr. college; 17.3 yr. high school USA	Examine SE – performance relationship and cognitive and somatic state anxiety (CSAI-2) over 9-game period	4-item SE strength on 11-pt. probability scale for hitting. (hierarchical) TTP: 15-20 min.	Contact percentages for 9 games	1. SE predicted hitting performance in 5 games. 2. Performance predicted SE in 6 games. 3. Anxiety and SE predicted performance in Game 1. 4. Lower levels of anxiety were related to stronger SE in 7 games. (used path analysis)
Geisler & Leith (1997)	40 male current and former collegiate soccer athletes M age = 23.8 yr. Canada	Examine self-efficacy, self-esteem, and audience effects on soccer penalty shooting performance	1-item SE on 10-pt. Scale on comparative ability in penalty shots TTP: several weeks	10 penalty shots against a goal keeper	1. Dichotomized SE had no effect on performance. 2. Dichotomized self-esteem had no effect on performance. 3. No audience effect on performance.

Haney & Long (1995)	178 female athletes M age = 18.7yr.; 20.4yr. (basketball; field hockey/soccer) Canada	Examine a model of coping effectiveness: Relationships among SE, control, somatic anxiety (CSAI-2), engagement and disengagement coping, and performance	Two 4-item SE strength on 101 pt. probability scales for shots listed for field hockey/soccer and basketball. (hierarchical) TTP: 5 min.	Shooting contest (2 rounds): 1. Number of free throws or penalty shots. 2. Performance satisfaction	1. Years playing experience predicted SE and perceived control. 2. SE predicted Round 1 performance , but not Round 2. 3. Round 1 performance predicted control and SE. (used path analysis)
Kane et al. (1996)	216 high school wrestlers M age = N/A USA	Examine the relationships among SE, personal goals, and wrestling performance	10-item SE strength on 7-pt. scale for wrestling moves. (α = .80) TTP: N/A	1. Prior performance 2. Win percentage 3. Overtime sudden death performance 4. Performance satisfaction	1. Prior performance predicted SE. 2. SE did not predict win %. 3. SE predicted overtime performance and satisfaction. (used path analysis)
LaGuardia & Labbé (1993)	47 club runners (33 men, 14 women) 16 college track athletes (10 men, 6 women) M age = N/A (all over 19 yr.) USA	Compare predictive power of task-specific SE, general SE, predicted time, and training mileage on running performance and examine the anxiety (STAI)-SE relationship	1. 14-item SE on 7-pt. probability scale for running. 2. PSE & PPA (α = N/A) TTP: 1 hr.	Pace times for 3 races (1 mile to 10K)	1. Running SE, but not PSE, predicted pace times in all 3 races.. 2. PSE, but not running SE, was related to STAI.
Lee (1982)	14 female gymnasts M age = 9.7 yr. Australia	Compare predictive power of SE and previous competitive scores on competition performance	Public estimation of score on each of 5 apparatus (1-10 pts.) TTP: 7 days prior	M score of best 3 apparatus performances on 10-pt. scales.	1. Gymnasts' expectancies related to performance more than previous performance. 2. Coaches' expectancies related to performance more than gymnasts' expectancies.
Lee (1986)	16 female gymnasts M age = 10.9 yr. Australia	Compare predictive power of SE, previous competition score, and training performance on competition performance	Public estimation of score (1-10 pts.) on uneven bars TTP: 2 weeks prior	Judged score on 10-pt. scale on uneven bars	1. Training performance related to competition score. 2. SE and previous score not related to competition score.
Lee (1988)	96 college female field hockey athletes on 9 teams M age = 21 yr. USA	Examine relationships among SE, goal-setting, and team performance.	Number of items: N/A 10-pt. probability scale for SE strength and level for hockey skills (α = N/A) TTP: Distant	Team won/lost percentage	1. SE strength, but not level, related to team winning percentage. 2. Team goal-setting had stronger direct relationship with winning percentage than SE strength level.

Martin & Gill (1991)	73 male high school middle and long distance runners M age = 16 yr. USA	Examine relationships among SE, competitive orientation (SOQ and COI), sport confidence (TSCI and SSCI), cognitive anxiety (CSAI-2) and performance	1. 6-item placement SE (strength) on 101-pt. probability scale 2. 6-item performance time SE (strength) on 101 pt. scale (hierarchical) TTP: 25-35 min.	1. Finish time for 1/2, 1, or 2 mile, standardized across events 2. Finish place	1. TSCI predicted placement SE. 2. Only placement SE predicted finish time and finish place. 3. Competitive orientation (SOQ)was weak predictor of performance time SE.
Martin & Gill (1995a)	86 high school distance runners (38 women, 48 men) M age = 16 yr. USA	Examine relationships among SE, competitive orientation (SOQ), goal importance, goal thoughts, and performance	1. 6-item placement SE on 101-pt. probability scale 2. 6-item performance time SE on 101-pt. scale (hierarchical) TTP: 25-35 min.	1. Finish time for 1/2, 1, or 2 mile, standardized across events 2. Finish place	1. Win orientation and place goal importance predicted placement SE. 2. Time goal importance predicted performance time SE. 3. Placement SE predicted finish place. (used path analysis)
Martin & Gill (1995b)	41 male marathon runners M age = 32.2 yr. Philippines	Examine relationships among SE, sport confidence (TSCI),competitive orientation (SOQ), and goal importance	1. 6-item placement SE on 101-pt. probability scale 2. 6-item performance time SE on 101-pt. scale (hierarchical) TTP: 1-3 days	None	1. TSCI correlated with placement SE. 2. Placement SE correlated with place and time goal importance. 3. Time SE correlated with time goal importance.
Martin & Mushett (1996)	78 athletes with disabilities competing at cerebral palsy games in England (34 women, 44 men) M age = 23.4 yr. Australia, Canada, Great Britain	Examine relationships among social support, SE, and athletic satisfaction	1-item SE on 101 probability scale for ability to train to achieve one's potential	None	SE correlated with listening support, emotional support, and technical challenge support
McAuley & Gill (1983)	52 female collegiate gymnasts M age = N/A USA	Compare predictive power of task-specific and general SE on gymnastic performance	1. 4 SE strength scales (vault, beam, floor, bars), each with 7 items (hierarchical) 2. PSE (α = .72) Subscales: PPA (α = .76);	Individual scores for each event on 10-pt. scale	Task-specific SE scales were better predictors of performance than PSE scales.

			PSPC (α = .42) TTP: less than 1 hr.		
Miller (1993)	84 club-level competitive swimmers (42 mean, 42 women) M age = 14.38 Canada	Compare SE, skill level, and motivation on swimming performance in experimental design, manipulating SE into high and low levels; and examine the SE – motivation relationship	SE strength on 100-pt. probability scale. Number of items = N/A. (α = .N/A) TTP: 3 min.	200m individual medley. Simulated competition	1. High SE faster than low SE swimmers. 2. No effect on performance for skill level or motivation. 3. Negative relationship between high SE and motivation.
Okumabua (1986)	90 marathon runners (82 men, 8 women) M age = 35.5 USA	Examine relationships among SE, associative cognitive strategy use, expected pain, training history, past performance, and race performance.	9-item SE strength and level on a 100-pt. probability scale for the marathon task. (hierarchical) TTP: approx. 3 days	Finish time	1. SE strength was the strongest predictor of finish time, followed by past performance, expected pain, and training history. 2. SE strength and level were related to training history and past performance.
Ryckman & Hamel (1993)	123 Grade 9 high school athletes (61 women, 62 men) M age = 14.34 yr. USA	Examine PPA and sport participation motives	PPA	None	High PPA athletes rated skill development, team affiliation, and having fun as more important reasons for sport participation than low PPA athletes.
Singleton & Feltz (1999)	23 male ice hockey athletes M age = N/A Range = 18-23 USA	Intervention to examine effect of self-modeling on SE and goal shooting performance	5-item SE strength on 10-pt. probability scale for performing shooting skills in competition (α = .80) TTP: immediate	5 backhand shots at each of four targets in each corner of goal. Total shots = 20 at each of 3 time periods	Self-modeling group showed greater shooting accuracy and stronger SE than control.
Slanger & Rudestam (1997)	40 male participants in extreme sports of skiing, rock climbing, white water kayaking, stunt flying (20 extreme risk takers,	Compare extreme, high risk sports, and moderate risk sports participants on general SE, task-specific SE, sensation seeking, death anxiety, and	1. Physical risk SE strength scale (α = .91) with 3 error focused subscales: trivial, harmful, fatal. Each scale contained 6	None	Physical risk SE was the only variable that distinguished between extreme and high risk participants.

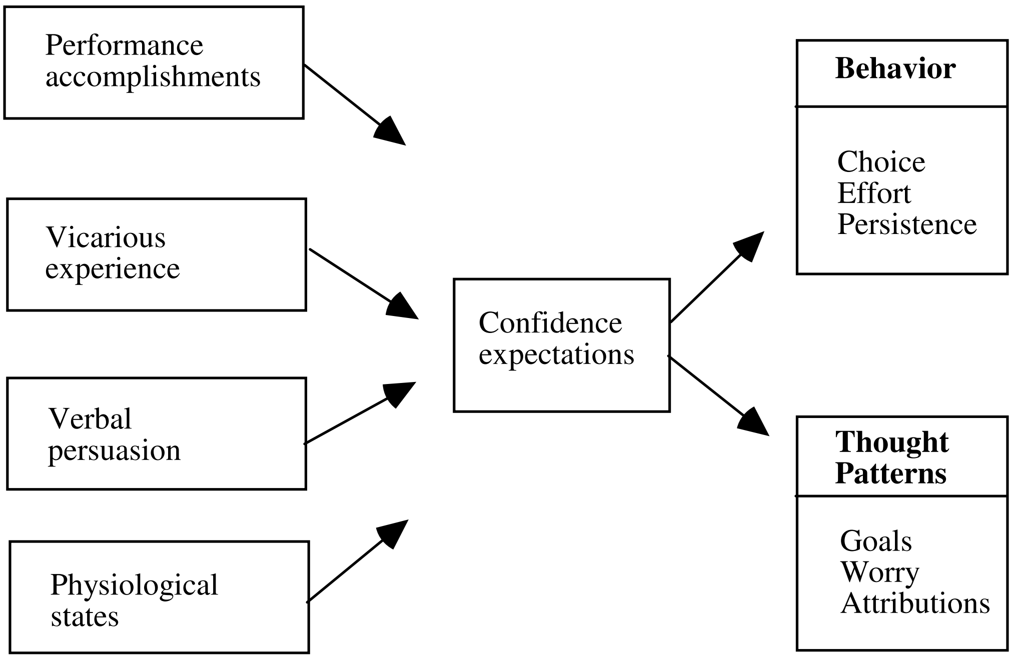
	20 high risk takers) 20 trained athletes in moderate risk sports M age = N/A	repression/senitization.	items on 101-pt. probability scale. Trivial (α = .90); Harmful (α = .89); Fatal (α = .92); 2. PSE 3. SES TTP: not relevant		
Treasure et al. (1996)	70 male high school wrestlers M age = 16.03 USA	Examine the relationships among SE, performance, anxiety (CSAI-2) and affect prior to competition.	10-item SE strength on 101-pt. probability scale on wrestling maneuvers (α = N/A) TTP: 15 min.	1. Win-loss 2. Number of points scored	1. SE sig. related to precompetition positive affect and anxiety. 2. SE sig. related to both performance measures. 3. SE was only sig. predictor of winners and losers compared with positive affect, anxiety, wrestling experience, and age.
Watkins et al. (1994)	205 male youth baseball players at sports camp M age = 12.5 yr. USA	Examine the relationship between SE and baseball hitting performance.	6-item SE strength on 10-cm visual analog scale (hierarchical) TTP: immediate	Hitting performance in batting cage over 4 trials	1. SE did not predict performance. 2. Previous performance predicted SE and subsequent performance.
Weiss et al. (1989)	22 male youth gymnasts at state tournament M age = 11.5 yr. USA	Examine the relationships among SE, competitive anxiety (CSAI-C), worry cognitions, experience, and performance	Estimation of score on each of 6 apparatus TTP: 2 hr.	Judges' scores on high bar, horse, floor, bars, rings, vault, and all-around	SE only sig. predictor of performance
Winfrey & Weeks (1993)	11 female youth gymnasts, intermediate level M age = N/A Range = 8-13 yr. USA	Intervention to examine effect of self-modeling on SE and balance beam performance	9-item SE on 9-pt. scale for balance beam, modified from SSCI (α = .82-.97) TTP: immediate	Judged balance beam skill tests across 4 time periods	No effect for SE or performance

Note. COI = Competitive Orientation Inventory (Vealey, 1986)CSAI-2 = Competitive State Anxiety Inventory-2 (Martens et a., 1990). CSAI-C = Competitive State Anxiety Inventory – Children (Martens, Burton, Rivkin, & Simon, 1980). N/A = Not available. PPA = Perceived Physical Ability Subscale (Ryckman et al., 1982). PSE = Physical Self-efficacy Scale (Ryckman et al., 1982). PSC = Physical Self=Presentation Confidence Subscale (Ryckman et al., 1982). SE = Self-efficacy. SOQ = Sport Orientation Questionnaire (Gill & Deeter, 1988). SSCI = State Sport Confidence Inventory (Vealey, 1986). = STAI = Spielberger State-Trait Anxiety Inventory (Spielberger, Gorsuch, & Lushene, 1970). TSCI = Trait Sport Confidence Inventory (Vealey, 1986). TTP = Time to performance.

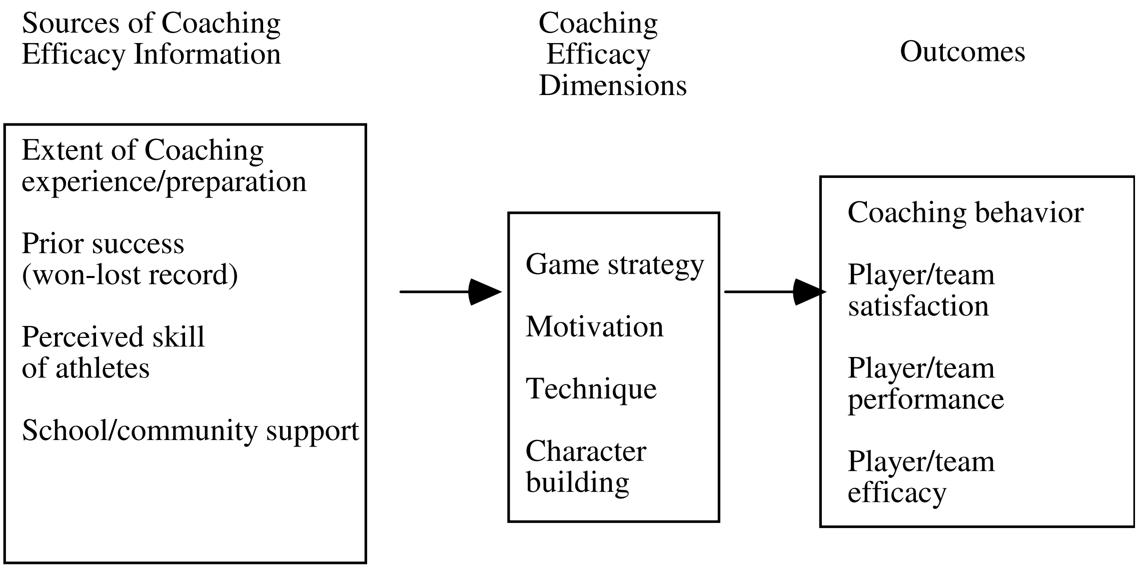
Figure Captions

Figure 1. Relationship between sources of efficacy information, efficacy judgments, and consequences. Note. From *Advances in sport and exercise psychology measurement* (p. 64), by J. L. Duda (Ed.), 1998, Morgantown, WV: Fitness Information Technology. Copyright by Fitness Information Technology. Adapted with permission.

Figure2. Conceptual model of coaching efficacy. Note. From "A conceptual model of coaching efficacy: Preliminary investigation and instrument development," by D. L. Feltz, M. A. Chase, S. E. Moritz, and P. J. Sullivan, 1999, *Journal of Educational Psychology, 91*, p.2. Copyright 1999 by American Psychological Association. Reprinted with permission.



Performance accomplishments
Vicarious experience
Verbal persuasion
Physiological states
Confidence expectations
Behavior
Choice
Effort
Persistence
Thought Patterns
Goals
Worry
Attributions


Sources of Coaching
Efficacy Information
Coaching
Efficacy
Dimensions
Outcomes
Extent of Coaching
experience/preparation
Prior success
(won-lost record)
Perceived skill
of athletes
School/community support
Game strategy
Motivation
Technique
Character
building
Coaching behavior
Player/team
satisfaction
Player/team
performance
Player/team
efficacy