

CURRENT DIRECTIONS IN SELF-EFFICACY RESEARCH IN SPORT

Alison Ede, Seunghyun Hwang, & Deborah L. Feltz
Michigan State University

ABSTRACT: Self-efficacy and collective efficacy have been well studied in sport contexts. Since Bandura's first publication (1977), of the self-efficacy construct, there have been over 300 research articles published on self- and collective efficacy related to sport and motor performance. This research has continued to grow in North America and elsewhere around the world. In this paper, we describe new areas of research in sport self-efficacy: decision-making efficacy, preparatory efficacy, relational concepts of efficacy beliefs (i.e., tripartite efficacy), emotional intelligence as a source of coaching efficacy, efficacy dispersion, referee self-efficacy, and new measurement advances. We describe examples of research in these areas and suggest where more research is needed.

KEYWORDS: self-efficacy; collective efficacy; coaching efficacy

TENDENCIAS ACTUALES EN LA INVESTIGACIÓN SOBRE LA AUTOEFICACIA EN EL DEPORTE

RESUMEN: La autoeficacia y la eficacia colectiva han sido ampliamente estudiadas en el ámbito del deporte. Desde la primera publicación de Bandura (1977) sobre el constructo de la autoeficacia, se han publicado más de 300 artículos sobre la autoeficacia y la eficacia colectiva relacionada con el deporte y la ejecución motora. Esta investigación ha continuado creciendo en Norteamérica y en el mundo entero. En este trabajo, se describen nuevas áreas de investigación

relacionadas con la autoeficacia en el deporte: eficacia en la toma de decisiones, eficacia preparatoria, conceptos relacionados con las creencias de eficacia (es decir, eficacia tripartita), inteligencia emocional como una fuente de eficacia para el entrenamiento, dispersión en la eficacia, autoeficacia del árbitro y nuevos progresos en las medidas. Se describen ejemplos de investigaciones en estas áreas y se sugieren otras nuevas.

PALABRAS CLAVE: Autoeficacia; Eficacia colectiva; Eficacia del entrenamiento.

TENDÊNCIAS ACTUAIS NA INVESTIGAÇÃO SOBRE A AUTOEFICÁCIA NO DESPORTO

RESUMO: A autoeficácia e a eficácia coletiva têm vindo a ser bem estudadas em contextos desportivos. Desde a primeira publicação de Bandura (1977) sobre o constructo da autoeficácia, foram publicados mais de 300 artigos de investigação sobre autoeficácia e eficácia coletiva relacionadas com o desporto e a performance motora. Esta investigação tem continuado a crescer na América do Norte, bem como noutros lugares do mundo. Neste artigo, descrevemos novas áreas de investigação na autoeficácia desportiva: a eficácia na tomada de decisões, a eficácia na preparação, conceitos relacionados com ascrenças de eficácia (i.e., a eficácia tripartida), inteligência emocional como fonte de eficácia do treinamento, a dispersão da eficácia, autoeficácia dos árbitros e novos avanços na sua avaliação. Descrevemos exemplos de investigações nessas áreas e sugerimos onde é necessária mais investigação.

PALAVRAS-CHAVE: Auto-eficácia; Eficacia coletiva; Eficácia de treinamento.

Within sport contexts, Bandura's (1977, 1997) theory of self-efficacy (and its collective efficacy extension) has been well studied as a cognitive explanation for differences in achievement strivings (Feltz, Short, & Sullivan (2008). Since Bandura's first publication (1977), of the self-efficacy construct, there have been over 300 research articles published on self- and collective efficacy related to sport and motor performance (Dithurbide & Feltz, in press). Feltz et al. summarized much of this research and its applications for athletes, teams, and coaches. Since the Feltz et al. book was published, the field has continued to

grow in North America and elsewhere around the world. New areas of research in sport self-efficacy in have been investigated, including decision-making efficacy, preparatory efficacy, relational concepts of efficacy beliefs (i.e., tripartite efficacy), emotional intelligence as a source of coaching efficacy, efficacy dispersion, referee self-efficacy, and new measurement advances. This paper provides a brief overview of self-efficacy theory, and then describes these new areas of research on self-efficacy within the athletic realm. We describe this research in five major sections: individual self-efficacy, coaching efficacy, col-

lective efficacy, referee self-efficacy, and measurement issues.

OVERVIEW OF SELF-EFFICACY

THEORY

Bandura (1997) defined self-efficacy as the “beliefs in one’s capabilities to organize and execute the courses of action required to produce given attainments” (p. 3). The theory of self-efficacy was developed within the framework of social cognitive theory, which views individuals as proactive agents in the regulation of their cognition, motivation, actions, and emotions (Bandura). According to Bandura, within this social cognitive framework of human functioning, self-efficacy addresses the role of self-referent beliefs as the core agentic factor that determines people’s goal-directed behavior. Thus, people’s efficacy judgments are hypothesized to determine the challenges they undertake, the effort they expend in the activity, and their perseverance in the face of difficulties. People’s self-efficacy judgments are also hypothesized to influence certain thought patterns and emotional reactions (e.g., pride, shame, happiness, sadness) that also influence motivation (Bandura). However, researchers in sport psychology typically examine the predictive strength of efficacy beliefs on performance because improving performance is of utmost importance to athletes and coaches alike (Feltz et al., 2008). Sport performance is a combination of choice of challenges undertaken, effort expended, and persistence.

In turn, one’s efficacy judgments are

based on a complex process of self-persuasion that relies on cognitive processing of diverse sources of confidence information (Bandura, 1997). Bandura categorized these sources as past performance accomplishments, vicarious experiences, verbal persuasion, and physiological states. Performance accomplishments provide the most dependable efficacy information because they are based on one’s own mastery experiences. Vicarious sources of efficacy information are based on gaining efficacy information from observing others and comparing one’s own capabilities to those observed. Persuasive information includes verbal persuasion, evaluative feedback, expectations by others, self-talk, positive imagery, and other cognitive strategies. 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 (Feltz & Chase, 1998). Various interventions, based on one or more sources of efficacy information and experiences (e.g., success or failure), can alter self-efficacy beliefs.

The theory of self-efficacy extends to the concept of collective efficacy and coaching efficacy. For instance, whereas self-efficacy refers to people’s judgments of individual capabilities and effort, collective efficacy is defined as a group’s judgment of their conjoint capabilities to organize and execute the courses of action required to produce specified levels of performance (Bandura, 1997).

These concepts are described in subsequent sections along with current research.

Individual Self-Efficacy

Much of the research on self-efficacy in sport continues to focus on individual athletes, primarily examining the relationship between self-efficacy and performance (e.g., Beattie, Adamoulas, & Oliver, 2011; Coffee, Rees, & Haslam, 2009; Heazlewood & Burke, 2011). However, current research also has expanded to examine the role of self-efficacy in contexts other than physical performance. The work discussed in this section includes the relationships between self-efficacy and decision-making, the role of self-doubt in preparation stages (i.e., preparatory efficacy), and the role of self-efficacy in relationships between dyads of coaches and athletes, and athlete pairs.

Self-Efficacy and Decision-Making

According to Bandura (1997), self-efficacy influences cognitive as well as physical aspects of performance. One type of cognitive performance important in a sport context is the ability to make decisions quickly and accurately, and current research has begun to examine the relationship between self-efficacy and decision-making in tasks specific to sport. In a study by Hepler and Feltz (in press), undergraduate college students watched video clips of baseball scenarios and made decisions about what players should do next in each given situation. Controlling for residualized past per-

formance, self-efficacy predicted decision-making speed; individuals higher in decision-making self-efficacy made decisions faster than those with lower self-efficacy. Hepler and Feltz (in press) suggested that individuals who are confident in their abilities to make a decision have less hesitation and doubt about the options they generate, which allows them to make decisions quickly. It is possible that those with lower efficacy had to exclude more options before settling on their final choice, increasing time needed to make their decision.

The relationship between self-efficacy and decision-making was also supported in Hepler and Feltz's (2011) research on self-efficacy, decision-making, and use of the take-the-first (TTF) heuristic in basketball tasks. The basis of TTF is that individuals generate options in a meaningful order, and early decisions are often better choices than those generated later. In Hepler and Feltz's (2011) study, undergraduate students created a list of decisions based on basketball video clips in a specified amount of time. Decision-making self-efficacy positively predicted TTF, as individuals with higher levels of self-efficacy used TTF more often, generated fewer choices, and made decisions faster than those with lower levels of self-efficacy. These findings highlight the importance of self-efficacy in athletes' cognitive performance. Improving levels of athlete's decision-making self-efficacy would be beneficial in allowing athletes to make quicker and better decisions in a sport context where speed and accuracy are

necessary for high levels of performance.

Preparatory Efficacy

Bandura (1997) noted that self-efficacy plays different roles during the preparation and performance phases of a task, or more specific to the sport context, an athlete's season. The term, "preparatory efficacy," as used by Bandura (1997), has the same definition as performance efficacy (i.e., beliefs in one's capabilities to be successful at an upcoming task), but is measured during the preparatory period instead of just prior to performance (Wood & Feltz, 2009). In the preparation phase, while skilled athletes are preparing and training for a competition, Bandura (1997) suggested that the existence of some self-doubt may help an athlete exert the required effort to fully prepare for his or her upcoming performance. Thus, although doubt is detrimental during the performance phase of sport competition (Bandura, 1997; Feltz et al., 2008), it may be beneficial to effortful practice during the preparation phase of competition as long as it is not overwhelming doubt. When athletes believe a competition will be too easy, or have overly high beliefs in their abilities, they may become complacent and put forth less preparatory effort than when they know they will be faced with a tougher challenge (Feltz et al., 2008). Instead of a linear, positive relationship between self-efficacy and effort during preparatory practice, it is likely that the relationship between preparatory efficacy and effort is curvilinear, and better

described by an inverted-U (Feltz et al., 2008). Self-efficacy levels that are too high or too low can result in low levels of effort, whereas moderate levels of self-efficacy should result in the highest amount of preparatory effort (Feltz et al., 2008).

Research examining preparatory efficacy in sport is just beginning to emerge. As noted by Feltz and Wood (2009), the majority of research supporting the concept of preparatory efficacy has focused on learning or decision-making tasks outside of the sport domain. However, some research has started to focus on sport, as Feltz and Wood (in press) provided preliminary results of a preparatory efficacy experiment using a golf-putting task. Individuals were given 30 practice putts to distribute how they wished across targets of three difficulty levels: (a) low difficulty (high-efficacy condition), (b) moderate difficulty (medium-efficacy condition), and (c) high difficulty (low-efficacy condition), and were then asked to take five putts at each target during the performance phase of the experiment. Participants chose to use more of their practice putts at the targets in the low- and medium-efficacy conditions, and their lower levels of preparatory effort at the high-efficacy condition resulted in lower than expected performance. While this provides some initial support for the concept of preparatory efficacy, Feltz and Wood (in press) also proposed that more research is needed in this area.

Bandura (1997) suggested that coaches already use the concept of

preparatory efficacy to motivate their athletes to adequately prepare for upcoming performances. Coaches talk up the strength of their opponents, or focus on their own teams' weaknesses, in order to introduce a level of doubt to keep their athletes from becoming complacent in the face of a competitor or performance that is thought to be less challenging (Bandura, 1997). Based on these examples, more research on preparatory efficacy in sport is needed to fully understand how athletes are motivated to prepare for performance situations, and find ways for coaches and athletes to put preparatory efficacy concepts into practice.

Tripartite Efficacy

Relationships among dyads of athletes and coaches, or athletes and their teammates are also an important consideration in the development of an athlete's self-efficacy. Feltz and colleagues (2008) identified the tripartite model of efficacy as an emerging area of research in self-efficacy in sport. Since then, a few studies have been published examining this concept through quantitative and qualitative methodologies (Jackson & Beauchamp, 2010; Jackson, Beauchamp, & Knapp, 2007; Jackson, Grove, & Beauchamp, 2010; Jackson, Gucciardi, & Dimmick, 2011; Jackson, Knapp, & Beauchamp, 2009). Originally proposed by Lent and Lopez (2002), the tripartite model includes self-efficacy, other-efficacy, and relation-inferred self-efficacy (RISE). Other-efficacy includes an individual's beliefs about a part-

ner's/teammate's abilities, and RISE beliefs are an athlete's perceptions of the partner's/teammate's beliefs about the athlete's capabilities (Lent & Lopez, 2002). Lent and Lopez (2002) suggested that these three components are related, but each one can independently predict different outcomes (e.g., relationship satisfaction, relationship commitment, performance, and effort).

Research is beginning to support the tripartite model. Among junior doubles tennis players, Jackson et al. (2007) determined that athletes' individual levels of self-efficacy were related to both other-efficacy and RISE beliefs, self-efficacy was related to athletes' commitment to keep playing with their partners, and other-efficacy was related to satisfaction with their partner relationships.

However, the tripartite efficacy model may work differently in coach-athlete dyads than in paired-athlete dyads. Again with junior tennis players, Jackson et al. (2010) found interaction effects, in that the relationships between other-efficacy and outcomes varied between the coach and the athlete. They suggested that among coach-athlete dyads, in which the coach has more knowledge and power than the athlete, other-efficacy has more of an impact on the athlete than the coach on outcomes such as relationship closeness (e.g., affection, respect, and trust) and complementarity (e.g., reciprocal behaviors, feeling prepared to do their best). The effects of RISE beliefs also varied for coaches and athletes. When coaches perceived that their athletes had high beliefs

in their coaching abilities, it corresponded to high levels of commitment for the coaches. Conversely, when athletes perceived that their coaches had high beliefs in an athlete's abilities, it corresponded to low levels of commitment for the athletes, possibly allowing athletes to feel complacent. Thus, the type of relationship is extremely important when examining tripartite efficacy in dyads in sport contexts.

One issue that Feltz et al. (2008) raised about the tripartite efficacy model is that while other-efficacy is a perception of an individual about his or her partner's abilities, it does not include perceptions about the partner's levels of self-efficacy, which they described as confidence-focused other efficacy. Jackson and Beauchamp (2010) termed this concept "Estimations of the Other Person's Self-Efficacy" (EOSE), which represents how confident individuals think their partners are in themselves, potentially providing an additional component to the original tripartite efficacy model. Qualitatively examining EOSE beliefs among coach-athlete and athlete-athlete dyads, Jackson and Beauchamp (2010) found that EOSE was influenced by verbal and non-verbal communication, past performance, physiological and affective states, and success as a dyad. EOSE beliefs also influenced individual self-efficacy, relationship satisfaction, other-efficacy, and relationship persistence.

While there has been a growing body of recent research on the role of self-efficacy in relationships between mem-

bers of coach-athlete and athlete-athlete dyads, much more is needed to further examine these relationships. As results have shown that the different efficacy beliefs in the tripartite model influence relationship satisfaction, persistence, and commitment between partners, it is important to understand how those efficacy beliefs are shaped in order to help athletes and coaches maintain positive long-term relationships in different team and individual sport environments.

Coaching Efficacy

Besides athletes, coaches are another population receiving attention in self-efficacy research. Originally proposed by Feltz, Chase, Moritz, and Sullivan (1999), the concept of coaching efficacy represents a coach's belief in his or her ability to effectively teach and enhance the performance of their athletes. While the concept is similar to self-efficacy among athletes, coaching efficacy is less situation specific and includes beliefs about one's ability to influence athletes in the areas of motivation, game strategy, technique, and character building. These efficacy beliefs are influenced by a number of factors, including previous coaching experience, coaching preparation, prior wins and losses, coaches' perceived skill of athletes, and support from schools, parents, community, and administrators. Efficacy beliefs then influence coaching behaviors and athlete satisfaction and performance. Newer research is focusing on other relationships to this model, including (a) sources of coaching efficacy at the high school

level, (b) coaching efficacy and aggression in youth sports, (c) emotional intelligence, and (d) leadership efficacy, which we discuss in this section.

Head Coaches of High School Teams

Many studies have focused on examining the four dimensions of coaching efficacy, guided by Feltz et al.'s (1999) Coaching Efficacy Scale (CES). Recently, however, Myers, Feltz, Chase, Reckase, and Hancock (2008) developed the CES-II for High School Teams (CES-II HST), a coaching efficacy scale specifically designed for use with head coaches of high school team sports, noting that sources and dimensions of coaching efficacy may vary depending on the level of the athletes coached. Myers et al. (2008) also added physical conditioning as a fifth dimension of coaching efficacy to the model, and refined the definitions of the character building and technique efficacy dimensions. Myers, Feltz, and Chase (2011) used the new scale to examine sources of coaching efficacy among male and female head coaches of high school team sports. They found support for 35 sources of coaching efficacy (see Myers et al., 2011 for a complete list). However, gender moderated the relationship for some of the sources, as a few sources were related to specific dimensions for female coaches only (i.e., sources of career winning percentage, team's record from the previous year, and perceptions of team ability). Future research is needed to further examine the model of

coaching efficacy at different competitive levels in sport, and to investigate potential reasons for gender differences in sources of coaching efficacy.

Coaching Efficacy and Aggression

Research has examined the influence of coaching efficacy on the attitudes and behaviors of athletes. One area that has recently received attention is the issue of aggression in youth sports. Chow, Murray, and Feltz (2009) examined the relationship between specific dimensions of coaching efficacy and youth soccer players' likelihood to commit aggressive acts in a given scenario. In that study, game strategy efficacy significantly predicted likelihood to aggress, as players of coaches with high levels of game strategy efficacy were more likely to report that they would trip an opponent in a given situation than players of coaches with lower level of game strategy efficacy (Chow et al., 2009). Chow et al. (2009) suggested that the link between game strategy efficacy and aggression may potentially be explained by athletes' perceptions that aggression is a method to achieve the overall goal of winning, and athletes may view aggressive acts as strategic instead of unsportsmanlike behavior. Surprisingly, however, character-building efficacy was not related to players' likelihood to aggress in the study (Chow et al., 2009). The authors explained that this finding may be due to the fact that aggressive tendencies reflect a negative aspect of morality; whereas, character building efficacy focuses on instilling an attitude of good

moral character, fair play among athletes, respect for others, and promoting good sportsmanship, which reflect positive aspects of morality. The authors suggest that character building efficacy better predicts the positive aspects of morality that emphasize sportsmanship and fair play than the negative aspects of morality such as aggression. In a related study on youth soccer players in Botswana, Malete, Chow, and Feltz (2011) discovered that players' perceptions of their coaches' game strategy competency and their perceptions of coaches' endorsement of cheating and aggressive behaviors predicted players' likelihood to aggress. However, unlike the study by Chow et al. (2009), game strategy efficacy was not related to players' likelihood to aggress. Both studies noted that actual coaching behaviors were not assessed. Thus, researchers do not know if coaches who have high game strategy efficacy outright teach unfair tactics, positively reinforce athletes who use them, and/or ignore aggressive behavior when it occurs. The influence of those behaviors as part of the coaching efficacy model requires further attention in future research.

Emotional Intelligence

Recently, there has been an interest in examining emotional intelligence and coaching efficacy. Emotional intelligence plays an important role in coaching, as it refers to the ability of coaches to be able to monitor and manage the emotions of their athletes and themselves. Thelwell, Lane, Weston, and Greenlees (2008)

provided support for the relationship between components of emotional intelligence and the coaching efficacy dimensions among coaches of multiple sports. They determined that specific components of emotional intelligence acted as sources of different dimensions of coaching efficacy. Motivation efficacy was predicted by regulation of emotions, character-building efficacy was predicted by optimism, and technique efficacy was predicted by emotional appraisal (Thelwell et al., 2008). Hwang, Feltz, and Lee (in press) built upon the work by Thelwell et al. (2008) and examined leadership style (e.g., autocratic or democratic decision-making, providing social support and feedback) along with coaching efficacy and emotional intelligence among high school basketball coaches. Hwang et al. (in press) found that emotional intelligence predicted both coaching efficacy and leadership style, and coaching efficacy also mediated the relationship between emotional intelligence and leadership style. Thus, coaches' beliefs in their ability to regulate their own emotions may influence their perceptions of their abilities to coach their athletes, and the ability to understand the emotions of their athletes may be beneficial in developing their leadership styles (e.g., providing positive feedback, evaluating athletes, and planning appropriate training schedules). This result implies that emotional intelligence is a source of self-efficacy information because trait emotional intelligence includes dispositions as well as self-perceptions related to emotional

functioning (Petrides & Furnham, 2003). Also, regarding its relationship, Bandura (1997) noted that one way of altering efficacy belief is by reducing “negative emotional proclivities” (p. 106). This also includes mood states, such as anger, fear, anxiety, and joy. Bandura explains that moods provide sources of efficacy information “because they often accompany changes in quality of functioning” (p. 111).

Leadership Efficacy

Besides coaching efficacy, the role of efficacy and leadership development is beginning to emerge. Although they did not focus specifically on sport, Machida and Schaubroeck (in press) reviewed the existing literature on self-efficacy and leadership, and proposed that self-efficacy has a multifaceted role in the development of individual leaders. The first role involves the concept of preparatory efficacy discussed previously in this paper. Individuals preparing for a leadership role, with efficacy levels that are too high or low, may not put in the effort needed to develop leadership skills. Second, a baseline level of moderate self-efficacy is needed for self-correcting cycles to occur. After experiencing improvements or decreases in efficacy and performance, leaders need to be able to readjust and make corrections to return to the moderate level of self-efficacy, instead of continuing in an upward or downward cycle. Learning self-efficacy also plays an important role in leadership development. If individuals do not believe they have the ability to learn the

skills needed to become effective leaders, they may not make attempts to learn those skills. Lastly, learning self-efficacy must also be resilient and stable in order for leaders to face and overcome challenges, which provide opportunities for further learning.

Machida and Schaubroeck (in press) also identified potential sources of leadership efficacy. These include learning orientation and development experiences in the form of challenges, support, and feedback. In a sport context, Machida, Schaubroeck, and Feltz (2011) conducted preliminary work examining these sources of leadership efficacy to better understand why women are underrepresented in athletic administration positions. They examined the roles of challenges, support, feedback, and resiliency on NCAA female athletic administrators’ feelings of leader self-efficacy and their motivation to lead. Machida et al. (2011) determined that leader self-efficacy is positively influenced by all four constructs, and leader self-efficacy is also related to motivation to lead. Their findings suggest that in order to help more women develop as leaders in sport, it is critical to create environments for women to experience challenges that push and expand their comfort zones, foster resiliency for women to overcome future challenges, and it is also necessary for women to receive proper feedback and social support from supervisors or peers.

Besides leadership efficacy, coaching efficacy has been shown to influence interest in a coaching career. Moran-

Miller and Flores (2011) examined the relationship between coaching efficacy and interest in a coaching career among female collegiate student-athletes. They found that the quality of female coaches as role models (but not quantity) was positively related to coaching efficacy, and coaching efficacy was related to interest in coaching. However, long working hours was perceived as a barrier, and was negatively related to both coaching efficacy and coaching interest.

Although the roles of athletic administrators and coaches differ in terms of training and development, both are leadership positions, and the findings from these studies that self-efficacy influences the interest and development of women as leaders in sport can help address ways to promote women into these positions. Future research needs to continue to examine the reasons that women are underrepresented in leadership positions in sport, and determine if there are other factors that influence the role of self-efficacy in leadership and coach development among women.

Collective Efficacy

As with individual athletes and coaches, efficacy beliefs also influence behaviors among teams. Bandura (1997) defined collective efficacy as “a group’s shared belief in its conjoint capabilities to organize and execute the courses of action required to produce given levels of attainment” (p. 477). Although other definitions of collective efficacy exist, Feltz et al. (2008) noted that the other definitions do share common themes.

Collective efficacy is a shared belief among members of team, it is specific to tasks and situations, and it is not solely the sum of the individual levels of team members’ self-efficacy, as long as there is interdependence among members (Feltz et al., 2008). Sources of collective efficacy include those that are similar to self-efficacy (e.g., previous performances, vicarious experiences, verbal persuasion, and physiological states), but Feltz et al. (2008) discussed other factors that may also influence collective efficacy (e.g., team size, amount of time members of a team have been together, and stage of team development).

Although there have been fewer studies examining collective efficacy than individual self-efficacy (Feltz et al., 2008), research on collective efficacy has begun attracting more attention. A number of recent book chapters and research studies have focused on the topic (Chow & Feltz, 2007; Damato, Grove, Eklund, & Cresswell, 2008; Dithurbide & Feltz, in press; Edmonds, Tenenbaum, Kamata, & Johnson, 2009). Some of the current topics that we discuss in this section include: (a) use of collective motivational self-talk statements, (b) team efficacy and attributions, and (c) dispersion of efficacy among team members.

Motivational Self-Talk Statements

Son, Jackson, Grove, and Feltz (2011) recently examined the effects of using individually-oriented, group-oriented, or neutral self-talk motivational statements on a dart-throwing task. Individuals who

used “we” statements regarding the group’s capabilities showed more improvement from their practice to performance throws and demonstrated higher levels of self-efficacy and collective efficacy than those in the individual or neutral conditions. This indicates that the feeling of being part of a team, even an imagined one, can positively impact individual performance. Son et al. (2011) suggested that group-oriented self-talk statements could be beneficial when new or inexperienced teams are formed, to foster a sense of unity among the team members, and they also suggested that athletes can use pre-recorded self-talk statements during training or before competing to help improve self-efficacy and performance.

Attributions

After experiencing a team success or a failure, self-efficacy can influence how athletes view their previous performance. Athletes make attributions regarding the perceived causes, or reasons, that their team won or lost, and recent research has focused on the relationship between collective efficacy and athletes’ attributions on sports teams (Chow & Feltz, 2008; Hepler, Chow, & Feltz, 2008). Chow and Feltz (2008) examined the relationships between pre-performance collective efficacy and post-performance attributions among high school girls and boys track relay teams. Using multi-level analysis, they determined that individual perceptions of collective efficacy were related to controllable attributions, and this relation-

ship was stronger for girls than for boys. Individual athletes, especially girls, with high perceptions of their team’s collective efficacy believed that their team had control over their performance.

Hepler, Chow, and Feltz (2008) also examined collective efficacy and attributions among golf, baseball, basketball, and softball teams. Similar to Chow and Feltz’s (2008) results, they determined that collective efficacy was related to controllable attributions, as well as internal attributions. Additionally, Hepler et al. (2008) included the influence of coaching efficacy on team attributions. Athletes whose coaches had high levels of coaching efficacy made internal and controllable team attributions. The findings of both of these studies suggest that both collective efficacy and the efficacy of coaches are important factors to consider as athletes create perceptions about the causes of their successes or failures.

Collective Efficacy Dispersion

Research on collective efficacy has primarily examined the construct as a shared belief and focused on commonalities between team members. However, individuals vary in their perceptions of their team’s abilities, and DeRue, Hollenbeck, Ilgen, and Feltz (2010) proposed that the variation of efficacy beliefs within a team, or the dispersion of efficacy beliefs among team members, is an important consideration in the relationship between collective efficacy and team functioning. They suggested that dispersion can take several

different forms within a team: (a) shared efficacy (consensus among team members), (b) minority belief (one team member will either have higher or lower perceptions of team efficacy than the rest of the group), (c) bimodal (subgroups will form with different efficacy levels), and (d) fragmented (all members have different team efficacy beliefs; DeRue et al., 2010). Each of the different forms can result in their own potential benefits or negative consequences in the development of team functioning (DeRue et al., 2010).

Researchers are just beginning to examine collective efficacy dispersion in a sport context. In a recent experiment, rugby players participated in a task using a scrum sled that measured the group's levels of exerted force (Dithurbide, Sullivan, Feltz, & Chow, 2010). For each group, collective efficacy dispersion was manipulated into either a shared efficacy belief condition or a bimodal efficacy belief condition. By design, the bimodal teams demonstrated more efficacy dispersion than the shared condition teams, while having similar aggregated collective efficacy scores, yet there was no significant relationship between form of dispersion and performance (Dithurbide et al., 2010). Similar results were found in a group tug-of-war performance task, as manipulated efficacy dispersion conditions did not predict performance, but overall collective efficacy did (Dithurbide, Chow, Feltz, & Sullivan, 2011). The findings of both of these studies suggest that in terms of performance, the overall magnitude of a

team's collective efficacy may be more important than the amount of dispersion, but more research is needed to understand the relationship between collective efficacy dispersion and team functioning. DeRue et al. (2010) also proposed that efficacy dispersion plays an important role in the preparatory phases of team development, and future research should examine the influence of collective efficacy dispersion during training and preparation phases of sports teams.

Referee Efficacy

Research in self-efficacy in sport is now beginning to include new populations outside of the realm of athletes and coaches. An example of a group of individuals who perform in a sport setting, but do not compete, are referees. Guillen and Feltz (2011) have proposed the concept of referee efficacy, or refficiency, as a framework to examine unique factors influencing referees' perceptions of their abilities and the resulting consequences. Using a focus group of male soccer referees, Guillen and Feltz (2011) developed an initial model of refficiency. Similar to Bandura's (1997) theory of self-efficacy, potential sources of refficiency information include (a) mastery experiences (e.g., years of experience, previous performances, knowledge of game rules, and mentored experiences), (b) perceived levels of social support (e.g., feedback from players, coaches, peers, and evaluators), (c) physical and mental preparation (e.g., goal-setting, visualizations, and regulating arousal), and (d)

partner qualifications (e.g., partner's abilities, feeling qualified for game assignments, and favorable environmental conditions). Guillen and Feltz (2011) hypothesized that those sources influence efficacy beliefs, which then influence the following constructs: (a) decision-making abilities, (b) rule violations by athletes, (c) satisfaction with other referees, (d) behaviors of coaches, (e) stress, and (f) satisfaction levels of athletes and co-referees. As these constructs have the potential to greatly influence athletes' behaviors as well as the outcome of a game or competition, it is necessary to understand the factors that impact referee efficacy. A measure to examine referee efficacy, the Referee Efficacy Scale, is currently under development, and future research is needed to support or change the hypothesized model, as Guillen and Feltz (2011) noted that there are likely more constructs that will emerge as more work is conducted in this area.

Measurement Issues

Feltz et al. (2008) recommended the use of Bandura's (2006) guidelines for constructing efficacy measures. These guidelines include: (a) domain specification, (b) gradations of challenge, (c) content relevance, (d) response scale, (e) validity, and (f) minimizing social evaluative concerns. For domain specification, measures that assess efficacy beliefs should be specific to the context. Bandura advocates the use of efficacy belief measures specific to particular domains of functioning rather than

those assessing global expectations of performance, devoid of context. Content relevance reflects that efficacy belief is about one's judgment of capacity (i.e., "I can do"), not intention, potential, or future. Response scales are generally constructed using an 11-point rating scale, ranging from 0 to 10 with 1-unit increments, or from 0 to 100 with 10-unit increments to obtain efficacy strength. The 0 indicates 'complete uncertainty' while the 10 or 100 indicates 'complete certainty'. For validity issues of efficacy measures, Bandura recommends a factor analysis to verify the homogeneity of items for a construct. If the construct has multiple dimensions supported by a factor analysis, the efficacy measures should be analyzed with a multi-dimensional structure in order to prevent all items from collapsing into a composite score (Myers & Feltz, 2007). To minimize social evaluative concerns, Bandura suggests conducting a pilot study with a sample demographically similar to those that will participate in the study, and using a nondescript title (e.g., Skating Appraisal). Current measurement issues in efficacy beliefs in sport have focused on optimal categorization, and in team contexts, multilevel confirmatory factor analysis (MCFA) and multi-level modeling (MLM) in collective efficacy.

Optimal Categorization

Despite a general consensus among Bandura's (2006) guidelines, an optimal categorization (i.e., rating scale) has been an issue for psychometric investigation.

Determination of an optimal categorization is important because it increases the likelihood of measure stability, measure accuracy, and related inference for future samples (Linacre, 2002). Regarding the 11 categories that Bandura advocated, he warned, "scales that use only a few steps should be avoided because they are less sensitive and less reliable. People usually avoid the extreme positions so a scale with only a few steps may, in actual use, shrink to one or two points (p. 312)." Pajares, Hartley, and Valiante (2001) supported his intention on the categories by comparing the 11-point scale to a 6-point Likert scale, and concluded that writing self-efficacy measures with 11 categories produced greater prediction of theoretically relevant external variables, along with greater sensitivity. However, Smith, Wakely, Kruijff, and Swartz (2003) argued that Pajares et al.'s (2001) study had a limitation in their data analysis. Pajares et al. used ordinal data and methods (e.g., factor analysis, internal consistency, and regression) that assumed interval level data. Due to unequal distances between ratings, the ordinal data do not support valid mathematical operations (i.e., multiplying scores), and analysis of such data may mask ineffective treatments and hide effective methods (Merbitz, Morriz, & Grip, 1989).

Smith et al. (2003) advocate Rasch models as a specific method to optimize the number of rating points for each application of a self-efficacy measure in a given research context. Rasch models are mathematical models that require

unidimensionality and result in additivity. A single latent construct (e.g., a specific efficacy belief) is measured under unidimensionality, and same sized units, called logits (logarithm of odds), are obtained under additivity if the data fit the model. These models provide a non-linear function of the probability of obtaining a certain score or rating for a person of a given ability over the entire continuum of a single construct. Smith et al. (2003) demonstrated disordered thresholds (i.e., levels of a latent construct to change to a next rating) of a 10-point scale. It implies that as one moves up the self-efficacy continuum, these ordered categories from 10 to 100 are never the most likely response to be observed. Based on disordered threshold, they combined disordered categories with a 5-point and 4-point scale. After unfitted items were removed, the 4-point scale was more parsimonious with an inspection of category count, average measures, threshold, and outfit mean-square statistics based on Linacre (2002)'s guideline for optimizing rating scale category effectiveness by the Rasch rating scale model.

In sport, there is evidence that fewer response categories produce better psychometric properties of self-efficacy scales (Myers, Feltz, & Wolfe, 2008; Myers, Wolfe, & Feltz, 2005; Zhu & Kang, 1998; Zhu, Updyke, & Lewandowski 1997). For instance, Myers et al. (2005) reported that the functioning of a 10-point coaching efficacy scale could be improved if the structure was collapsed to four categories, and Myers

et al. (2008) confirmed this four-category structure after comparing the original five-category structure (category-1, 2, 3, 4, 5) to post-hoc four-category structure (category-2, 2, 3, 4, 5) because of the infrequent use of category-1 in the five-category structure (i.e., 'no confidence'). Also Myers et al. noted that because coaches rarely endorse categories representing less than moderate confidence, there is unlikely a need for many categories representing degrees for less than moderate confidence within coaching efficacy. This recommendation does not mean, however, that representatives of other populations (e.g., novice athletes or parents who never coached before) would not endorse 'no confidence' or 'little confidence' categories.

Multilevel Confirmatory Factor Analysis

There are a number of instances in sport where individual efficacy beliefs are reported within teams, such as in collective efficacy beliefs. Multilevel confirmatory factor analysis (MCFA) is an appropriate methodology when data, such as these, are meaningfully nested and evaluation of the factor structure of a set of indicators is desired (Muthén, 1989, 1994). Myers, Feltz, Maier, Wolfe, & Reckase (2006) used this method to develop a coaching competency scale for athletes to evaluate their coaches' competency. Using a detailed four step process in MCFA (Muthén, 1994), Myers et al. tested a unidimensional and multidimensional model of the scale within teams, and compared model-data

fit indexes (e.g., comparative fit index, Tucker-Lewis index, and root mean square error of approximation). Imposing the internal model on the within-group covariance matrix fit the data better than imposing the model on the total covariance matrix, which ignored the nesting of the data. Thus, instruments that are developed using athletes within teams must account for the nesting of athletes within those teams when determining a factor structure at the athlete-level even if the factor structure at the team level is not investigated.

Multilevel Modeling (MLM) in Collective Efficacy

As Myers and Feltz (2007) noted, specifying a single level of analysis in collective efficacy research either ignores the groupings of teams or ignores the within team variability by analyzing aggregated data at the team level only. They suggested using MLM for studies in collective efficacy because of the nesting of athletes within teams. This type of analysis allows one to model variances of efficacy beliefs at the individual and group levels, as well as the associations across levels. Using this methodology, the relationship between collective efficacy and performance (e.g., Myers, Feltz, & Short, 2004; Myers, Payment, & Feltz, 2004), and dispersion of collective efficacy (e.g., Chow, et al., 2009; Dithurbide, et al., 2011; Dithurbide, et al., 2010) have been studied to examine the variability and predictors of collective efficacy at both individual and group levels. The

degree of dependency of the aggregated collective efficacy was determined by the intraclass correlation coefficient, which indicates the proportion of variance due to both within- group and between-group. In addition to this, DeRue, et al. (2010) advocated the use of all four components of the distributions (mean, variance, skewness, and kurtosis) to measure dispersion. The mean provides information of the magnitude of collective efficacy, and variance provides how much dispersion is present in the team. Kurtosis and skewness provide information regarding the form of this dispersion. For example, a kurtosis value of -2 indicates bimodal dispersion, whereas a kurtosis value of -1.2 indicates a fragmented form (see details in DeRue et al., 2010).

CONCLUSIONS

Self-efficacy research has continued to grow in the past several years, expanding beyond individual athlete's motivation and performance, to that of coaches, teams, and referees. We have provided an overview of some of the recent directions in self-efficacy research in sport, along with measurement recommendations to consider when conducting research on this topic.

One area that may provide potential for future research is that of proxy efficacy. Proxy efficacy refers to an individual's belief in the capabilities of another person or group (i.e., a proxy) to provide help or function on behalf of that individual (Bray et al., 2001). While work in this area has focused solely on physical

activity and exercise, Bray and Shields (2007) suggest that it may apply to coach and athlete relationships in a sport setting as well. Thus, there are areas in self-efficacy and sport that need to be explored, along with the continuation of research in the areas outlined in this paper.

REFERENCES

- Bandura, A. (1997). *Self-efficacy. The exercise of control*. New York, NY: W.H. Freeman and Company.
- Bandura, A. (2006). *Self-efficacy belief of adolescents*. Greenwich, CT: Information Age Publishing.
- Beattie, S., Lief, D., Adamoulas, M., & Oliver, E. (2011). Investigating the possible negative effects of self-efficacy upon golf putting performance. *Psychology of Sport and Exercise, 12*(4), 434-441.
- Betz, N. E., Borgen, F. H., Harmon, L. W. (2006). Vocational confidence and personality in the prediction of occupational group membership. *Journal of Career Assessment February, 14*, 36-55.
- Bray, S. R., Gyurcsik, N. C., Culos-Reed, S. N., Dawson, K. A., & Martin, K. A. (2001). An exploratory investigation of the relationship between proxy efficacy, self-efficacy and exercise attendance. *Journal of Health Psychology, 6*, 425-434.
- Bray, S. R., & Shields, C. A. (2007). Proxy agency in physical activity. In M. Beauchamp & M. Eys (Eds.), *Group dynamics advances in sport and exercise psychology: Contemporary themes*, (pp. 79-95). New York: Routledge.

- Chow, G. M., Dithurbide, L., & Feltz, D. L. (2009). Going beyond level of analysis: Examining dispersion as a team-level construct. *Journal of Sport and Exercise Psychology, 31*, S113.
- Chow, G. M., & Feltz, D. L. (2007). Exploring new directions in collective efficacy and sport. In M. Beauchamp & M. Eys (Eds.), *Group dynamics advances in sport and exercise psychology: Contemporary themes*, (pp. 221-248). New York: Routledge.
- Chow, G. M., Murray, K. E., & Feltz, D. L. (2009). Individual, team, and coach predictors of players' likelihood to aggress in youth soccer. *Journal of Sport and Exercise Psychology, 31*, 425-443.
- Coffee, P., Rees, T., & Haslam, S. E. (2009). Bouncing back from failure: The interactive impact of perceived controllability and stability on self-efficacy beliefs and future task performance. *Journal of Sports Sciences, 27*(11), 1117-1124.
- Damato, G. C., Grove, J. R., Eklund, R. C., & Cresswell, S. (2008). An exploratory examination into the effect of absence due to hypothetical injury on collective efficacy. *Sport Psychologist, 22*(3), 253-268.
- DeRue, D. S., Hollenbeck, J., Ilgen, D., & Feltz, D. L. (2010). Efficacy dispersion in teams: Moving beyond agreement and aggregation. *Personnel Psychology, 63*, 1-40.
- Dithurbide, L., Chow, G. M., Feltz, D. L., & Sullivan, P. J. (2011). Collective efficacy magnitude and dispersion: The effects on tug-of-war group performance. *Journal of Sport and Exercise Psychology, 33*, S142.
- Dithurbide, L., & Feltz, D. L. (in press). Self and collective efficacy. In G. Tenenbaum, R. Edklund, & A. Kamata (Eds.), *Handbook of measurement in sport and exercise psychology*. Champaign, IL: Human Kinetics.
- Dithurbide, L., Sullivan, P. J., & Feltz, D. L. (2010). Collective efficacy dispersion: A preliminary rugby lab study. *Journal of Sport and Exercise Psychology, 32*, S156.
- Edmonds, W. A., Tenenbaum, G., Kamata, A., & Johnson, M. B. (2009). The role of collective efficacy in adventure racing teams. *Small Group Research, 40*(2), 163-180.
- Feltz, D. L., Chase, M. A., Moritz, S. A., & Sullivan, P. J. (1999). A conceptual model of coaching efficacy: Preliminary investigation and instrument development. *Journal of Educational Psychology, 91*, 765-776.
- Feltz, D. L., Hepler, T. J., Roman, N., & Paiement, C. (2009). Coaching efficacy and volunteer youth sport coaches. *The Sport Psychologist, 23*, 24-41.
- Feltz, D. L., Short, S. E., & Sullivan, P. J. (2008). *Self-efficacy in sport*. Champaign, IL: Human Kinetics.
- Feltz, D. L., & Wood, J. M. (in press). Preparatory self-efficacy: The role of self-doubt in preparing for competition. In *Sport psychology: On the way to the Olympic Games*. Mokhoyova, Russia: Moscow State University.
- Feltz, D. L., & Wood, J. M. (2009). Can self-doubt be beneficial to performance? Exploring the concept of

- preparatory efficacy. *The Open Sports Sciences Journal*, 2, 65-70.
- Guillén, F., & Feltz, D. L. (2011). A conceptual model of referee efficacy. *Frontiers in Psychology*, 2, 1-5.
- Heazlewood, I., & Burke, S. (2011). Self-efficacy and its relationship to selected sport psychological constructs in the prediction of performance in ironman triathlon. *Journal of Human Sport and Exercise*, 6(2), 328-350.
- Hepler, T. J., & Chase, M. A. (2008). Relationship between decision-making self-efficacy, task self-efficacy, and the performance of a sport skill. *Journal of Sports Sciences*, 26(6), 603-610.
- Hepler, T. J., Chow, G. M., & Feltz, D. L. (2008). The influence of team perceptions and leader efficacy on team-referent attributions. *Journal of Sport and Exercise Psychology*, 30, S175.
- Hepler, T. J., & Feltz, D. L. (in press). Path analysis examining self-efficacy and decision-making performance on a simulated baseball task. *Research Quarterly for Exercise and Sport*.
- Hepler, T. J. & Feltz, D. L. (2010). *Take the first heuristic, self-efficacy, and decision-making in sport*. Manuscript submitted for publication.
- Hwang, S., Feltz, D. L., & Lee, J. D. (in press). The predictive strength of emotional intelligence on coaching efficacy and leadership style of high school basketball head coaches. *International Journal of Sport and Exercise Psychology*.
- Jackson, B., & Beauchamp, M. R. (2010). Self-efficacy as a metaperception within coach-athlete and athlete-athlete relationships. *Psychology of Sport and Exercise*, 11(3), 188-196.
- Jackson, B., Beauchamp, M. R., & Knapp, P. R. (2007). Relational efficacy beliefs in athlete dyads: An investigation using actor-partner interdependence models. *Journal of Sport and Exercise Psychology*, 29, 170-189.
- Jackson, B., Grove, J. R., Beauchamp, M. R. (2010). Relational efficacy beliefs and relationship quality within coach-athlete dyads. *Journal of Social and Personal Relationships*, 27(8), 1035-1050.
- Jackson, B., Gucciardi, D. F., Dimmock, J. A. (2011). Tripartite efficacy profiles: A cluster analytic investigation of athletes' perceptions of their relationship with their coach. *Journal of Sport & Exercise Psychology*, 33(3), 394-415.
- Jackson, B., Knapp, P., & Beauchamp, M. R. (2009). The coach-athlete relationship: A tripartite efficacy perspective. *Sport Psychologist*, 23(2), 203-232.
- Lent, R. W., & Lopez, F. G. (2002). Cognitive ties that bind: A tripartite view of efficacy beliefs in growth-promoting relationships. *Journal of Social and Clinical Psychology*, 21, 256-286.
- Linacre, J. M. (2002). Optimizing rating scale category effectiveness. *Journal of Applied Measurement*, 3, 85-106.
- Machida, M., & Schaubroeck, J. (in press). The role of self-efficacy beliefs in leader development. *Journal*

- of *Leadership and Organizational Studies*.
- Machida, M., Schaubroeck, J., & Feltz, D. L. (2011). *Examining the role of challenges, feedback, support, self-efficacy, and resiliency on motivation to lead (MTL) of women leaders*. Manuscript in preparation.
- Maleté, L., Chow, G. M., & Feltz, D. L. (2011). *The influence of coaching efficacy and coaching competency on variables in Botswana youth soccer*. Manuscript submitted for publication.
- Merbitz, C., Morriz, J., & Grip, J. C. (1989). Ordinal scales and foundations of misinference. *Archives of Physical Medicine and Rehabilitation*, 70, 308-312.
- Moran-Miller, K., & Flores, L. Y. (2011). Where are the women in women's sports? Predictors of female athletes' interest in a coaching career. *Research Quarterly for Exercise and Sport*, 82(1), 109-117.
- Muthén, B. (1989). Latent variable modeling in heterogeneous populations: Presidential address to the Psychometric Society. *Psychometrika*, 54, 557-585.
- Muthén, B. (1994). Multilevel covariance structure analysis. *Sociological Methods and Research*, 22, 376-398.
- Myers, N. D., & Feltz, D. L. (2007). From self-efficacy to collective efficacy in sport: Transitional methodological issues. In G. Tenenbaum & R. C. Eklund (Eds.), *The handbook of sport psychology* (3rd ed., pp. 799-819). New York: Wiley.
- Myers, N. D., Feltz, D. L., & Chase, M. A. (2011). Proposed modifications to the conceptual model of coaching efficacy and additional validity evidence for the Coaching Efficacy Scale II – High School Teams. *Research Quarterly for Exercise and Sport*, 82(1), 79-88.
- Myers, N. D., Feltz, D. L., Chase, M. A., Reckase, M. D., & Hancock, G. R. (2008). The Coaching Efficacy Scale II – High School Teams. *Educational and Psychological Measurement*, 68(6), 1059-1076.
- Myers, N. D., Feltz, D. L., Maier, K. S., Wolfe, E. W., & Reckase, M. D. (2006). Athletes' evaluations of their head coach's coaching competency. *Research Quarterly for Exercise and Sport*, 77, 111-121.
- Myers, N. D., Feltz, D. L., & Short, S. E. (2004). Collective efficacy and team performance: A longitudinal study of collegiate football teams. *Group Dynamics: Theory, Research, and Practice*, 8, 126-138.
- Myers, N. D., Feltz, D. L., & Wolfe, E. W. (2008). A confirmatory study of rating scale category effectiveness for the coaching efficacy scale. *Research Quarterly for Exercise and Sport*, 79, 300-311.
- Myers, N. D., Payment, C. A., & Feltz, D. L. (2004). Reciprocal relationships between collective efficacy and team performance in women's ice hockey. *Group Dynamics: Theory, Research, and Practice*, 8, 182-195.
- Myers, N. D., Wolfe, E. W., & Feltz, D. L. (2005). An evaluation of the psychometric properties of the coaching efficacy scale for American coaches.

- Measurement in Physical Education and Exercise Science*, 9, 135-160.
- Pajares, F., Hartley, J., & Valiante, G. (2001). Response format in writing self-efficacy assessment: Greater discrimination increases prediction. *Measurement and Evaluation in Counseling and Development*, 33, 214-221.
- Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods*. Newbury Park, CA: Sage.
- Smith, E. V., Wakely, M. V., Kruij, R. L., & Swartz, C. W. (2003). Optimizing rating scales for self-efficacy (and other) research. *Educational and Psychological Measurement*, 63, 369-391.
- Son, V., Jackson, B., Grove, J. R., & Feltz, D. L. (2011). "I am" versus "We are": Effects of distinctive variants of self-talk on efficacy beliefs and motor performance. *Journal of Sports Science*, 29, 1417-1424.
- Thelwell, R. C., Lane, A. M., West, N. J. V., Greenlees, I. A. (2008). Examining relationships between emotional intelligence and coaching efficacy. *International Journal of Sport and Exercise Psychology*, 6(2), 224-235.
- Zhu, W., & Kang, S. J. (1998). Cross-cultural stability of the optimal categorization of a self-efficacy scale: A Rasch analysis. *Measurement in Physical Education and Exercise Science*, 2, 225-241.
- Zhu, W., Updyke, W. F., & Lewandowski, C. (1997). Post-hoc Rasch analysis of optimal categorization of an ordered-response scale. *Journal of Outcome Measurement*, 1, 286-304.
- Manuscrito recibido: 28/11/2011
Manuscrito aceptado: 01/12/2011

