PJSS
ISSN: 1309-0356

Pamukkale Journal of Sport Sciences
2011, Vol. 2, No. 1, Pg:06 -26

Received: 30/09/2010
Accepted: 25/12/2010

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ORIGINAL ARTICLE

MULTIVARIATE RELATIONSHIPS AMONG EFFICACY, COHESION, SELF-TALK AND MOTIVATIONAL CLIMATE IN ELITE SPORT

Abstract

The present study examined relationships among motivational climate, self-efficacy, collective efficacy, cohesion and self-talk in soccer players. Data were obtained from male players (N = 139, mean age = 23, SD = 4.43 yrs) from nine teams. Participants completed the GEQ, the PMCSQ-2, as well as measures of self-talk, self-efficacy, and collective efficacy created for this study. Canonical analyses indicated that higher levels of Determination Collective Efficacy, Skills Collective Efficacy and Skills Self-Efficacy were associated with high levels of individual attractions to group-task cohesion, group integration-task and group integration-social cohesion, positive self-talk about the team, and a task-oriented motivational climate. Generally, players with high levels of self and collective efficacy used self-talk about the team more often, as well as possessed high levels of task cohesion and perceived their team climate to be more mastery-oriented. Conclusions, future directions and implications are discussed in detail.

Key Words: *Collective efficacy, self-efficacy, motivational climate, cohesion, self-talk.*

Self-efficacy and collective efficacy are proposed to have implications for the viability, perseverance, affect, cohesion and success of any group (Bandura, 1997). Self-efficacy theory descended from Bandura's (1977, 1982, 1986) social learning theory and "refers to beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (Bandura, 1997, p. 3). Collective efficacy is defined by Bandura (1997) as, "a group's shared belief in its conjoint capabilities to organize and execute the courses of action required to produce given levels of attainments" (p. 477). Efficacy perceptions are integral to human processes because people's levels of motivation, affective states, and related actions are based on what they believe rather than what is objectively true (Bandura, 2000). Whether in sport, education or business, an individual or group high in collective efficacy may possess a psychological and potential performance advantage over those lacking high efficacy beliefs (Bandura, 1997, 2000).

Collective efficacy is integral to group formation and maintenance, and it influences various psychological features of a group (Bandura, 2000). Some of these features include: the type of action a group chooses to undertake; how much effort the group puts forth; how well group resources are managed; future motivations of group members; group effort, goals, and affective states; expected outcomes; ability to persevere and resilience in the face of failure (Bandura, 2000). Collective efficacy is a necessary component of any thriving team because having a belief in the abilities of one's team is instrumental to success (Bandura, 1997; Feltz & Lirgg, 2001; Myers & Feltz, 2007). Collective efficacy plays an integral role in increasing the performance of teams because "one's perceptions or beliefs about expected competency in an achievement domain are a critical determinant of motivation and performance" (Zaccaro, Blair, Peterson, & Zazanis, 1995, p. 305).

Self and collective efficacy are based on four principal sources of efficacy information which include: enactive mastery experience, vicarious experience, verbal persuasion, and physiological and affective states (Bandura, 1997). Several researchers have established that enactive mastery experience has the greatest impact on self-efficacy and collective efficacy in sport (Bandura, 1997; Feltz & Lirgg, 2001; Myers & Feltz, 2007; Myers, Feltz, & Short, 2004; Watson, Chemers, & Preiser, 2001). Less sport-specific research has been conducted on other sources of efficacy information, such as verbal persuasion (e.g., self-talk) (Hardy, 2006). The focus on this manuscript will be on self-talk as a source of efficacy information both for the individual and the group.

Researchers have posited that collective efficacy has it own distinct sources of efficacy information (Feltz & Lirgg, 2001; Zaccaro et al., 1995). Zaccaro et al. affirm that in addition to Bandura's (1997) sources of efficacy information, prior performance, leadership behaviors, group size and cohesion are specific sources of collective efficacy information used by players to assess their team's capabilities. Prior performance, similar to Bandura's (1997) enactive mastery experience, pertains to the performance success of the team as a whole. Leadership processes are another proposed source of collective efficacy information (Zaccaro et al.). Successful leaders facilitate a sturdy sense of collective efficacy among team members by persuading and developing competence as a unified group (Bandura, 1997; Zaccaro et al.). Group size is also posited to affect the collective efficacy level of teams, whereby large teams would typically possess lower levels of collective efficacy than small teams. The proposed reason for this phenomenon is that individual members of smaller teams are better able to coordinate group functioning and hence, have an increased potential to possess elevated levels of efficacy. Finally, teams with elevated levels of cohesion would theoretically have greater influence over individual

members, which would facilitate an increase in acceptance of group roles, responsibility and standards, and is in turn associated with elevated collective efficacy levels (Zaccaro et al.).

While self-talk is purported to be one of the most widely employed psychological skills training methods (Hanton & Jones, 2006), to date, empirical evidence supporting the role of self-talk in athletic performance has been less then clear (Hardy, 2006). Links have been established between positive self-talk and performance in sport (e.g., Landin & Hebert, 1999; Theodorakis, Weinberg, Natsis, Douma, & Kazakas, 2000; Van Raalte, Brewer, Rivera, & Petipas, 1994; Van Raalte, Cornelius, Hatten, & Brewer, 2000), and efficacy and performance in sport (e.g., Feltz, 1992; Feltz & Lirgg, 1998, 2001), yet, a paucity of research exists on self-talk utilizing the framework of efficacy theory (Hardy, 2006). This is striking given that self-talk has been characterized as an important variable in sport performance (Dagrou, Gauvin, & Halliwell, 1992; Gould, Hodge, Peterson, & Giannini, 1989; Van Raalte et al., 1995; Van Raalte et al., 2000). Despite the calls for further research (e.g., Gould, Hodge, Peterson, & Giannini, 1989; Hardy, 2006; Weinberg, 1985), to date, no published investigations have focused on self-talk and perceptions of self and collective efficacy in sport.

Researchers have criticized self-talk research in sport as being atheoretical in nature (Hardy, Hall, & Alexander, 2001) and suggested that advances in the area were being impeded by the relative absence of coherent conceptual frameworks (Gammage, Hardy, & Hall, 2001). Because previous researchers have not agreed upon which theory is most appropriate to study self-talk, operational definitions have been haphazardly utilized. Many of the previous definitions for self-talk have been loosely based on other less-relevant theoretical frameworks. Information processing perspectives, Vygotsky's theory of cognitive development, and imagery models have all been utilized in past research on self-talk in sport. Recently, however, Hardy (2006) has suggested that: "Self-efficacy theory has particular relevance to the study of self-talk, as it seems to have application to both its instructional and motivational aspects and allows investigators to conceptualize self-statements as an independent, mediating, or dependent variable" (p. 95). The present investigation will utilize efficacy theory to guide the operational definition of self-talk. Using verbal persuasion as an umbrella for the definition of self-talk, the following definition is proposed, *self-affirming or disaffirming persuasory feedback overtly or tacitly stated to oneself*.

Utilizing the framework of efficacy theory, it is reasonable to believe that positive verbal persuasion may contribute to the creation and maintenance of a mastery-oriented motivational climate. For example, a coach who emphasizes a mastery-oriented motivational climate (as opposed to a performance motivational climate) believes each player is important to the team, does not get angry about player mistakes, remains positive and helpful, focuses on trying one's best, and expects each game to be played better than the last (Duda, 2001). Hence, a coach who emphasizes a mastery motivational climate would be expected to positively influence player and team efficacy perceptions via verbal persuasion. Only recently have sport scientists started to examine relationships between collective efficacy and motivational climate (Heuze, Sarrazin, Masiero, Raimbault, & Thomas, 2006; Magyar, Feltz, & Simpson, 2004). Using a multilevel analysis, Magyar and colleagues found a mastery motivational climate significantly predicted collective efficacy on the group level for rowing teams. Heuze et al. extended Magyar et al.'s findings by collecting data at two points in a competitive season. Using canonical analyses, they found that near the beginning of the season, perceptions of a low performance-oriented

motivational climate and a high mastery-oriented motivational climate were associated with low levels of task cohesion. Conversely, near the endpoint of the season, a low performance-oriented motivational climate and a high mastery-oriented motivational climate was associated with high levels of task cohesion and collective efficacy.

Cohesion has been characterized as the most significant small-group variable for intact groups (Golembiewski, 1962), and specifically athletic teams (Paskevich, Estabrooks, Brawley, & Carron, 2001). Carron, Brawley, and Widmeyer (1998) defined team cohesion as "a dynamic process which is reflected in the tendency for a group to stick together and remain united in the pursuit of its goals and objectives and/or for the satisfaction of member affective needs" (p. 213). According to Bandura (1997), perceptions of group cohesion reflect a sense of collective efficacy and shared goals. Consistent with this tenet, several researchers have found a positive link between cohesion and collective efficacy in various sport teams (Kozub & McDonnell, 2000; Paskevich, Brawley, Dorsch, & Widmeyer, 1999; Paskevich et al., 2001; Spink, 1990). Although conceptually, cohesion and CE seem to augment one another (i.e., high CE may lead to high cohesion and likewise), its relationship to CE deserves further scrutiny in elite sport teams. Cohesion has been conceptually dictotomized into individual and group variables, which have been each further divided into task and social aspects. Hence, four subscales representing group task and social aspects (Group Integration-Task (GI-T) and Group Integration-Social (GI-S)) (as well as individual attraction aspects for task (ATG-T) and social (ATG-S)) were created. A recent correlate of task cohesion and efficacy has been a task-oriented motivational climate (Heuze et al., 2006; Magyar et al., 2004). Carron et al. (1998) believe that social cohesion is an inevitable outcome of athletes having common goals, and training and competing together (task cohesion) and is therefore expected to correlate positively with self and collective efficacy levels.

This study was formulated in order to advance the understanding of efficacy processes in sport by extending previous researchers' findings through the examination of theoretically linked correlates of self-efficacy and collective efficacy. Based on the findings of previous researchers and Bandura's (1997) theoretical propositions, the following hypotheses were formulated in regards to self and collective efficacy. Proposed positive correlates of self-efficacy were collective efficacy, positive self-talk, ATG-T, GI-T and a task-oriented motivational climate. Posited negative associations of self-efficacy include negative self-talk and an ego-oriented motivational climate. For collective efficacy, it was hypothesized that positive correlates would include: self-efficacy, positive self-talk, ATG-T, GI-T and a task-oriented motivational climate, while negative correlates were posited to be a performance-oriented motivational climate and negative self-talk.

Method

Participants

A total of 139 male soccer players representing nine semi-professional teams participated in the present study. The age of the players ranged from 15 to 35 years with a mean age of 23.1 years (*SD* = 4.4 yrs). The number of minutes played per game ranged from 0 to 90 with a mean of 80.6 (*SD* = 22.3), and the number of seasons of semi-professional soccer ranged from one to 19 with a mean of 4.5 (*SD* = 3.8). Players had an average of 5.1 years of experience playing in this semi-professional league (*SD* = 4.0) ranging from no experience (i.e., first season) to 17 years of semi-professional soccer experience.

Procedure

Following institutional human ethics approval, coaches were contacted for the nine teams by telephone and asked for their teams' voluntary participation. After receiving coaches' consent, players were invited to participate in the investigation at pre-arranged meetings occurring either before or after a training session in the concluding two weeks of the season. Prior to the administration of the questionnaires, participants were read a set of standardized instructions and a description of the investigation and were given an opportunity to decline participation. No players declined to participate. Following the provision of informed consent, the players were given a packet of questionnaires to complete on perceptions of self-efficacy, collective efficacy, motivational climate, self-talk and cohesion. These data were acquired late in the season to ensure that players had a substantial basis for their questionnaire responses.

Instruments

***Perceived Motivational Climate in Sport Questionnaire-2* (*PMCSQ-2,* Newton, Duda, & Yin, 2000).** The PMCSQ-2 is a modified version of the original PMCSQ developed to assess motivational climate in a hierarchical manner. This questionnaire consists of 33-items dichotomized into two subscales (Mastery Climate and Performance Climate). PMCSQ-2 items assess player perceptions of what it is usually like to play on his/her team. Sample questions include, "On this team, the coach wants us to try new skills" (Mastery Climate) and "On this team, the coach makes it clear who he or she thinks are the best players" (Performance Climate). Players respond to items on a five-point scale with alternatives ranging from "strongly disagree" (1), to "strongly agree" (5). The reliability coefficients (Cronbach's alphas) for the instrument in the present study were .86 and .88 for performance and mastery climate, respectively. These values are similar to those observed in past research using the PMSCQ and the PMSCQ-2 (e.g., Halliburton & Weiss, 2002; Kavussanu & Roberts, 1996; Seifriz, Duda, & Chi, 1992) and are considered good values for reliability.

***Group Environment Questionnaire* (*GEQ*).** The GEQ is an 18-item instrument containing four subscales relative to individual and group aspects of social and task cohesion (Carron, Widmeyer, & Brawley, 1985). Players respond to questions by indicating their level of agreement from strongly disagree (1) to strongly agree (9). Several researchers have found the GEQ subscales to have acceptable content, factorial, concurrent, predictive, and construct validity (Brawley, Carron, & Widmeyer, 1987; Carron et al., 1985; Li & Harmer, 1996), while other researchers have found mixed results for the supporting factor structure in co-acting sport teams (Schutz, Eom, Smoll, & Smith, 1994; Sullivan, Short, & Cramer, 2002). The Cronbach's alpha for the subscales of the GEQ in the present study were: ATG-T, .68; ATG-S, .72; GI-T, .70; and GI-S, .69, respectively. These alpha values are similar to those observed in past research (Carron, Bray, & Eys, 2002; Heuze et al., 2006).

***Collective Efficacy and Self-Efficacy Inventories*.** Collective efficacy and self-efficacy were assessed using two separate 16-item, researcher-constructed inventories. The inventories were developed based on the recommendations of Bandura (1997, 2006) and the findings of previous researchers (Feltz & Lirgg, 1998, 2001; Kozub & McDonnell, 2000). Bandura (1997) has provided two distinct approaches to assess the collective efficacy of groups. The first approach "involves aggregating members' appraisals of their

personal capabilities for the particular functions they perform in the group" (p. 478), while the second approach involves summing the players' perceptions of their team's capabilities as a whole (Bandura, 1997). Researchers have found no statistical differences in the two methods used to assess collective efficacy and found both to validly assess collective efficacy (Short et al., 2002). In the present study, the second method of aggregating the players' perceptions of their team as a whole was utilized because of its extensive use in previous studies in the measurement of collective efficacy with interdependent sport teams (e.g., Kozub & McDonnell, 2000; Magyar et al., 2004; Myers, Feltz, & Short, 2004; Myers, Payment, & Feltz, 2004; Watson et al., 2001).

Content validity input was obtained from current and previous semi-professional soccer players and coaches in the construction of the efficacy inventories. Specifically, *Premier League* coaches and players were asked to name several tasks necessary for success in *Premier League* soccer in Western Australia. The responses were then compiled into a list and given to players and coaches who were asked if the 16 tasks accurately reflected skills necessary for success in semi-professional soccer. Minor amendments were made to the tasks and the final collective efficacy and self-efficacy inventories were created. A copy of the collective efficacy inventory can be found in Appendix A. Following the suggestions of Bandura (2006), the collective efficacy inventory asked each player to "indicate your confidence level that *your team* as a whole can complete these tasks on a scale from 0 (cannot do at all) to 10 (certain can do)". Similarly, the self-efficacy inventory asked players' confidence in "*your ability*" to complete these tasks. Sample items included, "My ability to maintain physical endurance necessary to compete" (self-efficacy) or "My team's ability to accurately distribute the ball" (collective efficacy). Each inventory was piloted with 121 university students to ensure no floor or ceilings effects were elicited and to ensure all questions were properly understood.

Self-Talk Inventory **(STI).** The STI was created for the purpose of this investigation on the basis of previous research on self-talk in sport (e.g., Thomas, Murphy, & Hardy, 1999) as well the framework of efficacy theory. Specifically, overt and tacit verbal persuasion were utilized as sources of efficacy information. The inventory consisted of nine questions assessing the frequency of positive and negative self-talk, whether the self-talk was before, during, or after a match, and whether the self-talk was about the team or the individual. Three additional questions were added to determine the degree to which each player attempted to control negative self-talk and how often positive self-talk was practiced, but were not analyzed in the study. Each question was rated on a nine-point bipolar scale with response alternatives ranging from “never” (1) to “very often” (9) on the frequency each player used positive and negative self-talk. Sample questions included, "How often do you talk positively about your team's performance before a match (example, 'We are going to perform great today')"? and "How often do you talk negatively to yourself about your performance during a match (example, 'I am performing horribly right now)"? Similar to the efficacy inventories, preceding any data collection, the STI was pilot tested with 121 university students to ensure no floor or ceiling effects were found and to ensure all item were properly understood. A copy of the STI can be found in Appendix B.

Statistical Analyses

The analyses of the data in the present investigation were performed in three stages. Firstly, in order to determine the dimensionality and possible subscales of the researcher-

constructed inventories, factor analyses on the 10-item STI and the 16-item self-efficacy and collective efficacy inventories were conducted. Next, descriptive statistics were computed for all study variables and finally, bivariate and multivariate canonical correlations were evaluated.

Results

Factor Analyses

A principal axis factor analysis with direct oblim rotation was conducted on the Self-Talk Inventory (STI) to determine possible subscales. From the analysis, three factors were identified: Positive Self-Talk Self (PST-S, 3-items); Positive Self-Talk Team (PST-T, 3-items); and Negative Self-Talk (NST, 4-items) (see Table 1).

Table 1. Rotated Pattern Matrix From Exploratory Factory Analysis For Self-Talk Inventory (STI).

Factor	Pattern Loadings		
	1	2	3
1. Positive Self-Talk about Team			
7. Talk positively to yourself about your team's performance following a great play	**.718**	-.088	-.035
1. Talk positively to yourself about your team's performance before a match	**.712**	-.091	.029
3. Talk positively to yourself about your team's performance after a match	**.667**	-.022	-.041
2. Negative Self-Talk			
10. Talk negatively to yourself about your performance following an error	-.054	**.596**	.014
9.Talk negatively to yourself about your team's performance following an error	-.034	**.533**	-.207
5. Talk negatively to yourself about your performance during a match	-.038	**.514**	.174
2.Talk negatively to yourself about your team's performance during a match	-.053	**.502**	-.108
3. Positive Self-Talk about Self			
8. Talk positively to yourself about your performance following a great play	-.136	-.028	**-.772**
6. Talk positively to yourself about your performance after a match	.219	-.051	**-.613**
4. Talk positively to yourself about your performance before a match	.127	-.039	**-.594**

Following the factor analysis of STI data, internal consistency analyses were conducted on the resulting subscales. The PST-S, PST-T and NST subscales exhibited alpha coefficients of, respectively, .74; .61; and .61. Nunnally (1967) recommended a Cronbach's alpha equal to or greater than .60 as the minimum value sufficient for exploratory research purposes. The coefficient alpha is dependent upon the number of items and the size of item intercorrelations (Pedhazur & Schmelkin, 1991). Furthermore, given the same average inter-item correlation as observed between PST-T and NST it is estimated that increasing the number of relevant items on the PST-T and NST to six, instead of four and five, the alpha levels would have been raised to .75 in each instance (cf. Pedhazur & Schmelkin, 1991). It is therefore believed the alpha levels were sufficient to justify use of the questionnaire in this exploratory research.

A principal axis factor analysis with direct oblimin rotation was conducted on the researcher-constructed self and collective efficacy inventories to validly determine the dimensionality of each. By systematically eliminating variables which cross-loaded across dimensions as well as variables that were theoretically ambiguous, two coherent and interpretable factors from both inventories were evinced. From the factor analysis of the collective efficacy inventory, the factors included: Skills collective efficacy (7-items) and Determination Collective Efficacy (3-items) (see Table 2).

Table 2. Rotated Pattern Matrix From Exploratory Factory Analysis For Collective Efficacy Inventory.

Factor	Pattern Loadings	
	1	**2**
1. Skills Collective Efficacy		
4. My team's ability to control the ball under pressure	**.813**	-.058
5. My team's ability to read the game and make sound tactical choices	**.782**	-.082
2. My team's ability to dribble past opponents effectively	**.745**	.036
1. My team's ability to cross balls accurately	**.721**	.019
3. My team's ability to accurately shoot under pressure	**.714**	-.042
11. My team's ability to make split second decisions	**.668**	.139
13. My team's ability to make runs into space	**.625**	.168
2. Determination Collective Efficacy		
16. My team's ability to make strong clean tackles	-.093	**.938**
15. My team's ability to defend when outnumbered	.146	**.677**
6. My team's ability to win balls in the air	.105	**.525**

The alpha coefficients of Skills Collective Efficacy and Determination Collective Efficacy and were .89 and .79, respectively. The operational definitions of each form of collective efficacy were then constructed from the results of the factor analysis. Determination Collective Efficacy was operationally defined as *the specific belief that one's team possesses the necessary mental and physical tenacity required to produce given levels of attainments*. Similarly, Skills Collective Efficacy was operationally defined as *the specific belief that one's team possesses the necessary physical and mental skills required to produce given levels of attainments*.

Similarly, the factor analysis of the self-efficacy inventory evinced two coherent factors: Skills Self-Efficacy (3-items) and Determination Self-Efficacy (6-items) (Table 3). Skills and Determination Self-Efficacy both exhibited alpha coefficients of .77.

Table 3. Rotated Pattern Matrix From Exploratory Factory Analysis For Self- Efficacy Inventory.

Factor	Pattern Loadings	
	1	2
1. Skills Self-Efficacy		
2. My ability to dribble past opponents effectively	-.186	**.774**
3. My ability to accurately shoot under pressure	.121	**.729**
1. My ability to cross balls accurately	.151	**.702**
2. Determination Self-Efficacy		
15. My ability to defend when outnumbered	**.852**	-.070
16. My ability to make strong clean tackles	**.759**	-.087
6. My ability to win balls in the air	**.574**	-.197
11. My ability to make split second decisions	**.496**	.125
10. My ability to maintain physical endurance necessary for success	**.478**	.172
9. My ability to rebound from a difficult loss	**.470**	.142

Skills Self-Efficacy was defined as *the specific belief that one possesses the necessary physical and mental skills required to produce given levels of attainments*. Determination Self-Efficacy was operationally defined as *the specific belief that one possesses the necessary mental and physical tenacity required to produce given levels of attainments*.

Unit of Analysis

The prevailing zeitgeist in psychology research (and especially collective efficacy) is that a hierarchical linear model is essential to simultaneously evaluate both individual (player) and group (team) level variables (Heuze et al., 2006; Moritz & Watson, 1998; Myers & Feltz, 2007) because of the inherent hierarchical structure of teams (i.e., players nested within teams) (Raundenbush & Bryk, 2002). Although desirable, this analytic approach it is only statistically justifiable when the number of teams involved in the research exceeds 30—a matter presenting a substantial barrier to most group level research in sport psychology and especially research done with elite teams. In the present study, due to the small sample size on the team level (i.e., $N = 9$), the unit of analysis was the individual or player level. Hierarchical linear models are an advantageous statistical method that should be used in future research analyzing group level variables like collective efficacy and motivational climate when appropriate.

Descriptive Statistics

The descriptive statistics for the continuous variables are presented in Table 4. Some findings of note included moderately high levels of Determination Collective Efficacy (M = 7.22, SD = 1.53) and moderate levels of Skills Collective Efficacy (M = 6.55 SD = 1.24), Determination Self-Efficacy (M = 5.26, SD = 1.11) and Skills Self-Efficacy (M = 6.48, SD = 1.07). For the measures of Self-Talk, this sample reported moderately high levels of Positive Self-Talk for both Team (M = 6.55, SD = 1.24) and Self (M = 6.04, SD = 1.36), along with moderate levels of Negative Self-Talk (M = 4.76, SD = 1.33).

Table 4. Alpha Coefficients, Means, Standard Deviations, Ranges, Skewness, and Kurtosis for the Study Variables (N = 136).

	Alpha	Mean	SD	Range	Skewness	Kurtosis
Efficacy Variables						
Determination Collective Efficacy	.79	7.22	1.53	3.67- 10.00	-.41	-.54
Skills Collective Efficacy	.89	6.55	1.24	2.88 - 9.00	-.38	-.16
Determination Self-Efficacy	.77	5.26	1.11	1.44 - 7.78	-.53	.95
Skills Self-Efficacy	.77	6.48	1.07	4.28 - 8.61	-.05	-.91
Person Variables						
Positive Self-Talk Team	.61	6.55	1.24	3.00 – 9.00	-.23	-.31
Positive Self-Talk Self	.74	6.04	1.36	3.00 – 9.00	.02	-.28
Negative Self-Talk	.61	4.76	1.33	1.75 - 8.50	.47	.01
ATG-T	.68	6.55	1.83	1.25 - 9.00	-.69	-.02
ATG-S	.72	6.43	1.52	2.20 - 9.00	-.27	-.41
GI-T	.70	6.12	1.41	2.20 - 9.00	-.33	-.11
GI-S	.69	5.89	1.67	1.75 - 9.00	-.34	-.54
Task Orientation	.88	3.87	.53	2.47 - 5.00	-.31	-.09
Ego Orientation	.86	2.75	.70	1.38 - 4.50	.19	-.62

Note. *ATG-T = Attractions to Group-Task; ATG-S = Attractions to Group-Social; GI-T = Group Integration-Task; GI-S = Group Integration-Social.*

Correlations

Bivariate correlations between the Efficacy variables and Person variables are presented in Table 5.

Table 5. Bivariate and Partial Correlations (Controlling for the other Efficacy Variables) Between the Efficacy Variables and Person Variables.

	Determination Collective Efficacy		Skills Collective Efficacy		Determination Self-Efficacy		Skills Self-Efficacy	
	r	*Partial r*	*r*	*Partial r*	*r*	*Partial r*	*r*	*Partial r*
Person Variables								
Positive Self-Talk Team	.30***	.11	.20*	.01	.03	-.04	.40***	.31***
Positive Self-Talk	.07	-.03	.03	-.06	.15	.14	.27**	.26**
Negative Self-Talk	.02	-.04	.09	.12	-.07	-.09	-.03	-.04
ATG-T	.26**	-.04	.43***	.35***	.10	.01	.17*	.03
ATG-S	.18*	.01	.29**	.24**	-.03	-.09	.06	-.04
GI-T	.34***	.18*	.31***	.13	.07	.01	.15	-.02
GI-S	.31***	.17	.29**	.12	.12	.06	.14	-.03
Task Orientation	.23**	-.03	.35***	.26**	.08	.01	.20*	.09
Ego Orientation	-.17	.07	-.28**	-.21*	-.11	-.04	-.21*	-.14

Note. *ATG-T = Attractions to Group-Task; ATG-S = Attractions to Group-Social; GI-T = Group Integration-Task; GI-S = Group Integration-Social.* $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

Person variables are those on the individual or player level. The related multiple partial correlations were also calculated to examine the unique association between each Efficacy variable (controlling for the other Efficacy variables) and the various Person variables. Results indicated that Determination Collective Efficacy had a weak, but significant unique association with the cohesion variable GI-T. Stronger and statistically significant unique positive associations were found between Skills Collective Efficacy and ATG-T, ATG-S, and Task Orientation, and a weak negative association with Ego Orientation. Finally, Skills Self-Efficacy had moderately weak but statistically significant unique associations with the variables of Positive Self-Talk Team and Positive Self-Talk Self. Correlations among the Person variables had an absolute mean value of .25 and ranged from the -.37 correlation between Task Orientation and Ego Orientation to the .67 correlation between GI-T and GI-S. The Efficacy variables had an absolute mean value correlation of .33 and ranged from the .13 correlation between Skills Self-Efficacy and Determination Self-Efficacy to the .65 correlation between Determination Collective Efficacy and Skills Collective Efficacy. This pattern of intercorrelations among predictor sets did not present any potential multicollinearity concerns for canonical analysis.

Canonical Analysis

A canonical correlation analysis of Efficacy variables and the Person variables was also performed to determine significant canonical functions. Two significant canonical functions were observed. Specifically, the dimension reduction analysis produced a significant Wilks Lambda = .51, F (36,462) = 2.51, $p < .001$ with all four canonical correlations included, and a Wilks Lambda = .71, F (24, 360) = 1.89, $p < .008$, when the

first canonical correlation was removed. Subsequent steps in the dimension reduction analysis were not significant and, hence, only the first two canonical functions were considered.

Table 6 presents the correlations, standardized canonical coefficients, percent of variance and redundancies between the two sets of variables and their corresponding canonical variates.

Table 6. Correlations, Standardized Canonical Coefficients, Canonical Correlations, Percent of Variance, and Redundancies Between The Efficacy Variables and Person Variables and their Corresponding Canonical Variates.

	First Canonical Variate			Second Canonical Variate		
	Correlation	Structure Correlation	Coefficient	Correlation	Structure Correlation	Coefficient
Efficacy Variables						
Determination Collective Efficacy	.81	**.43**	.23	.00	.00	-.19
Skills Collective Efficacy	.87	**.46**	.55	.48	.20	.95
Determination Self-Efficacy	.25	.13	.05	-.25	-.10	-.32
Skills Self-Efficacy	.74	**.39**	.43	-.59	-.24	-.79
% of Variance		54.29			13.16	Tot.= 67.45
% of Redundancy		15.08			2.28	Tot.= 17.36
Person Variables						
Positive Self-Talk Team	.67	**.35**	.54	-.45	-.19	-.44
Positive Self-Talk Self	.29	.15	-.04	-.58	-.24	-.47
Negative Self-Talk	.08	.04	.01	.31	.13	.41
ATG-T	.71	**.37**	.37	.46	.19	.39
ATG-S	.43	.23	-.19	.48	.20	.43
GI-T	.61	**.32**	.10	.22	.09	-.04
GI-S	.57	**.30**	.33	.17	.07	-.04
Task Orientation	.63	**.33**	.13	.26	.11	.21
Ego Orientation	-.55	-.29	-.25	-.08	-.03	.26
% of Variance		29.83			15.57	Tot.= 45.40
% of Redundancy		8.29			2.69	Tot.= 10.98
Canonical Correlation		.53			.42	

Note. Canonical structure correlations greater than .30 are presented in boldface to indicate that they were interpreted as significantly contributing to the multivariate relationships.

The total percent of variance and redundancies for each set of variables, and canonical correlation is also shown. The canonical correlation for the first canonical variate was .53, representing approximately 28% overlapping variance for the first pair of canonical variates, and the canonical correlation for the second canonical variate was .42, representing approximately 18% overlapping variance for the second pair of canonical variates. The Efficacy variates accounted for 67% of the variance in the Efficacy variables, and a total variance redundancy of about 17% with the Person variables. The Person

variates accounted for a total of about 45% of the variance in the Person variables, and a total variance redundancy of about 11% with the Efficacy variables.

The nature of the canonical relationships can be assessed by examining the canonical structure correlations of the canonical variates (Hair, Anderson, Tatham, & Black, 1998). Using a cutoff correlation of .30, only one canonical variate exhibited meaningful relationships. Specifically, the first Efficacy canonical variate was related to Skills Collective Efficacy (structure correlation = .46), Determination Collective Efficacy (structure correlation = .43), and Skills Self-Efficacy (structure correlation = .39), and the first Person canonical variate was related to ATG-T (structure correlation = .37), Positive Self-Talk Team (structure correlation = .35), Task Orientation (structure correlation = .33), GI-T (structure correlation = .32), and GI-S (structure correlation = .30). This pattern of associations between the Efficacy and Person variables indicates that high levels of Skills Collective Efficacy, Determination Collective Efficacy, and Skills Self-Efficacy were associated with high levels of the person variables of ATG-T, Positive Self-Talk Team, Task Orientation, GI-T, and GI-S.

Finally, we examined the stability of our canonical relationships via a validation process. The validation of the canonical analysis involved a sensitivity analysis on the two canonical variates in which their respective canonical loadings were examined for stability when individual variables when deleted (Hair et al., 1998). Specifically, three additional canonical correlation analyses were run separately for the two canonical variates and the variables of GI-T, Negative Self-Talk, or Task Orientation individually omitted from an analysis (Table 7).

Table 7. Sensitivity analysis of the canonical correlation results to removal of a variable.

		Results After Deletion				Results After Deletion		
	First Variate	**X1**	**X2**	**X3**	**Second Variate**	**X1**	**X2**	**X3**
Efficacy Variables								
Determination Collective Efficacy	.43	.42	.43	.43	.00	.00	-.03	.02
Physical-Skills Collective Efficacy	.46	.46	.46	.45	.20	.20	.19	.21
Determination Self-Efficacy	.13	.14	.14	.13	-.10	-.11	-.05	-.11
Physical-Skills Self-Efficacy	.39	.39	.39	.40	-.24	-.25	-.22	-.23
% of Variance	54.29	50.34	50.61	50.77	13.16	15.99	15.12	16.05
% of Redundancy	15.08	13.93	14.06	13.98	2.28	2.76	2.25	2.71
Person Variables								
Positive Self-Talk Team	.35	.35	.36	.36	-.19	-.19	-.20	-.17
Positive Self-Talk Self	.15	.16	.16	.16	-.24	-.25	-.22	-.24
Negative Self-Talk	.04	.04	Om.	.04	.13	.13	Om.	.13
ATG-T	.37	.38	.37	.37	.19	.19	.21	.20
ATG-S	.23	.23	.23	.22	.20	.20	.19	.21
GI-T	.32	Om.	.32	.32	.09	Om.	.08	.11
GI-S	.30	.30	.30	.30	.07	.07	.07	.09
Task Orientation	.33	.34	.33	Om.	.11	.10	.12	Om.
Ego Orientation	-.29	-.29	-.29	-.29	-.03	-.03	-.05	-.03
% of Variance	29.83	28.48	32.72	27.85	15.57	14.74	16.36	15.35
% of Redundancy	8.29	7.88	9.09	7.67	2.69	2.55	2.44	2.59
Canonical Correlation	.53	.53	.53	.52	.42	.42	.39	.41

Om. *: Omitted*

As can be seen, the canonical structure loadings and the overall canonical correlations were relatively stable with the omission of a single variable. We conclude that the canonical relationship found in the current study is relatively robust.

Discussion

The purpose of the present study was to identify significant multivariate correlates of self and collective efficacy among semi-professional soccer players. Efficacy was broadly divided into two categories representing a) physical and mental skills and b) perseverance and tenacity dimensions of both personal and collective forms of efficacy. Following content analysis, four dimensions were subsequently named: Skills and Determination Self-Efficacy and Skills and Determination

Collective Efficacy

From the descriptive statistics, it was evident that the sample included elite athletes with elevated levels of personal and collective efficacy. Recent researchers have found high levels of collective efficacy in interactive and elite basketball and handball players (Heuze, Raimbault et al., 2006; Heuze, Sarrazin et al., 2006). It seems that elevated collective efficacy levels in elite samples should not be seen as possible flaws (i.e., ceiling effects) in the psychometric instruments utilized to measure collective efficacy, but rather an indication that the players are highly efficacious as would be expected at an elite level of play.

The results from the partial correlations indicated that Determination Collective Efficacy was positively correlated with the GI-T subscale only. Skills Collective Efficacy was positively correlated with ATG-T, ATG-S and a mastery-oriented motivational climate, and negatively related to a performance-oriented motivational climate. Interestingly, only Skills Self-Efficacy was found to be positively related to both forms of positive self-talk. Finally, no significant bivariate correlates were found in regards to Determination Self-Efficacy and any of the

Person Variables

The most unique finding from the partial correlations was in regards to players' use of self-talk about themselves and the team and its positive relationship with Skills Self-Efficacy. Plainly stated, it seems that teams who frequently use positive self-talk tend to have elevated confidence in their personal ability to persevere and remain determined both physically and mentally in competition. This is an interesting finding and certainly worthy of future research considering the dearth of empirical examinations into efficacy and self-talk in sport (Hardy, 2006).

Results from the multivariate correlations indicated that players who possessed elevated levels of Determination Collective Efficacy, Skills Collective Efficacy, as well as Skills Self-Efficacy used more positive self-talk about the team, possessed greater individual and group task cohesion (ATG-T, GI-T), group social cohesion (GI-S) and reported experiencing a mastery-oriented motivational climate. Although very close to the standard value acceptable for interpretation as meaningfully contributing to the multivariate relationships (i.e., .30), it is worth noting that the observed coefficient of -.29 indicates, as predicted, perceptions of an ego-oriented motivational climate were negatively related to Determination Collective Efficacy, Skills Collective Efficacy and Skills Self-Efficacy.

The findings in the present study were generally consistent with our hypotheses. We had predicted that players who possessed high levels of self and collective efficacy would also possess elevated levels of positive self-talk, elevated levels of ATG-T, GI-T and a mastery-oriented motivational climate, as well as low levels of negative self-talk and an ego-oriented motivational climate.

The multivariate associations among Determination Collective Efficacy, Skills Self and Collective Efficacy and team-based positive self-talk are important findings. Players should be consistently utilizing positive self-talk strategies as a means of efficacy enhancement, similar to what numerous coaches (Weinberg, 1985; Weinberg, Grove, & Jackson, 1992; Weinberg & Jackson, 1990) and athletes have already reported doing. These results add to the paucity of research evaluating self-talk and efficacy perceptions in sport, hence additional research is needed to extend and replicate the present findings in interactive sport teams. Future researchers should evaluate self-talk, efficacy and motivational climate utilizing a HLM (i.e., a hierarchical linear model approach) across a competitive season to determine if changes in self-talk, self and collective efficacy are related to a mastery or performance-oriented motivational climate. This will allow researchers to determine the extent of influence and cross-level effects of each variable over time.

It is interesting to note that negative self-talk levels had no relationship to player's individual perceptions of Determination and Skills Collective Efficacy or Skills Self-Efficacy (and were slightly in the positive direction). Researchers have reported divergent findings in regards to the motivational effect of positive versus negative self-talk. Although a dearth of research exists in regards to self-talk and efficacy beliefs, some researchers have found that positive self-talk increases motivation and performance (e.g., Landin & Hebert, 1999; Theodorakis, Weinberg, Natsis, Douma, & Kazakas, 2000; Van Raalte, Cornelius, Hatten, & Brewer, 2000), while others have found evidence to suggest that negative self-talk may motivate some athletes (Hardy et al., 2001; Van Raalte et al., 1994). Future study on efficacy and negative self-talk would be warranted to determine its affect, if any, on efficacy perceptions.

Hardy (2006) has called upon future self-talk researchers to utilize efficacy theory as a logical framework to explain self-talk findings (i.e., verbal persuasion as a source of efficacy information. A future avenue of study would involve various levels of play (i.e., beginner, intermediate and elite) to determine if participation level may moderate the relationships among self-talk and self and collective efficacy as posited by Bandura (1997).

The canonical analysis found elevated levels of Determination Collective Efficacy, Skills Collective Efficacy, and Skills Self-Efficacy to be positively associated with ATG-T, GI-T and GI-S, with GI-S having the weakest relationship. Carron et al. (1985) described the task aspects "as a general orientation toward achieving the group's goals and objectives" (p. 248). Essentially, players who perceived their teams as having achieved their goals and objectives also had elevated levels of both forms of collective efficacy and Skills Self-Efficacy. These findings are in line with those of previous researchers examining cohesion and collective efficacy who found that the task subscales of the GEQ to be closely related to collective efficacy (Kozub & McDonnell, 2000; Paskevich, Brawley, Dorsch, & Widmeyer, 1999; Spink, 1990). More recently, Heuze, Raimbault et al. (2006) researched cohesion, collective efficacy and performance of professional basketball players. Heuze and colleagues found that GI-T was strongly related to collective efficacy and subsequent performance. One reason why group social cohesion had the weakest association of all the cohesion variables may be that groups with high levels of

task cohesion also develop social cohesion through interaction and communication with team members and therefore, social cohesion may be a valuable byproduct of high levels of task cohesion (Carron et al., 1998). Future researchers should use HLM to determine changes in collective and self-efficacy based on task cohesion longitudinally with a minimum of 30 teams to ensure the stability of the hierarchical model at the group level (Bryk & Raudenbush, 1992). This type of research design would facilitate a greater understanding of potential changes in task cohesion and how they relate to changes in collective efficacy while appropriately evaluating player and group level data simultaneously.

Players with high levels of Determination Collective Efficacy, Skills Collective Efficacy and Skills Self-Efficacy believed their motivational climate was filled with more task (mastery) features and less ego (performance) characteristics. These findings are in line with the findings of past researchers on collective efficacy and motivational climate in sport (Heuze et al., 2006; Magyar et al., 2004). Heuze, Raimbault et al. found that a high mastery-oriented and low performance-oriented motivational climate were positively related to collective efficacy. These findings are analogous to the bivariate correlational findings of Magyar et al. (2004) who reported that collective efficacy was positively related to a mastery-oriented motivational climate and negatively associated with a performance-oriented motivational climate. Similarly, the findings of the present study are consistent with those of Magyar and Feltz (2003) who found that athletes who perceived their coach to be emphasizing a mastery-oriented motivational climate had more confidence in their own abilities (i.e., high self-efficacy) to play volleyball. Taken as a whole, it seems that if coaches and players are interested in augmenting levels of efficacy, they need to focus on personal betterment and treating starters and non-starters equal (i.e., more mastery-oriented) (e..g., Pensgaard & Roberts, 2002; Reinboth & Duda, 2006), as well as encourage an increased use of positive self-talk about the team's abilities.

Based on the growing evidence on efficacy and motivational climate, coaches need to be cognizant of the potential impact they may have upon their players' and teams' level of efficacy. One can logically conclude from current research that coaches who emphasize a mastery-oriented motivational climate are more likely to have teams that are collectively and personally efficacious, which other researchers have found are associated with increased performance levels (Feltz & Lirgg, 1998, 2001; Hodges & Carron, 1992; Lichacz & Partington, 1996; Myers & Feltz, 2007; Myers et al., 2004). Consistent with the recommendations of previous researchers, if coaches are interested in increasing performance through efficacy building, then mastery criteria should be consistently emphasized in training sessions and in games (Magyar & Feltz, 2003; Magyar et al., 2004; Pensgaard & Roberts, 2002; Reinboth & Duda, 2006).

Limitations and Conclusions

The findings of the present study were limited by the honesty of the participants and the validity and reliability of the psychometric inventories utilized. A statistical drawback of the present study was the fact that all analyses were conducted on the individual level because of the small number of teams (N = 9). Hence, future researchers should seek to use a larger number of teams with upcoming efficacy research in sport and simultaneously analyze individual and group level data with a multilevel analysis.

In conclusion, it seems that if teams are interested in creating elevated efficacy levels, then individual efficacy enhancement through multiple sources (e.g., team based self-talk, emphasizing mastery criteria, and task cohesion) may prove beneficial to the

team. The researchers make an important contribution to a more in-depth understanding of self-efficacy and collective efficacy in sport through the multivariate examination of theoretically linked variables in elite, interdependent players.

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Appendix A

Collective Efficacy Inventory

***Instructions*:** Listed below are 16 important game abilities for success in Premier League Soccer in Western Australia. Please indicate your confidence level that **your team as a whole can complete** these tasks on a scale from 0 (cannot do at all) to 10 (certain can do).
Circle the appropriate number to the right of the task.

My team's ability to. . .	Cannot do at all				Moderately certain can do						Certain can do
1. Cross balls accurately	0	1	2	3	4	5	6	7	8	9	10
2. Dribble past opponents effectively	0	1	2	3	4	5	6	7	8	9	10
3. Accurately shoot under pressure	0	1	2	3	4	5	6	7	8	9	10
4. Control the ball under pressure	0	1	2	3	4	5	6	7	8	9	10
5. Read the game and make sound tactical choices	0	1	2	3	4	5	6	7	8	9	10
6. Win balls in the air	0	1	2	3	4	5	6	7	8	9	10
7. Quickly transition from offence to defense and defense to offence	0	1	2	3	4	5	6	7	8	9	10
8. Persevere in the face of failure	0	1	2	3	4	5	6	7	8	9	10
9. Rebound from a difficult loss	0	1	2	3	4	5	6	7	8	9	10
10. Maintain physical endurance necessary to compete	0	1	2	3	4	5	6	7	8	9	10
11. Make split-second decisions	0	1	2	3	4	5	6	7	8	9	10
12. Communicate with team members	0	1	2	3	4	5	6	7	8	9	10
13. Make runs into space	0	1	2	3	4	5	6	7	8	9	10
14. Accurately distribute the ball	0	1	2	3	4	5	6	7	8	9	10
15. Defend when outnumbered	0	1	2	3	4	5	6	7	8	9	10
16. Make strong clean tackles	0	1	2	3	4	5	6	7	8	9	10

Appendix B

Self-Talk Inventory (STI)

Self-talk is what an athlete says to oneself, before, during, and after competition. Some people refer to it as, 'internal dialogue'. Please answer the following questions honestly about how frequently you use self-talk before, during, and after competition.

How often do you. . . ***(each question was followed by a 9-point Likert scale ranging from 1 (never) to 9 (very often).***

1.) Talk **positively** to yourself about *your team's performance* **before** a match
Example "We are going to perform great today"

2.) Talk **negatively** to yourself about *your team's performance* **during** a match
Example "We are getting killed on defense now"

3.) Talk **positively** to yourself about *your team's performance* **after** a match
Example "We beat that team all around today"

4.) Talk **positively** to yourself about *your performance* **before** a match
Example "I will be unstoppable today"!

5.) Talk **negatively** to yourself about *your performance* **during** a match
Example "I am performing horribly right now"

6.) Talk **positively** to yourself about *your performance* **after** a match
Example "I played absolutely great today"

7.) Talk **positively** to yourself about *your team's performance* following a great play
Example "Our defense is unbelievable today"

8.) Talk **positively** to yourself about *your performance* following a great play
Example "I am a great goal scorer- no one can stop me"!

9.) Talk **negatively** to yourself about *your team's performance* following an error
Example "Come on- we can't even make a simple play happen!"

10.) Talk **negatively** to yourself about *your performance* following an error
Example “I am the worst- I can't even score from 5 yards out"

To what degree do you. . .

11.) Attempt to control negative thought

12.) Allow the negative thoughts to affect your performance

13.) Practice positive self-talk during games