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Research article

The relationship between imagery type and collective efficacy in elite and non elite athletes

David A. Shearer [1]✉, Rob Thomson [2], Stephen D. Mellalieu [1] and Catherine R. Shearer [3]
[1] Department of Sports Science, Swansea University, UK, [2] Department of Psychology, University of East London, UK,
[3] Department of Sports Science, Sports Council for Wales, UK

Abstract
This study investigated the relationship between imagery function and individual perceptions of collective efficacy as a function of skill level. Elite (n = 70) and non elite (n = 71) athletes from a number of interactive team sports completed the Sport Imagery Questionnaire (SIQ) and the Collective Efficacy Inventory (CEI). Multiple hierarchical regression analysis was then used to examine which SIQ sub-scales predicted individual perceptions of collective efficacy. For the elite sample, Motivational General-Mastery (MG-M) imagery accounted for approximately 17% of the variance in collective efficacy scores. No significant predictions were observed in the non elite sample. The findings suggest MG-M imagery as a potential technique to improve levels of collective efficacy although competitive level may moderate the effectiveness of such interventions.

Key words: Mental rehearsal, mental skills, team confidence, self efficacy, group dynamics.

Introduction

Collective efficacy has been described as an emergent group attribute composed of individual perceptions (Feltz and Lirgg, 1998). It represents the group equivalent of self-efficacy and is defined 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" (Bandura, 1997; p. 477). Consequently, it is an important component for team sports because it can influence a team's collective effort, their persistence in tough situations or defeat, and is a characteristic often observed in successful teams (Bandura, 1997). Accordingly, sport psychology research has consistently demonstrated that collective efficacy has positive effects on sport performance (e.g., Feltz and Lirgg, 1998; Greenlees et al., 1999; Hodges and Carron, 1992; Watson et al., 2001). Despite this support, there has been a lack of research investigating the potential interventions that might increase collective efficacy and influence subsequent team performance. However, before developing specific interventions, research should first explore the correlates of collective efficacy and this forms part of the rationale for conducting this study. For individual athletes, applied sport psychologists often recommend mental imagery as a technique to improve individual performance. Indeed, Bandura suggests that imagery helps to increase self-efficacy and consequently performance. Given the close association between self-efficacy and collective efficacy, and because collective efficacy perceptions are also manifested at an individual level, it is therefore probable that imagery will also increase collective efficacy.

In a review of over 200 scientific studies on imagery, the majority of investigations indicated that imagery improved sport performance (Martin et al., 1999). Since 1999, research has continued to support these findings and has highlighted that imagery can increase performance through a number of different mechanisms (e.g., Evans et al., 2004; Smith et al., 2001; Smith and Holmes, 2004). One of these mechanisms is via changes in self-efficacy and state sport confidence. Although similar, these two constructs differ slightly, such that self-efficacy beliefs relates to confidence for a specific situation or task, whereas state sport confidence reflects confidence levels at a specific moment in time. Bandura (1997) suggests that two sources of self-efficacy, vicarious experience and enactive mastery experience, can be attained through the use of imagery or '*cognitive rehearsal'*. Accordingly, research has indicated that imagery use by athletes is predictive of their levels of self-efficacy (e.g. Beauchamp et al., 2002) and can be used as an intervention to increase both self-efficacy perceptions (Jones et al., 2002) and state sport confidence (Callow et al., 2001). In recent years, imagery use by athletes has been broadly categorized into five functions defined during the development of the Sport Imagery Questionnaire (SIQ; Hall et al., 1998). These five functions were separated into cognitive and motivational categories (see Paivio, 1985). Specifically, cognitive imagery functions include: *Cognitive Specific* (CS), which involves imagery that focuses on improving a specific motor skill; and *Cognitive General* (CG), which entails imaging strategies/plays that might be used in specific competitions. The motivational imagery functions include: *Motivational Specific* (MS), which is used to image successfully achieving personal goals; *Motivational General-Mastery* (MG-M), which requires the individual to image being mentally tough and confident in all circumstances; and *Motivational General-Arousal* (MG-A), representing imagery that involves feelings of relaxation, stress, arousal, and anxiety associated with sport. Recently, Short et al. (2002) discussed the important conceptual distinction between imagery type/content and function. Specifically, they suggested that the items in the SIQ represented different types or content of imagery and that athletes could use these for a variety of different functions. To use imagery successfully, therefore, researchers recommend the type of imagery used should match the intended outcome. This suggests that to increase athlete's feelings of efficacy, an

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intervention which focuses on MG-M imagery content would be most appropriate (cf. Martin et al., 1999).

Studies exploring the link between imagery functions and sport confidence (e.g. Abma et al., 2002; Callow and Hardy, 2001), and imagery function and self-efficacy (Beauchamp et al., 2002; Mills et al., 2001), have indicated that athletes high in these constructs use specific types of imagery. For example, Callow and Hardy (2001) found that CG and MG-M imagery were related to state confidence in lower skilled county netballers, whereas MS imagery was related to state confidence in higher skilled county netball players. The authors suggested that the low-skilled sample used MG-M type imagery as a source of performance accomplishment information to enhance efficacy expectations, while the high-skilled sample used MS type imagery to image specific images associated with goal achievement. Similarly, Mills et al. (2001) observed that athletes high in self-efficacy in competition situations used more motivational types of imagery than athletes who had low self-efficacy.

Research evidence has indicated that perceptions of self-efficacy are important determinants of collective efficacy (Magyar et al., 2004; Riggs and Knight, 1994; Watson et al., 2001). For example, Magyar et al. (2004) discovered that self-efficacy perceptions significantly predicted individual perceptions of collective efficacy in rowers. Furthermore, Bandura (1982, p.143) suggests that "collective efficacy is rooted in self-efficacy". Therefore, if collective efficacy is in part determined by self-efficacy, both should logically share the same antecedents (Bandura, 1997). In particular, vicarious experience and mastery expectations provided through imagery may not only increase self-efficacy, but also as a consequence increase individual perceptions of collective efficacy. In short, simply imaging individual components of performance may increase individual perceptions of collective efficacy.

In addition to the indirect influence through self-efficacy, imagery may also directly influence perceptions of collective efficacy. Indeed, Callow (1999) has suggested that CG type imagery may influence a team's collective efficacy as it allows an individual to rehearse game elements such as team moves or plays. Similarly, as MG-M type imagery provides both enactive mastery and vicarious experiences (Bandura, 1997), this also would be likely to increase collective efficacy. To date, only Munroe-Chandler and Hall (2004) have tested the effects of an imagery intervention on collective efficacy. Specifically, the authors utilized a multiple baseline across groups design with a sample of female soccer players and found MG-M imagery increased collective efficacy in two of the three experimental groups. Although these initial findings provide preliminary support for the imagery use and collective efficacy relationship, Munroe-Chandler and Hall's research was limited to a young (10-12 years old), non elite sample. Given the existing findings regarding imagery use and self-efficacy (e.g. Abma et al., 2002) it is likely therefore that perceptions of collective efficacy and imagery type may differ as a function of skill level. Furthermore, because collective efficacy was examined at the group level, little is known about the relationship between imagery use and individual perceptions of collective efficacy. As imagery is largely an intervention used to manipulate individual cognitions, primary effects of the intervention occur at the individual level. Therefore, understanding which imagery functions are used by athletes with high collective efficacy beliefs, from different competitive levels, will help the development of suitable imagery interventions.

To develop a more accurate understanding of the relationship between collective efficacy and imagery types, the selection of appropriate measurement criteria is essential. In particular, recent research has heavily emphasized the use of a multilevel approach to examine group constructs such as collective efficacy (e.g. Watson et al., 2001). Multilevel approaches examine each individual's perception of their team's collective efficacy and also the aggregated perceptions of the group as a whole. To match the definition of collective efficacy as a "shared belief", perceptual consensus should exist at a group level regarding the collective efficacy of that team (Feltz and Lirgg, 1998). While a multi-level analysis has a number of advantages over single level analysis for examining group construct (cf. Moritz and Watson, 1998). Carron et al. (1998) suggest that the appropriate level of analysis depends upon the research question being answered. Gully et al. (2002) also suggest that the level of theory being considered should dictate the measurement and analysis. Indeed, recent research on collective efficacy (Heuze et al., 2006) and cohesion (Hardy et al., 2003) has followed this philosophy. In our study, as imagery is an individual cognitive process, we therefore chose to examine its relationship with individual perceptions of collective efficacy, rather than those aggregated at a group level.

A further issue concerning the level of measurement of collective efficacy relates to the operationalisation of collective efficacy measures (c.f. Bandura, 1997). Currently, four possible operational definitions of collective efficacy have been suggested. The first method aggregates the self efficacy scores for each individual in the team/group. However, while collective efficacy may be an extension of self-efficacy, the two are not the same (Bandura, 1982; p143). The second method uses a group response to a single question to attain a consensus of collective efficacy beliefs. Although this method directly relates to collective efficacy perceptions, Bandura (1997, p.479) suggests that individual responses would be effected by social persuasion and conformity. Therefore, results might be biased towards the perceptions and opinions of stronger characters within the group. The third methods aggregates team/group members own perception of what they believe their team's collective efficacy is. For example, *"I believe my team is confident*". In contrast, the final method aggregates each individual's perceptions of the teams' perceptions of collective efficacy; for example "*my team believes we are confident*". Previous research indicates that both the third and fourth operational definitions are equally suited to the measurement of collective efficacy (Short et al., 2002). Consequently, these operations were used in the current study.

In summary, the current literature suggests that certain imagery functions predict self-efficacy and that imagery interventions can be used to increase self-efficacy and self confidence. Furthermore, it has also been demonstrated that self-efficacy strongly predicts and moderates individual perceptions of collective efficacy. Given these relationships, it is therefore likely that certain individual imagery functions will also predict collective efficacy through their influence on self-efficacy perceptions. Therefore, the aim of this study was to investigate which individual imagery functions predicted high individual perceptions of collective efficacy in team sport athletes. As previous studies have indicated that MG-M type imagery is significantly associated with self-efficacy scores (e.g. Beauchamp et al., 2002) and CG imagery is suggested to allow rehearsal of team plays (Callow, 1999), it was proposed that a similar relationship would exist with collective efficacy. Specifically, it was hypothesized that MG-M and CG imagery would account for the most variance in collective efficacy scores. Based upon the evidence that suggests those athletes competing at a higher level consider imagery more relevant to performance than those competing at a recreational standard (e.g. Cumming and Hall, 2002), it was also predicted that both MG-M and CG imagery would explain more variance in collective efficacy at a high competitive standard (elite) compared to that of a lower competitive standard (non elite).

Methods

Participants

Participants (n = 141) were recruited for the study via opportunity sampling from three interactive team sports (football, rugby union, and wheelchair basketball). The sample consisted male athletes ranging in age from 18 to 55 years (Mean = 24.4, SD = 5.8 years). The competitive standard ranged from recreational to elite/international and professional, as defined by the competitive level of the team they were representing at the time. For the purposes of this study, this sample was divided into elite and non elite performers. Elite performers (n = 70; Mean = 25.5, SD = 5.7 years) were those individuals who were currently competing at semi-professional, professional, and international standard. Specifically, we defined elite level athletes as those who were playing for teams that required professional commitment (i.e. payment or contract). In contrast, non elite performers (n = 71; Mean = 23.3, SD = 5.5 years) were those individuals that competed at recreational, amateur, or university standard without any formal commitment, contract, or payment. Based on this distinction, it was assumed therefore that the elite sample would be training and competing more regularly than the non elite sample and as such they would have higher levels of competitive experience and skill.

Measures

Collective Efficacy Inventory (CEI): The CEI (Callow et al., 2003) is a 10-item inventory designed to measure collective efficacy in sport. The CEI contains five distinct items, each used twice, with two different item stems. The first item stem, "*I believe*", measures the individual's personal beliefs of the team's collective efficacy. For example, item one, *"I believe that the team is capable of performing at a high level"*. The second item stem, "*my team believes*", measures the individual's perception of their team's belief of collective efficacy. For example, item five, "*My team believes that the team is capable of performing at a high level"*. In accordance with previous research (e.g., Watson et al., 2001) each item is measured on a 5 point likert scale ranging from 1 (*not at all*) to 5 (*very much so*). Preliminary confirmatory factor analyses of the CEI have demonstrated strong factor validity for the 10 item questionnaire [$\chi^2 = 50.924$ (p = 0.0135) df = 31; RMSEA = 0.049; NNFI = 0.978; Callow et al., 2003]. However, both factors were shown to correlate highly (r = 0.94) which indicated that both factors were measuring the same construct. Indeed, Short et al. (2002) found comparable results using similar item stems. However, we recognize that the CEI was presented at a conference and has not been through a process of peer review. Despite this, no one single measure of collective efficacy has been fully validated, with the majority of research using non-validated measures (e.g. Greenlees et al., 1999; Heuze et al., 2006). In contrast, the CEI has undergone a validation process with encouraging initial results. In this instance, given the high correlation previously observed between the two factors, scores were aggregated across all 10 items in the questionnaire.

Sports Imagery Questionnaire (SIQ): The SIQ was developed by Hall et al. (1998) to measure imagery functions in sport. The questionnaire comprises thirty items designed to measure five different functions of imagery, represented by five separate sub-scales. These sub-scales are Cognitive General (CG: e.g. "*I image alternative strategies in case my event/game plan fails"*), Cognitive Specific (CS: e.g. "*I can mentally make corrections to physical skills"*), Motivational Specific (MS: e.g. "*I imagine myself winning a medal"*), Motivational General-Arousal (MG-A: e.g. "*I imagine the stress and anxiety associated with competing"*), and Motivational General-Mastery (MG-M; e.g. *"I imagine myself appearing self confident in front of my opponents"*). Participants respond on a seven point scale with regard to how often they use each functions of imagery (1 = *rarely* and 7 = *often*). The scores for each sub-scale are calculated as the sum of the item scores for that subscale. The construct validity of the five SIQ factors was rigorously tested during its development and predictive validity was supported by data that indicated that imagery function predicted performance (Hall et al., 1998). The sub-scales of the SIQ have demonstrated internal consistency alpha coefficients scores ranging from 0.68 to 0.90 (Hall et al., 1998; Abma et al., 2002). In our study, the alpha coefficients for the subscales of the SIQ scores ranged from 0.74 to 0.87, except on the MG-A scale (α = 0.48). The formula for coefficient alpha means that the larger the number of items in a scale, the greater its reliability (Peterson, 1994). However, all five subscales of the SIQ have 6 items, therefore, the low alpha score for the MG-A scale could be attributed to the differing emotional content of the items for this factor. Specifically, the MG-A factor is designed to measure the athlete's use of emotional imagery, however the factor contains items that relate to both images of anxiety and excitement, hence confounding positive and negative emotions. Nunnaly (1978) and Bland and Altman (1997) suggest that satisfactory Cronbach's alpha scores range from 0.7 to 0.8, which suggests that 0.7 would be the minimum level. For this reason, MG-A was excluded from the analysis.

Procedure

Following ethical approval from the University Psychology Department ethics committee, contact was made with a member of each team's management. Zacarro et al. (1995) indicated that a key aspect of collective efficacy is the group member's perceptions of the group's coordinative capabilities. Consequently, only interactive team sports (e.g. rugby) were used in this study, because the emphasis on coordinative capabilities and team work is greatest in these sports compared with co-active teams (e.g. a golf team). Following approval from the team management, the athletes were approached and asked to volunteer for a study examining which types of imagery they used for their sport. The exact nature of the study was withheld to prevent any response bias that might occur. All participants were assured that their participation was entirely voluntary and told they could withdraw from the study at anytime. During a mid-season team training session, volunteers were given the pack of questionnaires, which also included a demographic assessment sheet. Participants were told to carefully read the instructions at the beginning of each questionnaire and to take their time to ensure they completed them accurately. To protect against socially desirable responses, participants were assured that there were no right or wrong answers to any of the questions and that their responses would remain confidential. The team members were also asked not to confer while completing the questionnaires, which was monitored by a member of the research team. Following completion of the scales, the participants were debriefed about the true nature of the study and thanked for their involvement. The entire procedure lasted approximately fifteen minutes on average.

Data analysis

Data analysis occurred in four stages. First, we screened the entire sample of elite and non elite data points for the assumptions of univariate and multivariate normality. Second, in order to account for the potential covariates, a between groups ANCOVA was conducted on collective efficacy scores, with skill *level* as the between subjects factor and *sport* type and *age* of participants as potential covariates. Following this, the data were split into the elite and non elite sub-samples and screened again for normality and adjusted accordingly. Finally, a multiple hierarchical regression was used to examine which of the four SIQ variables were predictive of mean collective efficacy scores in both the elite and non elite samples. Based on our hypothesis that MG-M and CG imagery would predict the greatest amount of variance in both the elite and non elite sample, the SIQ variables were entered into the regression model in the following order; MG-M, CG, with MS and CS together. This analysis was used to specifically test the hypothesis that MG-M imagery would account for the largest amount of variance and this would be highest in the elite sample.

Results

Preliminary analysis

Both the elite and non elite samples were examined for the assumptions of multivariate normality. Tabachnick and Fidell (2001) suggest that Mahalanobis distances are used to indicate multivariate outliers with a criterion level of $p < 0.001$. Therefore, with 4 predictor variables in both samples, the criterion of $\chi^2 = 18.467$ was used to indicate multiple outliers. For the elite sample no outliers were identified, however for the non elite sample one case had a value greater than 18.467 and this outlier was deleted leaving 70 cases for analysis. Further screening of both the elite and non elite responses revealed that a number of the variables were non-normal. Specifically, in the elite group, the total CEI scores ($z = -2.35$) and the mean MG-M scores ($z = -3.46$) were both moderately negatively skewed. In the non elite group, the total CEI scores ($z = -3.37$) and the mean imagery scores for CG ($z = -2.32$) and CS ($z = -2.65$) were moderately negatively skewed, while MG-M imagery scores ($z = -4.38$) exhibited a more substantial negative skew. Following the recommendations of Tabachnick and Fiddell (2001), before running the multiple regression for the elite group we inversed and squared the total CEI scores and the mean MG-M scores. For the low level sample, we inversed and squared the CEI scores and the mean CG, CS, and MG-M imagery scores. The test revealed that all variables displayed normal distribution, with the exception of MG-M in the sub-elite sample, which was positively skewed. The original MG-M means scores were subsequently transformed again [inversed and logged (LG^{10})] and this corrected the skewness.

Collective efficacy across skill level and sport type

An ANCOVA, with *level* as the between subject factor and *sport* and *age* as potential covariates, was used to examine differences in collective efficacy scores (Table 1). A significant difference for CEI scores was observed between elite and non elite athletes [F (1, 127) = 23.51, $p < .001$; $\eta^2 = 0.156$]. This difference was expected, as teams that compete at an elite level may have more performance accomplishments experiences; an antecedent of self-efficacy beliefs (Bandura, 1997). However, as the two samples were analyzed independently of each other, these differences do not impact upon the regression analysis. For the covariates, neither *Sport* played [F (1, 127) = 2.50, $p > 0.05$; $\eta^2 = .117$] or *age* of participants [F (1, 127) = 3.61, $p > 0.05$; $\eta^2 = .028$] significantly effected collective efficacy scores.

Table 1. Means (Standard Deviations) for Collective Efficacy and SIQ subscales.

Variables	Non elite	Elite
Collective Efficacy	39.52 (4.88)	43.81 (4..49)
CG	4.60 (1.65)	4.53 (.97)
MS	4.47 (1.36)	4.19 (1.57)
MG-M	5.25 (1.11)	5.48 (.93)
CS	4.81 (1.15)	4.77 (1.13)

Imagery functions as predictors of collective efficacy

Multi-collinearity within a regression model increases the

Table 2. Summary of Hierarchical Regression Analysis for elite sample.

Variables	R^2	$R^2(adj)$	R^2 Change	B	$SE\ B$	β
Step 1						
MG-M	.17*	.16	.17	1.24	.33	.41
Step 2						
MG-M	.19	.17	.02	1.55	.40	.52
CG				.16	.12	.18
Step 3						
MG-M	.20	.15	.002	1.57	.43	.52
CG				.17	.14	.20
MS				-2.98×10^{-02}	.07	-.05
CS				1.61×10^{-02}	.11	.02

* $p < 0.05$.

chances that a good predictor will be found non significant (Field, 2005). Both Belsey et al. (1980) and Field (2005) provide criteria that indicate whether multicollinearity is a problem within the regression model. Specifically, there is a problem when a predictor variable displays a condition index of > 30 and contributes more than 50% of the variance to two or more of the other predictor variables. For the elite sample, when CS was added to the regression equation it returned a condition index of 31.5. However, it did not contribute more than 50% to two or more of the other predictor variable. As such, all four original predictor variables were included in the regression model. The results of the hierarchical regression analysis for the elite sample suggested that only MG-M imagery explained a significant proportion of the variance in collective efficacy scores (R^2 = .172, F (1, 68) = 14.08, p < 0.01). This indicated that the MG-M imagery function accounted for approximately 17% of collective efficacy scores in the elite athlete sample (Table 2).

In the sub-elite sample, all the collinearity diagnostics fell within the acceptable limits (Belsey et al., 1980; Field, 2005) and therefore all the predictor variables were included in the regression model. The results at step one (MG-M entered : R^2 = .039, F(1, 68) = 2.74, p > 0.05), step two (MG-M and CG entered: R^2 = .061, F(1, 67) = 1.62, p > 0.05), and step three (MG-M, CG, MS, and CS entered: R^2 = .074, F(2, 65) =.430, p > 0.05) indicated that none of the SIQ variables were predictive of collective efficacy (Table 3).

Discussion

The main aim of this study was to examine if specific individual imagery functions were predictive of individual collective efficacy perceptions in two separate samples of elite and non elite team athletes respectively. The results from the regression analysis provide partial support for the original hypothesis that MG-M and CG imagery would significantly predict collective efficacy scores. Specifically, the hierarchical regression analysis for the elite performers indicated that the MG-M imagery explained approximately 17% of the variance in individual collective efficacy scores. The amount of variance explained in this instance is comparable to the variance found in similar regression studies using the sub-scales of the SIQ as predictor variables of self-confidence and cohesion (e.g. Callow and Hardy, 2001; Hardy et al., 2003). Furthermore, given that many other possible collective efficacy predictors, such as mastery experiences, self-efficacy, and cohesion (Carron and Hausenblas, 1998) were not considered in this instance, the variance explained would appear reasonable. Therefore, our findings for the elite-level athletes suggest that those who use more MG-M imagery also have greater individual collective efficacy perceptions.

It has been suggested that MG-M imagery provides performance accomplishment information to enhance efficacy expectations (Callow and Hardy, 2001). The increase in individual efficacy expectations through imagery may also increase individual perceptions of collective efficacy. Elite athletes will have a greater number of performance accomplishment experiences and as such will find it easier to generate relevant MG-M imagery. In contrast to our hypothesis, CG imagery did not significantly predict any of the variance in collective efficacy scores in the elite sample. One explanation for this is that CG items are operationalized in a very different way to those of the MG-M items. Specifically, the CG items reflect rehearsal of strategies and plays and are almost entirely devoid of emotional content. For example, *"I imagine each section of an event/game"*. Therefore, any link with collective efficacy is indirect and merely as a consequence of the rehearsal afforded by that imagery type. In comparison, MG-M items directly reflect emotion in their construction. For example, *"I imagine myself being mentally tough"*. Therefore, the primary impact of imagery with MG-M content is more likely to occur at an emotional level and as such more closely predict collective efficacy. Furthermore, although CG imagery theoretically allows for the rehearsal of strategic plays, we believe it is only likely to predict collective efficacy if the imagery has some level of team content. This is only likely to happen if the individuals are specifically instructed to do so by the practitioner supervising the intervention. However, in this instance we were only interested in the extent to which individual imagery functions predicted individual perceptions of collective efficacy.

In contrast to the elite performers, none of the SIQ variables significantly predicted any of the variance in collective efficacy in the non elite sample. Inspection of the mean SIQ scores indicated that the non elite group used more CG, MS and CS imagery, but used less MG-M imagery than the elite group. Therefore, despite similar imagery function use scores, the results for the non elite sample suggest that no one specific imagery function predicts collective efficacy better than any other. This

Table 3. Summary of Hierarchical Regression Analysis for non elite sample.

Variables	R^2	$R^2(adj)$	R^2 Change	B	$SE\ B$	β
Step 1						
MG-M	.03	.02	.03	.96	.61	.18
Step 2						
MG-M	.06	.03	.03	.23	.80	.05
CG				.65	.46	.22
Step 3						
MG-M	.07	.01	.01	.32	.90	.06
CG				.59	.57	.20
MS				.05	.09	.09
CS				.16	.52	.06

may indicate that the use of imagery by non elite athletes is less structured and focused than that used by elite athletes. Indeed, whereas elite athletes may use specific types of imagery to help prepare for performance, the use of imagery by non elite athletes might be less deliberate. Unfortunately, while the SIQ measures the frequency of specific imagery types it doesn't indicate whether these images are created in controlled intentional imagery sessions, or occur more as inadvertent cognitive processes.

Currently, very little is known about how or what team sport athletes' image. However, it seems plausible that the content of their imagery would portray both individual and team elements. Although the current study demonstrated that the MG-M type imagery significantly predicts collective efficacy in elite level athletes, the lack of any other significant finding is probably because imagery with team content was not considered. While the SIQ is the standard inventory used to measure individual imagery functions in sport, it does not contain any specific items that directly reflect team-based processes. Consequently, future research might benefit from the development of an adapted version of the SIQ that uses stems such as "I image myself *and my team*...". An adapted version of the SIQ, with a greater emphasis on the team would not only allow for a better understanding of the relationship between collective efficacy and imagery with team content but could also be used to examine relationships with other team variables, such as cohesion.

At present, our understanding of how imagery can be used to increase collective efficacy is limited. However, evidence suggests that MG-M imagery increases self-efficacy (e.g. Jones et al., 2002; Short et al., 2002), and a close relationship has been established between self-efficacy perceptions and individual perceptions of collective efficacy (Magyar et al., 2004). Although self-efficacy was not measured in our study, when considered with the results of Munroe-Chandler and Hall (2004), we tentatively suggest that MG-M imagery which has an emphasis on team content could be used to successfully increase individual perception of collective efficacy. The nature and exact structure of such interventions is as yet unclear. However, for non elite athletes it may be necessary to direct them towards pertinent previous team experiences and memories to stimulate the imagery process and to encourage a more intentional imagery process.

The findings of the current study would appear fairly intuitive, since MG-M imagery is the imagery function most often associated with confidence/efficacy measures (Abma et al., 2002; Callow and Hardy, 2001). Currently however, little is known about the effects of individual interventions on team-based variables such as collective efficacy. Therefore, we suggest that future research should further test the predictive relationship between imagery functions and individual collective efficacy perceptions. Collective efficacy and self-efficacy should also be measured concurrently to further support the reciprocal relationship between the two constructs found in this study. Furthermore, both nomothetic and ideographic longitudinal studies are needed to investigate the effects of specific imagery functions on collective efficacy. In addition to measuring the impact of imagery on the individual perceptions of collective efficacy, research should also consider how imagery impacts on the overall shared beliefs of the team. A better understanding of these relationships will allow sport psychologists to devise individual imagery interventions, which aim to increase collective efficacy.

Conclusion

The findings of this study suggest that MG-M imagery types predict individual collective efficacy perceptions in elite level athletes. In contrast, none of the imagery types measured by the SIQ predicted individual imagery perceptions in non elite athletes. From an applied perspective, the results tentatively indicate that MG-M type imagery interventions could be used to successfully increase collective efficacy perceptions. Potential mechanisms for the effectiveness of such interventions may occur both directly or indirectly through changes in self-efficacy. Further research is warranted to examine the relationship between collective efficacy and specific imagery types, the effects of imagery interventions on collective efficacy perceptions, and the subsequent mechanisms of any associated changes in collective efficacy.

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Key points

- As imagery is an individual intervention, an examination of individual perceptions of collective efficacy was most appropriate.
- Elite athletes who use more MG-M imagery also have higher individual perceptions of collective efficacy.
- For non-elite athletes, none of the imagery functions tested predicted individual perceptions of collective efficacy.
- Performance accomplishments provided by MG-M imagery may increase individual perceptions of collective efficacy.
- Future research should investigate further the effects of imagery intervention programmes on collective efficacy beliefs.

AUTHORS BIOGRAPHY

David A. SHEARER
Employment
Lecturer, Department of Sports Science, Swansea University, United Kingdom
Degrees
MSc, BSc
Research interests
Imagery use in sport, team dynamics.
E-mail: d.a.shearer@swansea.ac.uk

Rob THOMSON
Employment
Senior Lecturer in Psychology, University of East London
Degrees
PhD, BSc.Hons
Research interests
Group processes in sports supporters, online communities and in merging organizations.
E-mail: r.thomson@uel.ac.uk

Stephen D. MELLALIEU
Employment
Lecturer, Department of Sports Science, Swansea University, United Kingdom
Degree
PhD
Research interests
Competition and organizational stress in sport, team dynamics.
E-mail: s.d.mellalieu@swan.ac.uk

Catherine R Shearer
Employment
Senior Sport Psychologist, Sports Council for Wales, United Kingdom
Degrees
MSc, BSc
Research Interests
Applied sport psychology issues, coping process in the sport environment.

✉ **David Shearer,**
Department of Sports Science, University of Wales Swansea, Swansea, SA2 8PP, United Kingdom.