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Team cohesion and team success in sport

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The main aim of this study was to examine the relationship between task cohesiveness and team success in elite teams using composite team estimates of cohesion. A secondary aim was to determine statistically the consistency (i.e. 'groupness') present in team members' perceptions of cohesion. Elite university basketball teams ($n = 18$) and club soccer teams ($n = 9$) were assessed for cohesiveness and winning percentages. Measures were recorded towards the end of each team's competitive season. Our results indicate that cohesiveness is a shared perception, thereby providing statistical support for the use of composite team scores. Further analyses indicated a strong relationship between cohesion and success ($r = 0.55$–0.67). Further research using multi-level statistical techniques is recommended.

Keywords: group and individual analysis, task cohesion, task performance.

Introduction

The definition of cohesion – 'a dynamic process that is reflected in the tendency of a group to stick together and remain united in the pursuit of its instrumental objectives and/or for the satisfaction of member affective needs' (Carron *et al.*, 1998, p. 213) – implicitly conveys the generally held assumption about team cohesion and team success; that is, greater team cohesiveness is assumed to be related to greater team success. Historically, this assumption has been challenged. For example, in 1969, Lenk provided data from two champion German rowing eights to 'refute the strict general validity of a thesis that seems to have been taken for granted . . . [namely that] only small groups, which are low in conflict, or highly integrated can produce especially high performances' (p. 393). Lenk's study, as well as other studies undertaken inside and outside of sport psychology over a 20 year period, led others (e.g. Landers and Lüschen, 1974; Carron and Chelladurai, 1981) to propose that type of sport is a moderator variable in the relationship between cohesion and success. That is, they hypothesized that cohesion is associated with enhanced team success in interacting sports (e.g. volleyball), but either has no effect or is associated with reduced team success in co-acting sports (e.g. bowling).

Powerful advantages of a meta-analysis are the opportunities to summarize statistically a large body of research and to examine the role of potential moderator variables if sufficient data are available. Thus, in 1994, when Mullen and Copper carried out their meta-analysis of 49 studies from various subdisciplines in psychology (e.g. industrial, sport, military, social), their conclusions appeared to provide unequivocal answers for sport psychology. They reported that the relationship between cohesion and team success is positive, albeit small, and the task interaction requirement (i.e. interacting *vs* co-acting sports) does not serve as a moderator variable. They also reported that 'real groups exhibit significantly stronger [cohesion–success] effects than artificial groups, and sport teams exhibit even stronger effects than nonsport real groups' (Mullen and Copper, 1994, p. 224). In fact, Mullen and Copper reported that the strongest relationship between cohesion and group success is present in sport teams, followed by military groups and then non-military groups.

Although Mullen and Copper's (1994) meta-analysis did provide some valuable insights, we would argue that it did not provide definitive answers about the relationship between cohesion and success in sport teams. The fundamental reason for our assertion is that most of the

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sport studies included in Mullen and Copper's meta-analysis (e.g. Carron and Ball, 1978; Landers *et al.*, 1982; Williams and Hacker, 1982) used the Sport Cohesiveness Questionnaire (SCQ; Martens *et al.*, 1972). The SCQ is no longer used for group dynamics research in sport, mainly because it was not developed from a strong conceptual base and its psychometric properties have never been fully established (Gill, 1977; Carron *et al.*, 1998).

Carron *et al.* (1985) developed the Group Environment Questionnaire (GEQ), which is based on a conceptual model in which cohesion is considered to be a result of four primary constructs: Individual Attractions to the Group-Task, which reflects a member's feelings about his or her personal involvement with the group's task; Individual Attractions to the Group-Social, a member's feelings about his or her personal social interactions with the group; Group Integration-Task, a member's perceptions of the similarity and unification of the group as a whole around its tasks and objectives; and Group Integration-Social, a member's perception of the similarity and unification of the group as a social unit.

Slater and Sewell (1994, p. 424) suggested that 'the GEQ holds great potential for furthering the establishment of a more complete picture of team cohesion in sport'. However, they also noted that, 'thus far, the GEQ appears to have been used in relatively few published studies of the cohesion–performance relationship' (p. 424).

Subsequent to the observations of Slater and Sewell (1994), various authors have examined the relationship between cohesion and success in sport using the Group Environment Questionnaire as an operational definition for cohesiveness. Unfortunately, however, that body of research suffers from shortcomings in terms of answering the fundamental question: Is team cohesion positively associated with team success? One shortcoming is that the perceptions of cohesion of individual athletes (on few winning and losing teams) have often been the focus of analysis (e.g. Matheson *et al.*, 1997; Kozub and Button, 2000). In short, statistical power for the analyses was derived by testing relatively large samples of individuals, not teams. Using individual athletes as the unit of analysis is not in and of itself inappropriate. This point was emphasized by Carron and Spink (1995, pp. 91–92):

> An ongoing debate in the group dynamics literature, which can be traced to the 1920s (Allport, 1924), is whether the individual or the group should be the unit of analysis. The answer, of course, is that there is no definitive answer – it depends on the nature of the question. Cohesion is a cognition that exists in the minds of individual group members. If the question of interest is centered on the relationship of cohesiveness to individual behavior – adherence for example – then the individual's cognition about cohesion is the critical consideration . . . Conversely, if the focus was on a group behavior – group performance for example – then the average level of cohesion in the group would be the appropriate unit of analysis.

Thus, using the individual as the unit of analysis does answer the question: Are individual athlete perceptions of cohesion related to personal or team productivity or success? However, such a strategy does not offer insight into the relationship between composite team cohesion and team success.

There have also been studies in which the Group Environment Questionnaire has been used as the operational definition for cohesion and the group or team has been used as the unit of analysis (i.e. a composite measure has been used to represent team cohesion and team winning percentage has been used to represent success). Nonetheless, that body of research also offers limited insight into the relationship between team cohesion and team success for two reasons. First, in some studies (e.g. Shanghi and Carron, 1987; Slater and Sewell, 1994), the sample sizes used were relatively small (i.e. less than eight teams). Thus, questions associated with statistical power arise. Secondly, in other studies (e.g. Widmeyer *et al.*, 1990; Grieve *et al.*, 2000), many teams were examined, but these teams were created or developed for the study – they were not intact (real) sport teams. As Mullen and Copper (1994) showed, 'the cohesiveness–performance effect is even more robust in the real world among real groups' (p. 224). Thus, the strength of the relationship between cohesion and success is probably underestimated in laboratory studies.

The main aim of this study was to examine the relationship between team perceptions of task cohesiveness and team success in elite basketball and soccer teams. Team success was operationally defined as the team's win–loss percentage. Team perceptions of cohesion were operationally defined using the two task cohesion measures from the Group Environment Questionnaire – Individual Attractions to the Group-Task and Group Integration-Task. Widmeyer *et al.* (1993) have suggested that the task-related dimensions of cohesion should be most directly related to team success. However, because the Group Integration-Task dimension taps members' beliefs about the team's integrated pursuit of its task-relevant goals and objectives, Widmeyer *et al.* suggested that 'the cohesion dimension most closely linked [conceptually] to performance outcome is Group Integration-Task' (p. 686). Consistent with this theorizing, we hypothesized that the Group Integration-Task and Individual Attractions to the Group-Task dimensions would be positively related to team success,

but the former would show a stronger relationship between cohesion and success.

A secondary aim of the study was to determine the consistency among team members' perceptions of cohesion before amalgamating responses to create a composite 'team cohesion' score. Analysis issues have attracted considerable attention in the general literature on group dynamics (e.g. Kenny and La Voie, 1985; Rousseau and House, 1994; Moritz and Watson, 1998), as well as in that on cohesion specifically (e.g. Carron *et al.*, 1998; Carron and Brawley, 2000; Paskevich *et al.*, 2001). Moritz and Watson (1998), for example, suggested that a failure to consider individuals and groups in group research is associated with three potential biases: (a) possible over-generalization, whereby it is assumed that relationships at one level are similar to those for a seemingly similar concept at another level; (b) possible underestimation of group influence when individuals are the unit of analysis as well as possible underestimation of individual influence when groups are the unit of analysis; and (c) possible reification of group structure.

In the present study, we selected the team as the unit of analysis for two reasons. First, the dependent variable – *team success* – is the product of an integrated aggregation of all team members' efforts. Also, team success is a measure that has no individual variability; it can only be analysed for the team. Secondly, although measures of task cohesion are obtained from individual members, these perceptions develop within an interdependent environment. As a consequence, measures of cohesion obtained from members within a group may be similarly biased (Zaccaro *et al.*, 1995). For example, Group Integration-Task refers to team members' *shared* beliefs about the group's approach to its performance. Thus, while all members of a team may not be entirely like-minded in these beliefs, their perceptions of Group Integration-Task should show a high degree of consistency and non-independence reflective of this sharing among members. Consistent with this theorizing, we hypothesized that the most appropriate unit of analysis for the research question would be the team. In short, we believed that acceptable consistency about Group Integration-Task and Individual Attractions to the Group-Task cohesion would be present among the members of each team, thereby lending statistical support for the aggregation of individual responses to the team.

Methods

Participants

The participants were 294 Canadian (154 females, 140 males) intercollegiate and club athletes from 18 basketball and nine soccer teams. The participants had considerable competitive experience at both the developmental and, in most cases, elite intercollegiate standards. For example, several athletes had experience on provincial and national junior teams. The athletes ranged in age from 15 to 30 years (20.9 ± 3.3 years; mean $\pm$ *s*) and had been members of their respective teams for 1–10 years (2.4 ± 1.5 years). A heterogeneous sample from two sports was used to increase the power for the analysis and to increase the generalizability of the findings.

Measures

Cohesion. The Group Environment Questionnaire (GEQ; Carron *et al.*, 1985) was used to assess cohesion. This is a self-report questionnaire that contains 18 items. Four aspects of cohesion are assessed: Individual Attractions to the Group-Task (4 items), Individual Attractions to the Group-Social (5 items), Group Integration-Task (5 items) and Group Integration-Social (4 items). Responses are provided on a 9-point Likert scale anchored at the extremes by 'strongly disagree' (1) and 'strongly agree' (9). Thus, higher scores reflect stronger perceptions of cohesiveness.

Only the task cohesion dimensions were included. The decision to focus on the relationship between task cohesion and team success only, and not on that between social cohesion and team success, was based on two related considerations: participant burden and conceptual rationale. The data used in the present study were obtained in research in which many variables were incorporated in the questionnaire. We were concerned that, if the questionnaire was too long, the athletes would either refuse to complete it or would complete it in a cursory fashion. Thus, we decided to include only the task cohesion scales of the GEQ, since it has been suggested that they have a stronger link with team success (i.e. Widmeyer *et al.*, 1993).

The internal consistency of each scale was computed for the data obtained in the present study. Both the Group Integration-Task ($\alpha = 0.75$) and the Individual Attractions to the Group-Task ($\alpha = 0.68$) scales possessed acceptable reliability.

Team success. Team success was operationally defined as each team's total winning percentage for the games played in their regular competitive schedule; play-off games were excluded. A percentage score was calculated by dividing the number of points obtained by the maximum number of points possible. Basketball designates two points for a win and no points for a loss; ties are not possible in basketball. Soccer in Canada designates two points for a win, one point for a tie and no points for a loss.

Procedure

Basketball and soccer team coaches were contacted by one of the researchers, who explained that he was conducting a study examining athletes' feelings about their team and team success. After permission was obtained, we met with the athletes and coaches to explain the study and to request their participation. Individual participation was voluntary and informed consent was obtained from all participants. When individuals were under 18 years of age, parental consent was also obtained.

The Group Integration-Task and Individual Attractions to the Group-Task scales of the Group Environment Questionnaire were completed under the supervision of the researchers approximately 2 weeks before the end of each team's regular competitive season. Questionnaires were administered at a convenient team meeting or practice that was neither immediately before nor immediately after a competition, thus avoiding competition-specific biases in the participants' responses. Although all members of each team completed the questionnaire at a group meeting, the importance of independent responses was stressed at the time of administration. The participants were required to complete the questionnaire on their own and without conversing with their team-mates.

Results

Aggregation of data

Team members' GEQ scores were aggregated to provide team scores for Individual Attractions to the Group-Task and Group Integration-Task. As indicated above, this procedure is consistent with the unit of analysis identified in the research question – that is, the team. To determine whether aggregation was empirically justified, intraclass correlation coefficients (Kenny and La Voie, 1985) and eta-squared (Georgopolous, 1986) were calculated. The intraclass correlation coefficient and associated eta-squared (η^2) provide evidence of the *consistency* of variance in responses among members of groups nested within a larger sample in relation to the scores of non-group members. It should be noted that the intraclass correlation coefficient (r) can range from −1 to +1; however, the typical range of scores falls between zero and one (Kenny and La Voie, 1985). If $r = 1$, then all members of the same group have identical scores; if $r = 0$, then the scores of the members belonging to one group are no more similar to one another than to those of members of other groups.

The intraclass correlation coefficients and eta-squared statistics for both Individual Attractions to the Group-Task and Group Integration-Task were consistent with group effects, lending support to our hypothesis; for Group Integration-Task, $r = 0.21$ and $\eta^2 = 0.27$; for Individual Attractions to the Group-Task, $r = 0.17$ and $\eta^2 = 0.24$. Myers (1972) suggested using a liberal criterion (i.e. $\alpha < 0.25$) to test for group phenomena rather than the conventional one ($\alpha < 0.05$). The use of a liberal criterion was not necessary, however, as the effects observed were highly significant ($P < 0.001$). The eta-squared statistics provide complementary evidence of group perceptions, as each exceeded the criterion of 0.20 for aggregation that has been used in previous research (e.g. Jehn and Shah, 1997; Dirks, 2000).

Descriptive statistics

Table 1 provides a summary of the descriptive statistics for the soccer and basketball samples. Before looking for an overall relationship between cohesion and success, preliminary analyses were performed to determine if differences were present in the samples. As indicated previously, both male and female basketball and soccer teams were recruited. Thus, a 2 (basketball, soccer) × 2 (female, male) multivariate analysis of variance (MANOVA) was computed with Individual Attractions to the Group-Task, Group Integration-Task and success as the dependent variables. Neither sex (Wilks' λ: $F_{3,21} = 0.46$, $P > 0.05$) nor the interaction of sex and sport (Wilks' λ: $F_{3,21} = 0.32$, $P > 0.05$) was statistically significant. However, a significant difference was found for sport (Wilks' λ: $F_{3,21} = 3.25$, $P < 0.04$). *Post-hoc* analyses found no differences in success or Group Integration-Task ($P > 0.05$), but Individual Attractions to the Group-Task was significantly greater in the soccer sample ($F_{1,23} = 6.41$, $P < 0.02$). Thus, we decided to combine the male and female teams within sports and to examine the cohesion–success relationship independently for basketball and soccer and, subsequently, in the total sample of teams by transforming the data to effect sizes and computing an average effect size.

The statistical techniques used to compute effect sizes were those outlined by Hedges (1981, 1982) and Hedges and Olkin (1985) and summarized by Thomas and French (1986). That is, the correlations were first converted to Cohen's (1969, 1992) effect size; then, because effect sizes are positively biased in small samples, a correction factor was used on each effect size before subsequent analyses. Also, each effect size was then weighted by the reciprocal of its variance before summation. An overall weighted mean estimate and an estimate of the variance of each effect size were obtained using the formula provided by Hedges and Olkin (1985). The designation effect size is used here to

Table 1. Descriptive statistics (mean ± *s*)

Group	Individual		
	Group Integration-Task	Attractions to the Group-Task	Team performance
Basketball ($n = 18$)	6.05 ± 0.93	6.11 ± 1.04	46.51 ± 27.32
Soccer ($n = 9$)	6.33 ± 0.76	7.04 ± 0.69	52.38 ± 25.54

Note: Cohesion was assessed on a 9-point scale with low scores representing less cohesiveness. Team performance represents a winning percentage out of 100%.

Table 2. The relationship between cohesion and performance

Group	Cohesion measure	Cohesion–performance relationship	Effect size
Basketball ($n = 18$)	Group Integration-Task	0.60**	1.42
	Individual Attractions to the Group-Task	0.62**	1.49
Soccer ($n = 9$)	Group Integration-Task	0.55	1.16
	Individual Attractions to the Group-Task	0.74*	1.94
All teams ($n = 27$)	Group Integration-Task	0.57**	1.29
	Individual Attractions to the Group-Task	0.67**	1.71

* $P < 0.05$, ** $P < 0.01$.

represent effect sizes that underwent all of the above transformations.

Cohesion and team success

Type of sport. Table 2 provides a summary of the correlation analysis of the relationship between cohesion and success in the basketball and soccer samples. For cohesion as manifested by Individual Attractions to the Group-Task, a statistically significant relationship was observed for both basketball ($r = 0.62$, $P < 0.01$) and soccer ($r = 0.74$, $P < 0.05$). In both instances, the size of the effect was very large: 1.49 and 1.94 for basketball and soccer, respectively. The designations 'small', 'medium' and 'large' were applied by Cohen (1992) to represent effect sizes of 0.20, 0.50 and 0.80, respectively.

Analysis of the relationship between cohesion and success using Group Integration-Task as the operational measure of cohesiveness showed a similar pattern. That is, for basketball, a significant relationship ($r = 0.60$, $P < 0.01$) of very large magnitude (effect size = 1.42) was obtained. For soccer, the relationship was not statistically significant ($r = 0.55$, $P > 0.05$). However, this non-significant correlation was undoubtedly a function of statistical power, given that the effect size was again very large (i.e. effect size = 1.16).

Total sample. The summation of effect sizes showed that, within the total sample, the relationship between cohesion and success was very strong. That is, for Group Integration-Task, an overall effect size of 1.29 was obtained, which represents a correlation coefficient of 0.57. For cohesion operationally defined as Individual Attractions to the Group-Task, the overall effect size was even larger at 1.71, which represents a correlation coefficient of 0.67. Our finding that the relationship between cohesion and success was greater for cohesiveness manifested as Individual Attractions to the Group-Task than as Group Integration-Task was contrary to our hypothesis.

Discussion

The main aim of this study was to examine the relationship between task cohesiveness and team success in elite teams using aggregate (i.e. composite team) measures of cohesion, with team success represented by season game winning percentages. A secondary aim, addressed before undertaking the main part of the study, was to determine statistically the consistency (i.e. 'groupness') of team members' perceptions of cohesion.

One of the most important aspects of our study is

that it has provided evidence of a very strong relationship between cohesion and success in sport teams. Interestingly, in their meta-analysis, Mullen and Copper (1994) reported that a small to moderate relationship is present in sport. One reason for the difference in the magnitude of this relationship in our study compared with that in the meta-analysis of Mullen and Copper could be the operational definition of cohesion used. We focused on task cohesion only, whereas Mullen and Copper's findings were based on studies that used both task and social cohesion. A second reason is that we operationally defined task cohesion using the Group Environment Questionnaire (Carron *et al.*, 1985). Mullen and Copper statistically summarized studies that overwhelmingly used psychometrically undeveloped measures of cohesion. A third possible reason might be related to our use of composite team scores to represent cohesion. The Sport Cohesiveness Questionnaire, a psychometrically undeveloped measure of cohesion, was used by Carron and Ball (1978), Landers *et al.* (1982) and Williams and Hacker (1982) to examine the relationship between composite team cohesion and team success. One of the items in the Sport Cohesiveness Questionnaire is teamwork, a construct that is very similar to task cohesion. In these three studies, using composite team scores, the relationship between teamwork (cohesion) and team success when both constructs were assessed at the end of the season (i.e. a time frame similar to that used in our study) was generally high, ranging from $r = 0.69$ (Landers *et al.*, 1982) to $r = 0.88$ (Carron and Ball, 1978) and $r = 0.90$ (Williams and Hacker, 1982).

Widmeyer *et al.* (1993) suggested that, because of the conceptual nature of the construct, Group Integration-Task is likely to have a stronger association with team performance than Individual Attractions to the Group-Task. Our results do not support this hypothesis; the relationship between Individual Attractions to the Group-Task and team success was slightly stronger than that between Group Integration-Task and team success. Although our findings do not support the hypothesis of Widmeyer *et al.* (1993), it is important to note that very large effect sizes were found for each relationship. Clearly, both the Group Integration-Task and Individual Attractions to the Group-Task dimensions of cohesion are strongly associated with team success. However, future research should investigate further the independent relationships between the task cohesion dimensions and team success.

Cohesion is a construct that can be examined in relation to both individual and group outcomes (Hoyle and Crawford, 1994). However, the results of research using the Group Environment Questionnaire indicate the strongest relationship appears to be that between group estimates of task cohesion and group-related constructs such as team success. Our results show that perceptions of team task cohesiveness are relatively consistent among members of the same team. That is, team members perceive their team's task unity similarly, which provides support for a conceptualization of 'cohesion-as-shared-beliefs' (Carron *et al.*, 1998; Carron and Brawley, 2000; Paskevich *et al.*, 2001). Paskevich (1995, Study 2), using intercollegiate volleyball teams, was the first to provide statistical support for group cohesion as shared individual beliefs. Thus, there is increasing support for the measurement of individual perceptions to obtain a valid estimate of a group property such as cohesion. In short, aggregating the scores of individual team members to produce a single measure of *team* cohesion does not run the risk of combining 'apples and oranges'.

It is also worth issuing a note of caution and inspiration for future researchers of the aggregation of individual cohesion scores for the relationship between cohesion and success. Although statistical indicators of consistency (e.g. the intraclass correlation coefficient) may show a high degree of sharing, because of the nature of common personal experiences it is likely that some variability in perceptions of cohesion exists within groups. For example, the intraclass correlation coefficients for Group Integration-Task and Individual Attraction to the Group-Task in the present study showed modest consistency, but were well short of scores of 1.00 that would indicate identical scores among all members within each team. The question arises as to the potential value of information offered by individual members in their estimates of cohesion that is lost due to aggregation. As Hoyle and Crawford (1994, p. 465) pointed out: 'A single score that represents the thoughts, feelings, or behavioral tendencies of the group results in a loss of information about the character of the group'. In the present study, the nature of both the research question and the dependent variable required group analysis. However, future research should try to combine individual and group analysis (e.g. multi-level modelling) to explore more fully the relationship between cohesion and success.

Our search of the literature identified several issues that need to be addressed relating to the relationship between cohesion and success in sport. One of these pertains to the role that cohesion might play in the success of individual sport teams. To date, research has examined the relationship between cohesion and success in swimming (Everett *et al.*, 1992), golf (Williams and Widmeyer, 1991), track events (Berardinis *et al.*, 1983) and bowling (Landers and Lüschen, 1974). Interestingly, the study of Landers and Lüschen (1974) is one of the few to report a *negative* relationship between cohesion and team success. Thus, the

manifestation of the relationship between cohesion and success in individual team sports is unclear. Given the inconsistency of results, future studies examining the combined individual and group effects of cohesion and success should be illuminating. Because multi-level statistical modelling requires individual scores for all variables, the investigation of the relationship between cohesion and success in individual sport teams lends itself to such an approach.

A second potential avenue of research that could prove fruitful is to examine the 'why' of the cohesion–success relationship. Paskevich (1995), for example, found some support for the conclusion that collective efficacy is a mediator in the relationship between cohesion and team performance outcome. Greater team cohesion contributes to greater collective efficacy, which, in turn, contributes to enhanced team performance.

Our finding that there is a strong relationship between cohesion and success in naturally forming sport teams leads us to echo the view of Mullen and Copper (1994, pp. 223–224):

> the cohesiveness–performance effect does not seem to be a rare and delicate 'hothouse' variety phenomenon restricted to the controlled confines of the research laboratory. Rather, the cohesiveness–performance effect is even more robust in the real world among real groups.

It also leads us to suggest that coaches and sport psychologists would do well to develop effective team-building strategies in an attempt to influence cohesiveness directly.

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