JOURNAL OF SPORT & EXERCISE PSYCHOLOGY, 2002, **24**, 168-188


# Cohesion and Performance in Sport: A Meta Analysis

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The main purpose of this study was to conduct a meta-analytic summary of the cohesion–performance relationship in sport. A secondary purpose was to examine the influence of a number of potential moderator variables. Another secondary purpose was to examine the cohesion–performance relationship reported in studies using the Group Environment Questionnaire (GEQ). Standard literature searches produced 46 studies containing a total of 164 effect sizes. Overall, a significant moderate to large relationship was found between cohesion and performance. A moderate effect was found in studies that used the GEQ. A larger cohesion–performance effect was found in refereed publications (vs. nonpublished sources) and for female teams. These results have implications for practitioners in terms of the importance of team building to enhance team cohesion, the nature of those team-building programs (e.g., both task- or social-oriented programs should be beneficial), and their target group (e.g., both interdependent and coactive sport teams should profit).

Key Words: group dynamics in sport, task cohesion, social cohesion, group effectiveness

Historically, narrative summaries of research in sport psychology have been inconclusive as to the relationship between cohesiveness and team performance. For example, in a discussion on the determinants and consequences of group cohesiveness, Martens and Peterson (1971) concluded, "findings relevant to the relationship between interpersonal attraction and task performance are contradictory" (p. 56). Similarly, less than a decade later Carron (1980) concluded, "the results of studies that have examined the effect of cohesion upon performance have not been consistent" (p. 245). And in 1986 Gill suggested "we can answer the question 'Do cohesive teams win more games?' with 'Yes,' 'No,' and 'Maybe' " (p. 226).

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Fortunately, with the advent of meta-analysis more definitive answers can be provided (see Evans & Dion, 1991; Mullen & Copper, 1994; Oliver, 1990). The most comprehensive meta-analysis on the cohesion–performance question was carried out by Mullen and Copper (1994) on 49 studies from various subdisciplines in psychology (e.g., industrial, sport, military, social). One important conclusion emanating from their work was that the overall cohesion–performance relationship is positive (albeit small). This led Mullen and Copper to suggest "future summaries...might be best advised to no longer refer to the effect as 'controversial,' 'ambiguous,' or 'unsubstantiated' and begin to refer to it as a small but significant effect" (p. 222).

Other important conclusions resulting from the Mullen and Copper meta-analysis are that: (a) the task interaction requirement (i.e., interactive vs. coactive sports) does not serve as a moderator variable; (b) stronger cohesion–performance effects are present in real groups than in artificial groups; (c) among real groups, sport teams show the strongest cohesion–performance effects; (d) the relationship of performance to cohesion is stronger than that of cohesion to performance; and (e) a cohesion–performance relationship is present when cohesion is operationally defined as commitment to task (i.e., analogous to task cohesion), but not when it is operationally defined as either interpersonal attraction (i.e., analogous to social cohesion) or group pride.

Although the Mullen and Copper meta-analysis was useful for the insights it provided into the cohesion–performance relationship, its applicability to sport can be questioned for three reasons. The first is associated with the general global nature of their meta-analysis. As indicated above, the 49 studies they included had focused on a wide variety of groups other than sport teams, for example military units, lab groups, business teams, etc. Inevitably this general sample was used in the examination of potential moderator variables. As a consequence, the resulting conclusions pertaining to factors that moderate the cohesion–performance relationship might not be valid in the specific domain of sport.

The other two reasons pertain to the sample of sport related studies used by Mullen and Copper. Their meta-analysis contained none of the *unpublished studies* in the sport sciences (e.g., theses, dissertations) available to them at the time.[1] Twenty percent of the studies used in the present meta-analysis are unpublished reports that were available prior to 1993. Meta-analyses routinely compare effect sizes generated in published and unpublished studies—with good reason. Research journals are notoriously outcome conscious; there is a propensity to favor manuscripts that contain significant results (see Rosenthal, 1966). Thus the cohesion–performance relationship in sport might be markedly lower than was reported by Mullen and Copper.

The Mullen and Copper meta-analysis also included only one third of the *refereed publications* in the sport sciences available to them. That is, their analysis included only 8 sport related studies; for the present meta-analysis an additional 16 studies published in 1993 or earlier were located. With such a large body of literature outstanding, conclusions produced by any meta-analysis have to be questioned.

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[1] The Mullen and Copper meta-analysis did contain one sport related study, Widmeyer (1977), listed as unpublished. This study was subsequently published (i.e., Widmeyer & Martens, 1978).

Thus the main purpose of the present study was to carry out a meta-analytic summary on research that has examined the cohesion–performance relationship in sport. One secondary purpose was to assess the influence of a number of potential moderator variables; the specific moderator variables examined as well as the underlying rationale for why they are of interest are outlined in the sections that follow. Another secondary purpose was to examine the cohesion–performance relationship in the subset of studies that used the Group Environment Questionnaire (GEQ, cf. Brawley, Carron, & Widmeyer, 1987; Carron, Widmeyer, & Brawley, 1985; Widmeyer, Brawley, & Carron, 1985) to operationally define cohesion.

Interest in examining the subset of studies that used GEQ independent of studies that have used other operational definitions of cohesion emanates from developments in the understanding and measurement of the construct. In his review of the measurement of cohesiveness, Hogg (1992) noted that, historically, five principal strategies have been used to assess cohesiveness in groups: behavioral measures; group members' reports of interpersonal attraction; closeness within the group as a whole; desire to remain in the group; and sense of belonging. Hogg also noted that in some cases cohesiveness was operationally defined with a single measure, in other cases with multiple measures designed to tap one of the above five. In the majority of cases, composite indexes calculated from members' evaluations of each other and the group as a whole were used.

How useful was this approach? When he reviewed the same literature in his article, "Defining Group Cohesiveness: A Legacy of Confusion?" Mudrack (1989) concluded that analyses of the construct have been "dominated by confusion, inconsistency, and almost inexcusable sloppiness with regard to defining the construct" (p. 45).

Since the mid-1980s, cohesion in sport teams has largely been assessed using the Group Environment Questionnaire (cf. Brawley et al., 1987; Carron et al., 1985; Widmeyer et al., 1985). The GEQ was based on a conceptual model of cohesiveness in which group members are assumed to hold two predominant types of social cognitions about the cohesiveness of the group: *group integration* (an individual's perceptions about the closeness, similarity, and bonding within the group as a whole); and *individual attractions to the group* (an individual's perceptions about personal motivations acting to retain him or her in the group). It is also assumed that there are two fundamental orientations in a group member's perceptions: *task* and *social* aspects of group involvement. Thus the GEQ assesses four manifestations of cohesion in sport teams: Group Integration–Task (GI–T), Group Integration–Social (GI–S), Individual Attractions to Group–Task (ATG–T), and Individual Attractions to Group–Social (ATG–S).

The conceptual model for cohesiveness and the GEQ that evolved from that model have received general acceptance within both social and sport psychology. For example, Dion and Evans (1992) proposed that "the two dimensional conceptualization of cohesion ... [proposed by Carron et al., 1985] appears promising as a conceptual and methodological approach with broad applicability to different types of groups" (p. 247). Also, Slater and Sewell (1994) suggested, "the GEQ holds great potential for furthering the establishment of a more complete picture of team cohesion in sport" (p. 424). Thus, for purposes of the present meta-analysis, the data were subdivided so that results from studies that used the GEQ could be examined independently.

The moderator variables examined were chosen on the basis of their potential contribution to theory (e.g., task vs. social cohesion and team performance), methodology (e.g., cohesion and perceived vs. actual performance), and design (e.g., the cohesion–performance relationship in correlational and experimental studies). The specific moderator relationships examined are as follows.

## Moderator Variables

### *Source of Data*

As indicated above, some concern has been expressed over the possibility that journals might favor the publication of research results that are statistically significant, generally consistent with previously published findings, and/or supportive of theoretical predictions. As Rosenthal (1966) noted:

> To evaluate research too much in terms of its results is to illustrate outcome consciousness, and we do it very often. Doctoral committees too often send the candidate back to the laboratory to run another group of subjects because the experiment as originally designed (and approved by them) yielded negative results .... The same problem occurs in our publication policies. (p. 36)

Thus, one comparison of interest in the present study was between the results from refereed publications and the results from other sources such as conference proceedings, theses, and dissertations.

### *Paradigm*

Mullen and Copper (1994) noted in their meta-analysis that two paradigms have been used to examine the relationship between cohesiveness and performance: correlational and experimental. In the former, members' perceptions of composite team levels of cohesiveness are correlated with group or individual performance (e.g., Bray, 1998). In the latter, ad hoc groups are created, an experimental manipulation of cohesiveness is undertaken, and the impact on performance is evaluated (e.g., Gammage, Carron, & Estabrooks, 2001). As Mullen and Copper noted, the correlational paradigm generally offers greater naturalism whereas the experimental paradigm affords greater scientific control. As a consequence, "the most plausible pattern of results is for the experimental paradigm to yield a weaker cohesiveness–performance effect than that rendered by the correlational paradigm" (Mullen & Copper, 1994, p. 212). Interestingly, however, they found that the correlational paradigm produced evidence of a stronger cohesiveness–performance effect. Type of paradigm was examined as a moderator variable in the present meta-analysis to determine whether the results from studies with sport teams are consistent with the results from studies with groups in general.

### *Manifestation of Cohesiveness*

Theoreticians in the group dynamics literature have emphasized the need to distinguish between the task-oriented and socially oriented concerns of groups and their members (cf. Festinger, Schachter, & Back, 1950; Fiedler, 1967; Hersey & Blanchard, 1969; Mikalachki, 1969). Moreover, Carron, Brawley, and Widmeyer (1998), in their definition of cohesion as "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" (p. 213), explicitly endorsed the view that there is both a task-oriented basis and a socially oriented basis for group unity. Thus, another comparison of interest in the present meta-analysis was the magnitude of the task cohesion–performance relationship vs. the social cohesion–performance relationship.

### *Sport Type*

The empirical analysis of the cohesion–performance relationship has a relatively short history. Some of the earliest research, for example the Lenk (1969) study with elite rowers and the Landers and Lüschen (1974) study with intramural bowling teams, produced results suggesting a negative relationship between cohesion and performance. Other research, for example the Carron and Ball (1977) study with ice hockey teams and the Williams and Hacker (1982) study with field hockey teams, produced results suggesting a positive relationship between cohesion and performance. In an attempt to reconcile the literature, a number of authors (e.g., Carron & Chelladurai, 1981) proposed that task type might serve as a moderator variable in the cohesion–performance relationship. The underlying rationale was that cohesion would be a catalyst for increased coordination in sports where task interactions are essential for group success, whereas its absence would serve to increase interpersonal competition (and performance) in sports where task interactions are not required. Mullen and Copper found no evidence that task type moderates the cohesion–performance relationship in groups in general. In the present meta-analysis, the issue was reexamined for sport teams specifically.

### *Females vs. Males*

There is no theoretical or empirical basis for predicting that female and male teams differ in the extent to which cohesion is associated with performance success. In fact, in one of the few studies that undertook a direct comparison, Widmeyer and Martens (1978) failed to find differences. However, gender has been shown to be a moderator variable in group dynamics research pertaining to, for example, leadership (Eagly & Johnson, 1990), productivity (Wood, 1987), and orientation toward competition vs. cooperation (Duda, 1987). Thus, in the present meta-analysis the total sample of studies was subdivided on the basis of the gender of the athletes, and the magnitude of the cohesion–performance relationship was examined.

### *Performance Measures*

Considerable discussion in the social and organizational psychology literature has focused on the use of self-report measures. For example, Podsakoff and Organ (1986) noted that "a casual inspection of published research in organizational behavior or management shows the self-report to be well-nigh ubiquitous as a form of data collection.... coincident with ubiquity, however, is the apparently widespread suspicion that self-reported methodology is the soft underbelly of the organizational research literature" (p. 531). Similar sentiments have been echoed in the sport and exercise science literature (e.g., Brawley, Martin, & Gyurcsik, 1998; Noble & Noble, 1998). Insofar as the cohesion–performance relationship is concerned, researchers have examined the association between perceptions of group

cohesion and both individual and group performance, and in terms of both actual performance and perceptions of performance (e.g., Apple, 1993; Bolger, 1984). Therefore, for the present meta-analysis, measurement of performance—self-reported vs. actual—was examined as a potential moderator variable.

### *Direction of the Relationship*

A number of studies in sport psychology have studied the temporal pattern of the relationship between cohesion and performance (e.g., Carron & Ball, 1977; Landers, Wilkinson, Hatfield, & Barber, 1982; Williams & Hacker, 1982). Does cohesion contribute to performance success? Does performance success contribute to cohesion? As Mullen and Copper noted,

> Logically, either direction is plausible. On the one hand, group cohesiveness could energize and direct group members toward successful task completion. This has been the implicit assumption guiding most studies of the cohesiveness–performance effect. On the other hand, excellence in performance should make group members feel much better about the group. (1994, p. 215)

In the present meta-analysis, studies in sport psychology have provided for the opportunity to compare the magnitude of the cohesion and performance relationship when: (a) cohesion was assessed and then, later in the competitive season, performance was evaluated; and (b) performance was assessed and then, later in the competitive season, cohesion was evaluated.

### *Level of Skill/Experience of the Athletes*

The cohesion–performance question in sport has been examined using a wide variety of groups such as, for example, hypothetical teams (Gammage et al., 2001), experimental groups (Grieve, Whelan, & Meyers, 2000), intramural teams (Martens & Peterson, 1971), and competitive teams varying in age, skill, and experience from the junior high school level (Gruber & Gray, 1981) to the professional level (Iordanoglou, 1993). There is no doubt that each study provided valuable insights into the cohesion–performance question. It also seems probable that the various teams examined differed in a number of important group variables known to be associated with cohesion: history/stability; group structure including well established roles, norms, and status hierarchies; previous success; quality and quantity of member communication, and so on. In short, an intercollegiate basketball team likely possesses different group properties than an intramural basketball team. Thus, the data in the present study were categorized to determine whether group type serves as a moderator in the cohesion–performance relationship.

## Method

### *Selection of the Data*

Literature searches were undertaken to identify studies that recorded performance and cohesion in a sport situation. The studies were obtained through three primary processes: computer searches, manual searches, and journal searches. Included in the computer searches was an initial catalog search, followed by the analysis of two computer bases, PsychLIT (1967–2000) and SPORTdiscus (1975–

2000), to locate articles, theses, and dissertations. The keywords presented for the computer searches were *cohesion*, *cohesiveness*, *performance*, *productivity*, *success*, and *sport*. The manual searches involved getting articles from reference lists contained in studies and narrative reviews. The journal searches focused on publications identified as popular for information on sport, cohesion, and performance. These included the *Canadian Journal of Applied Sport Sciences*, *International Journal of Sport Psychology*, *Journal of Applied Sport Psychology*, *Journal of Sport & Exercise Psychology*, *Journal of Sport Behavior*, *Journal of Sport Sciences*, *Perceptual and Motor Skills*, *Small Group Research*, *Group Dynamics*, and *The Sport Psychologist*. As a final strategy, group dynamics researchers were contacted to solicit published and/or unpublished data.

The various data searches produced a total of 55 articles matching the above criteria. These articles were examined and included in the meta-analysis if they met the following criteria: the cohesion–performance relationship was under test and data were available to compute an effect size. Within these constraints, 514 effect sizes were obtained from 46 studies containing 9,988 athletes and 1,044 teams. (Ultimately, 164 effect sizes were used in the meta-analysis. The rationale for reducing the population of 514 effect sizes to a sample of 164 and the protocol used are outlined below).

## *Data Coding*

Each study was examined and variables important to answering questions about the nature of the sample and/or potential moderators were coded. The variables coded included: (a) gender, (b) number of athletes, (c) number of teams, (d) age of participants, (e) type of sport (e.g., basketball, rowing, bowling), (f) level of competition (e.g., intercollegiate, intramural), (g) operational definition of performance (actual performance or self-reported performance), (h) direction of the performance–cohesion relationship (performance to cohesion, cohesion to performance), (i) nature of the research design used (correlation or experimental), (j) source of the study (e.g., refereed publication, thesis), and (k) operational definition of cohesion used.

Two researchers carried out the coding of each study. In order to ensure high reliability, the coding was agreed upon by two of the researchers when the data were transferred from the original source to the coding sheets. Subsequently, a third researcher rechecked the coding when the data were entered into the computer file.

A large number within the original sample of 514 effect sizes were from studies that contained multiple endpoints (i.e., multiple measures). For example, the Landers et al. (1982) study yielded 63 effect sizes because the Sport Cohesiveness Questionnaire, with its 7 measures of cohesion, was administered three times over the course of the season. As a result, Landers and his colleagues provided a considerable amount of data pertinent to the temporal cohesion-to-performance relationship, the temporal performance-to-cohesion relationship, and the relationship of cohesion and performance when both variables were assessed concurrently. However, multiple endpoints violate the assumption of independent data points (Bangert-Drowns, 1986; Gleser & Olkin, 1994). Thus it was decided to obtain average effect sizes (a) where multiple endpoints were present, but (b) in a manner that permitted examination of the major questions of interest (see below).

One research question of interest was whether the manifestation of cohesiveness—task vs. social cohesion—serves as a moderator in the cohesion–performance relationship. Twenty-three operational measures of cohesiveness were found in the 46 studies used in the meta-analysis. Therefore, in Step 1 those 23 cohesion measures were categorized according to whether they reflected task-oriented concerns (task cohesion) or social-oriented concerns (social cohesion) or a generic type of cohesion. What is referred to here as *generic cohesion* was typically assessed through a single item that took the form "How would you rate the cohesion of your team" (Ruder & Gill, 1982, p. 229). Given that respondents could have used the team's task unity, its social unity, or both as their point of reference in responding, generic cohesion measures were classified in a separate category.

The various measures categorized under the label *social cohesion* included: (a) group integration–social and individual-attractions-to-group–social from the Group Environment Questionnaire (Carron et al., 1985); friendship, influence, value of membership, enjoyment, sense of belonging, and closeness from the Sport Cohesiveness Questionnaire (Martens, Landers, & Loy, 1972); (c) attractions-to-group from the Multidimensional Sport Cohesion Instrument (Yukelson, Weinberg, & Jackson, 1984); (d) measures referred to as social cohesion (e.g., Bolger, 1984), and (e) reaction to conflict, seeks close relationships, tolerance of differences, and degree of independence from Berardinis, Barwind, Flaningam, and Jenkins (1983).

The various measures categorized under the label *task cohesion* included: (a) group integration–task and individual-attractions-to-group–task from the Group Environment Questionnaire (Carron et al., 1985); (b) teamwork from the Sport Cohesiveness Questionnaire (Martens et al., 1972); (c) unity of purpose, teamwork, and valued roles from the Multidimensional Sport Cohesion Instrument (Yukelson et al., 1984); and (d) measures referred to as task cohesion (e.g., Bolger, 1984).

Another research question of interest was associated with the temporal nature of the cohesion–performance relationship. Therefore, in Step 2 the effect sizes from a single study were averaged. The specific protocol used can best be illustrated using the Landers et al. study. It was pointed out above that 63 effect sizes were available because the Sport Cohesion Questionnaire with its 7 operational measures of cohesion was administered at three points in the competitive season. As result, 21 effect sizes were available to test the cohesion-to-later-performance relationship (i.e., early season cohesion to midseason performance, early season cohesion to late season performance, and midseason cohesion to late season performance). Also, another 21 effect sizes were available to test the performance-to-later-cohesion relationship.

Finally, 21 effect sizes were available to test the relationship of cohesion and performance when the two constructs were tested concurrently. When Steps 1 and 2 were completed, 6 effect sizes were derived from the Landers et al. study: early task cohesion to later performance, early social cohesion to later performance, early performance to later task cohesion, early performance to later social cohesion, social cohesion and performance assessed concurrently, and task cohesion and performance assessed concurrently.

Initial data analyses showed that the category referred to as non-refereed publications included few effect sizes from unpublished research and conference proceedings. Therefore, for purposes of analysis, the data were collapsed and a

comparison was made of refereed vs. nonpublished data. Also, a category of sport types was created consisting of interactive teams: basketball, ice hockey, volleyball, rugby, field hockey, softball, soccer, football, and baseball; and coactive teams: rifle shooting, rowing, bowling, track and field, swimming, and golf.

### *Effect Sizes*

The statistical techniques used to compute effect sizes (ES) were those outlined by Hedges (1981, 1982) and Hedges and Olkin (1985) and summarized by Thomas and French (1986). Because ES show positive bias in small samples, a correction factor was used on each ES prior to subsequent analyses. Also, each ES was weighted by the reciprocal of its variance prior to combining several ES. We obtained an overall weighted mean estimate and an estimate of the variance of the ES using the formula provided by Hedges and Olkin (1985). The designation ES is used in the present report, rather than ES', to represent ES that underwent all of the above transformations.

In order to determine whether an ES was significantly different from zero, the following formula was used:

$$SD / [(\text{square root of } n) * (1.96)]$$

where *SD* is the standard deviation of the effect size and *n* is the number of observations. If the computed value was less than .05, the ES was considered to be significantly different from zero. In the analysis of moderator variables, one-way ANOVA were used to examine for differences between conditions.

Finally, Cohen (1969, 1992) has recommended that ES values of .20, .50, and .80 be viewed as small, medium, and large, respectively. These descriptors are used in the present report.

## Results

### *Overall*

The overall analysis of the 164 effect sizes revealed a significant moderate to large relationship between cohesion and performance in sport; ES = .655, $p < .03$ (see Table 1). Although this sample of 164 effect sizes was used in all subsequent analyses to examine for potential moderator variables, it was deemed of interest to examine the overall effect in the original population of effect sizes ($n = 514$). As Table 1 shows, a slightly larger overall effect (ES = .690, $p < .02$) resulted. However, the difference in magnitude of effect size from the sample used in the study and the total population of effect sizes was not statistically significant ($p > .05$). Also, a third analysis was undertaken with a random sample generated by selecting one effect size from every data set avaialable.[2] In this case a slightly smaller overall effect was produced (ES = .645, $p < .06$). Again, however, there was no significant difference between the magnitude of the cohesion–performance relationship whether the data consisted of the total population of effect sizes or the sample of effect sizes ultimately used (both $p > .05$).

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[2]Although only 46 studies were included in the meta-analysis, Gruber and Gray (1981) reported data from multiple samples. Thus the number of cases in the "random analysis" was 49.

**Table 1 The Cohesion–Performance Relationship in Sport**

| Factor | *F*-test | *p* | Effect size | *SD* | *n* | *p* |
|---|---|---|---|---|---|---|
| Total population of effect sizes | | | .690 | .951 | 514 | .02 |
| Random sample of effect sizes | | | .645 | .886 | 49 | .06 |
| Average effect size from individual studies | | | .655 | .877 | 164 | .03 |
| Refereed vs. Non-refereed | $F(1, 162) = 73.38$ | <.001 | | | | |
| Refereed | | | .730 | .915 | 109 | .04 |
| Nonpublished | | | .507 | .783 | 55 | .05 |
| Paradigm | $F(1, 162) = 1.95$ | ns | | | | |
| Correlational | | | .692 | .917 | 54 | .06 |
| Experimental | | | .406 | .468 | 13 | .07 |
| Type of Cohesion Measure | $F(2, 161) = 0.26$ | ns | | | | |
| Task | | | .607 | .737 | 68 | .05 |
| Social | | | .702 | 1.009 | 86 | .06 |
| Generic measure | | | .582 | .478 | 10 | .08 |
| Sport type | $F(1, 154) = 0.29$ | ns | | | | |
| Coactive | | | .766 | .565 | 20 | .06 |
| Interactive | | | .657 | .927 | 136 | .04 |
| Females vs. Males | $F(1, 160) = 2.59$ | <.05 | | | | |
| Females | | | .949 | 1.295 | 44 | .10 |
| Males | | | .556 | .722 | 74 | .04 |
| Measure of Performance | $F(1, 162) = 0.51$ | ns | | | | |
| Self-reported | | | .577 | .533 | 46 | .04 |
| Behavior | | | .686 | .979 | 118 | .03 |
| Direction of Relationship | $F(1, 102) = 0.51$ | ns | | | | |
| Cohesion to performance | | | .566 | .887 | 54 | .06 |
| Performance to cohesion | | | .689 | .872 | 50 | .06 |
| Cohesion Type by Direction | $F(3, 94) = 0.21$ | ns | | | | |
| Performance to task cohesion | | | .642 | .577 | 23 | .06 |
| Performance to social cohesion | | | .715 | 1.099 | 25 | .11 |
| Task cohesion to performance | | | .509 | .967 | 23 | .10 |
| Social cohesion to performance | | | .603 | .887 | 27 | .09 |
| Level of Competition | $F(5, 142) = 1.81$ | ns | | | | |
| Intercollegiate | | | .811 | .979 | 74 | .06 |
| High school | | | .769 | 1.367 | 16 | .17 |
| Laboratory | | | .720 | .454 | 11 | .07 |
| Intramural | | | .732 | .754 | 20 | .09 |
| Professional | | | .192 | .327 | 10 | .05 |
| Club | | | .236 | .325 | 17 | .04 |

(*continued*)

**Table 1** (***Continued***)

| Factor | *F*-test | *p* | Effect size | *SD* | *n* | *p* |
|---|---|---|---|---|---|---|
| **Group Environment Questionnaire** | | | | | | |
| Overall | | | .499 | .674 | 97 | .03 |
| Refereed vs. Non-refereed | $F(1, 95) = .05$ | ns | | | | |
| Refereed | | | .486 | .514 | 55 | .04 |
| Nonpublished | | | .517 | .845 | 42 | .07 |
| Paradigm | $F(1, 95) = .79$ | ns | | | | |
| Correlational | | | .518 | .692 | 89 | .04 |
| Experimental | | | .296 | .401 | 8 | .07 |
| Type of Cohesion Measure | $F(3, 93) = 1.00$ | ns | | | | |
| Attractions to group–Task | | | .471 | .455 | 25 | .05 |
| Attractions to group–Social | | | .349 | .533 | 21 | .06 |
| Group integration–Task | | | .676 | .961 | 27 | .09 |
| Group integration–Social | | | .463 | .573 | 24 | .06 |
| Task vs. Social Cohesion | $F(1, 95) = 1.49$ | ns | | | | |
| Task cohesion | | | .577 | .760 | 52 | .05 |
| Social cohesion | | | .410 | .552 | 45 | .04 |
| Sport Type | $F(1, 87) = 5.76$ | <.02 | | | | |
| Coactive | | | 1.042 | .605 | 8 | .10 |
| Interactive | | | .451 | .670 | 81 | .04 |
| Females vs. Males | $F(1, 54) = 2.74$ | ns | | | | |
| Females | | | .672 | 1.010 | 28 | .10 |
| Males | | | .321 | .489 | 28 | .05 |
| Measure of Performance | $F(1, 95) = 3.47$ | ns | | | | |
| Self-reported | | | .707 | .521 | 26 | .05 |
| Behavior | | | .423 | .700 | 71 | .04 |
| Direction of Relationship | $F(2, 94) = .97$ | ns | | | | |
| Cohesion to performance | | | .492 | .894 | 32 | .08 |
| Performance to cohesion | | | .399 | .384 | 36 | .03 |
| Concurrent measures | | | .633 | .674 | 29 | .06 |
| Cohesion Type by Direction | $F(3, 64) = 0.01$ | ns | | | | |
| Task cohesion to performance | | | .565 | 1.077 | 18 | .13 |
| Social cohesion to performance | | | .398 | .610 | 14 | .08 |
| Performance to task cohesion | | | .459 | .355 | 19 | .04 |
| Performance to social cohesion | | | .331 | .414 | 17 | .05 |

(*continued*)

**Table 1** ***(Continued)***

| Factor | *F*-test | *p* | Effect size | *SD* | *n* | *p* |
|---|---|---|---|---|---|---|
| Cohesion Type by Direction | $F(7, 60) = 0.40$ | ns | | | | |
| Group integration–task to performance | | | .726 | 1.510 | 9 | .26 |
| Individual attractions to group–task to performance | | | .404 | .360 | 9 | .06 |
| Group integration–social to performance | | | .515 | .669 | 8 | .12 |
| Individual attractions to group–social to performance | | | .241 | .537 | 6 | .11 |
| Performance to group integration–task | | | .490 | .355 | 10 | .06 |
| Performance to individual attractions to group–task | | | .425 | .375 | 9 | .06 |
| Performance to group integration–social | | | .396 | .459 | 9 | .08 |
| Performance to individual attractions to group–social | | | .256 | .371 | 8 | .07 |
| Level of Competition | $F(4, 88) = 2.04$ | ns | | | | |
| Professional | | | .198 | .336 | 8 | .06 |
| Club | | | .234 | .335 | 16 | .04 |
| Intercollegiate | | | .549 | .479 | 50 | .03 |
| High school | | | .828 | 1.474 | 12 | .22 |
| Laboratory | | | .735 | .525 | 7 | .10 |

*Publication and Design Difference.* The first question of interest was whether the source of the data would influence the magnitude of the cohesion–performance relationship. As the results in Table 1 show, data from refereed publications present a significantly ($p < .001$) more optimistic picture of the cohesion–performance relationship (ES = .730) than do data from sources that are not published (ES = .507). As Table 1 shows, differences were present in the magnitude of the cohesion–performance relationship in those studies using a correlational paradigm (ES = .692) vs. those using an experimental paradigm (ES = .406). However, this difference was not statistically significant.

*Type of Cohesion Measure.* The principal interest in examining type of cohesion measure as a potential moderator was to determine whether task and social cohesion are both related to successful performance in sport teams. Although, surprisingly, social cohesion showed a stronger relationship with performance (ES = .702) than either task cohesion (ES = .607) or a generic measure of cohesion (ES = .582), the differences among the three were not statistically significant.

*Sport Type.* Although the cohesion–performance relationship is slightly stronger in coactive sports (ES = .766) than in interactive sports (ES = .657), the difference is not statistically significant ($p > .05$). Thus, type of sport does not moderate the cohesion–performance relationship.

*Gender.* As Table 1 shows, a large cohesion–performance relationship is present for female athletes/teams (ES = .949), but only a moderate cohesion–performance relationship is present for male athletes/teams (ES = .556). Moreover, the difference is statistically significant ($p < .05$).

*Measure of Performance.* Concern has been raised about the validity of self-reports. Interestingly, an identical picture of the cohesion–performance rela-

tionship is provided whether performance is assessed through self-reports (ES = .577) or through actual behavioral indices (ES = .686).

*Direction of Relationship.* Two sets of analyses were undertaken to examine for possible temporal effects in the cohesion–performance relationship. For one set of analyses, an overall measure of cohesion was used in that task and social cohesion were combined; for the second set of analyses, the results for social and task cohesion data were examined independently. As Table 1 shows, no differences are present ($p > .05$) in cohesion as a *cause of* (ES = .566) vs. cohesion as a *result of* (ES = .689) successful performance. Similar findings were obtained when the temporal nature of the cohesion–performance relationship was examined and type of cohesion measure (task and social cohesion) was considered. In short, both task and social cohesion contributes to better performance and, likewise, better performance contributes to task and social cohesion.

*Skill/Experience of the Competitors.* As Table 1 shows, there were differences in the magnitude of the cohesion–performance relationship across levels of competition from professional to club to intercollegiate to high school and intramural. However, the ANOVA showed that these differences were not statistically significant ($p > .05$). Thus it can be concluded that skill/experience level of the competition is not a moderator in the cohesion–performance relationship.

*Group Environment Questionnaire.* When the sample of ES were subdivided and analyses were undertaken using only data derived from the Group Environment Questionnaire (GEQ), the results were generally similar to those produced using the total sample of ES—although the magnitude of the cohesion–performance relationship was smaller. For example, as Table 1 shows, the overall cohesion–performance relationship was significant and moderate in magnitude (ES = .499, $p < .03$). This finding contrasts with the significant moderate to large ES derived from the total sample of ES (i.e., ES = .655). An ANOVA on results from the GEQ vs. results obtained with other operational definitions of cohesion showed that the latter produced a significantly stronger cohesion–performance relationship, $F(1, 162) = 7.81$, $p < .01$.

Some of the results from the GEQ contrasted with those from the total sample and should be highlighted (see Table 1). For example, with GEQ data there was no difference in the magnitude of the cohesion–performance relationship from refereed vs. non-refereed sources. Thus, if the GEQ was the primary operational definition for cohesion in sport research, it can be reasonably assumed that the picture presented in journals is not substantially different from the one presented in conference proceedings, theses, and/or other non-refereed publications.

Widmeyer, Carron, and Brawley (1992) suggested that in light of the conceptual nature of the construct, group integration–task (GI–T) should have the strongest relationship to team performance. As the results in Table 1 show, no differences were present among the various manifestations of cohesiveness assessed through the GEQ. Both of the group integration constructs (task and social) and both of the individual-attractions-to-group constructs (task and social) showed a statistically similar small to moderate relationship to performance in sport.

Although data from all studies showed that task type was not a moderator variable, the data from those studies that used the GEQ revealed a different pattern of results. Task type was found to be a moderator with the largest cohesion–performance effect being present in *coactive* sports. These findings have to be considered

with caution, however. Due to the small number of ES available for coactive sports ($n = 8$) and variability in the results, the ES was only statistically significant at $p < .10$.

## Discussion

The general purpose of the study was to carry out a meta-analytic review of the cohesion–performance relationship in sport. One secondary purpose was to examine the role of a number of potential moderator variables. Another secondary purpose was to examine the cohesion–performance relationship in the subset of studies that used the Group Environment Questionnaire as the operational definition of cohesion.

The overall effect size using all operational measures of cohesion showed that a significant moderate to large cohesion–performance relationship is present for sport teams (ES = .655). The magnitude of the cohesion–performance effect in those studies that used the GEQ as the operational definition for cohesiveness was also significant but classified as moderate in size (ES = .499). These results are generally consistent with the results reported *for sport* in the Mullen and Copper meta-analysis. Also, as was pointed out previously, Mullen and Copper observed that the highest cohesion–performance relationship is found in sport teams (followed by military groups, nonmilitary nonsport groups, and artificial groups).

Why sport represents a context in which cohesiveness has a particularly strong relationship to performance is unclear. In attempting to come to grips with this issue, Mullen and Copper noted that in contrast to other types of groups, sport teams are characterized by high degrees of groupness or "entitativity." They also proposed that, in sport, standards for excellence are clear and generally universally endorsed by team members. Finally, success and failure are vivid and distinct. All of these proposed differences between teams and other types of groups are, of course, intuitively appealing and certainly possible. However, military groups also seem to be characterized in much the same way—high groupness, clear accepted standards for excellence, vivid and distinct barometers for success and failure. Yet cohesion is associated with the strongest performance effects in sport. Future sport researchers might do well to search for possible mediators to gain a better understanding of the "why" of the cohesion–performance relationship. This issue is discussed in greater depth below.

One moderator variable of the cohesion–performance relationship identified was the source of the data. A pervasive impression among scholars (cf. Rosenthal, 1966) is that peer-reviewed journals tend to favor research that either is consistent with previously published findings or which supports theoretical predictions. Interestingly, when the total sample of ES was examined, the data did show a difference between refereed and unpublished work with the largest effect being reported in the former. However, when the sample of ES emanating from research using the GEQ was examined, no difference was found. For the past decade the GEQ has largely been the operational definition used in sport research. Thus it is encouraging that recent conclusions about the magnitude of the cohesion–performance effect can be viewed as valid, regardless of the data source.

One important difference between the Mullen and Copper meta-analysis and the present findings pertains to the association between performance and type of cohesion. Mullen and Copper placed various operational measures of cohesion into three categories—commitment to task, interpersonal attraction, and group

pride—and found that only commitment to task (analogous to task cohesion) was significantly related to performance. As was pointed out above, their sample necessarily included a broad cross-section of groups. Our results, using sport teams only, showed that both task and social cohesion are associated with performance.

These results have important implications for applied sport psychology and the interventions used with athletes and teams to enhance team cohesiveness. Some team-building interventions used thus far appear to be, at least according to their description, nontask and socially oriented activities. These include personal growth experiences (e.g., McClure & Foster, 1991), team campouts (e.g., Cogan & Petrie, 1995), ropes and challenge courses (e.g., Meyer, 2000), and social get-togethers outside the sport context (e.g., Yukelson, 1997). It could be predicted that the primary outcome from these types of interventions would be social cohesion.

Other team-building interventions, again based on their description, appear to have more directly focused on the team's tasks and objectives. These include exercises designed to enhance team goal-setting (e.g., Widmeyer & DuCharme, 1997), communication (e.g., Yukelson, 1997), and role clarity and acceptance and conformity to team norms (e.g., Prapavessis, Carron, & Spink, 1996). It could be predicted that the primary outcome from these types of interventions would be task cohesion.

Team-building interventions are designed to improve team cohesiveness with the ultimate objective of improving team performance. If the results from the Mullen and Copper meta-analysis were used as a basis for structuring intervention programs, a strong case could be made against the use of socially oriented team-building interventions; their major impact would be on social cohesion, yet social cohesion was unrelated to performance. However, the results from the present meta-analysis show that interventions targeting either or both task and social cohesion should have an influence on performance.

The present results also showed that task type is not a moderator for the cohesion–performance relationship. That is, more cohesiveness is related to better performance in both coactive sports (e.g., golf) and interactive sports (e.g., basketball). Mullen and Copper reported similar findings. Interestingly, however, the results in the present meta-analysis from studies that used the GEQ as the operational measure of cohesiveness provide preliminary evidence that the cohesion–performance effect is stronger in coactive sports.

Whether the cohesion–performance relationship in coactive sports is slightly stronger or equal to the magnitude of the relationship in interactive sports seems unimportant. What does seem to be of primary importance is the fact that cohesion is reliably associated with performance in coactive sports. This is another finding that has implications for applied sport psychology and the use of team-building interventions. Not surprisingly perhaps, the absolute level of group cohesion present in coactive sport teams is significantly less than in interactive sport teams (Carron et al., 1985; Widmeyer et al., 1985). In interactive sports, coaches inevitably and explicitly introduce many of the team-building strategies associated with increased cohesiveness: ensuring role clarity and acceptance, establishing team performance goals, improving athlete-athlete and coach-athlete communication, and so on. On the other hand, the nature of coactive sports means there are fewer natural or inevitable opportunities for groupness or "entitativity" to develop. As a consequence, team-building interventions might have a greater impact on both team cohesion and team performance in that context.

The search for possible moderator variables produced another finding that should be highlighted. Although the analysis of the total sample of ES and the analysis of ES from research using the GEQ produced slightly different results, in general the data do support the suggestion that the cohesion–performance relationship is greater in female sports. It should be noted that normative data published by Widmeyer et al. (1985) show that the absolute amount of cohesiveness in female and male teams is highly similar in that they generally do not differ on the degree to which they are cohesive. Yet the cohesiveness in female teams is more strongly associated with performance. Thus, events that contribute to a loss of cohesiveness might be expected to be more detrimental to team success in female teams.

Anecdotally, a recent discussion about the U.S. Olympic women's volleyball team illustrates this point. As a result of considerable internal conflict, "in the days before the 1996 Olympics [the team] was on the edge of disintegration. The gold medal that some observers had predicted ... had become an afterthought to the players" (Wahl, Wertheim, & Dohrman, 2001, p. 60). The team eventually placed 7th, leading one team member to comment, "with women's sports especially, so much is based on emotion and how the team is feeling" (Wahl et al., 2001, pp. 69-70). In short, from a performance perspective, it would seem especially important for coaches and applied sport psychologists to strive to maintain high cohesiveness and prevent team conflict in female teams.

The results from the present study also showed that there is no difference between the cohesion-to-performance and the performance-to-cohesion relationships. In this regard, sport teams differ from groups in general. As Mullen and Copper (1994) pointed out, for groups generally, "although cohesiveness may indeed lead the group to perform better, the tendency for the group to experience greater cohesiveness after successful performance may be even stronger" (p. 222). Intuitively, the results from the Mullen and Copper meta-analysis seem more logical than those of the present study. Just as there are no atheists in foxholes, unhappy athletes are ostensibly nonexistent when TV cameras invade the dressing rooms of championship teams. Future research might investigate whether the temporal nature of the performance–cohesion relationship is influenced by moderator variables such as level of experience (professional vs. intercollegiate vs. high school) and/or member status (starting status, playing time, etc.).

The results also support the general conclusion that there is generality in the cohesion–performance relationship across the broad band of athlete skill and experience from high school to professional sport. This conclusion must be considered tentative, however. Substantial differences in the magnitude of the cohesion–performance effects were found among athletes at different levels of competition; for example, ES = .769 for high school teams and .192 for professional teams. Furthermore, some individual effect sizes did not differ statistically from zero, possibly as a result of low statistical power. Further research could lend insight into this question.

A final note is appropriate. One unfortunate byproduct of any meta-analysis—if other researchers consider the protocol to be acceptable and the sample to be representative—is that the results may be assumed to provide the final answer on an issue. The present meta-analysis does not offer any final answers. Science proceeds in stages from description to explanation to prediction to control. Meta-analyses provide a summary at the descriptive stage. They do not offer insights

into questions associated with the "why" or "when" of a relationship—important questions insofar as the cohesion–performance relationship is concerned.

What are the important mediators of the cohesion–performance (and performance–cohesion) relationship? A useful starting point for answering this question might be to concentrate on important aspects of the dynamics of groups that have been shown to be correlated with both cohesion and team success: goal clarity and acceptance (Brawley et al., 1987); role clarity, role acceptance, and role performance (Bray, 1998); normative expectations (Kim, 1995); and efficacy, both role efficacy (Bray, 1998) and collective efficacy (Paskevich, 1995)—these are but a few examples. Paskevich for example found some support for the conclusion that collective efficacy is a mediator in the relationship between cohesion and performance outcome. Future research should continue to investigate how other manifestations of group dynamics in sport teams influence the cohesion–performance relationship.

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*Manuscript submitted*: April 24, 2001
*Revision accepted*: November 15, 2001