

Examining the Origins of Team Building in Sport: A Citation Network and Genealogical Approach

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Team building (TB) is regarded as one of the most effective group development interventions in organizations (Cannon-Bowers, J. A., & Bowers, C. [2010]. Team development and functioning. In S. Zedeck [Ed.] *APA handbook of industrial and organizational psychology* [Vol. 1, pp. 597–650]. Washington, DC: American Psychological Association.). Although the body of literature on TB continues to grow, there have been few attempts to synthesize TB research in sport. The present study examined the influential texts (articles, books, and chapters) providing the basis for TB in sport using two novel, yet related, research synthesis approaches; namely, citation network analysis and citation path analysis. Results revealed how a focus on cohesion helped shape present conceptualizations and research of TB in sport. The findings also serve to highlight alternative perspectives and frameworks (i.e., other than those with a focus on cohesion) that may have been overlooked or ignored by group dynamics researchers interested in TB in sport.

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Over the past 50 years, team building (TB) has been regarded as one of the most prevalent

and promising group development interventions applied within organizations (Beer, 1976; French & Bell, 1984; Klein et al., 2009). While sometimes referred to as team development, group development, or team enhancement (Carron & Eys, 2012; DeMeuse & Liebowitz, 1981; Tannenbaum, Beard, & Salas, 1992), TB has evolved from a group process intervention intended to improve interpersonal relationships to a group-based intervention designed to also enhance team effectiveness, functioning, and performance (see Klein et al., 2009 for a review). With its origins in the organizational psychology literature, TB has been defined in a number of ways (cf. Hardy & Crace, 1997). Newman (1984) put forward a common definition of TB as a group-based intervention designed to “promote a greater sense of unity and cohesiveness, and to enable the team to function more smoothly and effectively” (p. 27). Brawley and Paskevich (1997) subsequently offered an integrated definition of TB based upon several definitions in the organizational psychology literature: “a method of helping the group to (a)

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increase effectiveness, (b) satisfy the needs of its members, or (c) improve work conditions” (pp. 13–14).

One prominent context within which TB is applied is sport. A likely reason for this is that sport team members often work together in close proximity with one another toward shared goals with the purpose of obtaining a very visible outcome (i.e., team success). Thus, if disharmony within the group is present, this will likely affect group functioning. Conversely, if TB can serve as a mechanism to direct group efforts and foster improved interpersonal dynamics, this represents a logical means for the group to maximize its potential.

In light of the potential for TB to support interpersonal processes within sport teams it is perhaps unsurprising that there has been a steady accrual of evidence supporting the effectiveness and benefits associated with TB to individuals (e.g., improved confidence, individual satisfaction) and groups (e.g., improved cohesion, performance) (Dunn & Holt, 2004; Newin, Bloom, & Loughhead, 2008; Senecal, Loughhead, & Bloom, 2008). TB interventions in sport have typically implemented one or a combination of four approaches identified in the organizational psychology literature including the improvement of goal setting, problem solving, interpersonal relationships (e.g., cohesion), and role development (Beer, 1976; Buller, 1986).

Recently, Martin and colleagues (2009) conducted a meta-analysis of 17 TB studies in sport to evaluate the effectiveness of TB and appraised a number of potential moderators influencing the TB-team effectiveness relationship. Specific variables examined included characteristics of the study (e.g., experimental design), intervention (e.g., intervention type, mode of delivery, intervention length), participants (e.g., gender, type of sport), and dependent variables (e.g., cohesiveness, performance, enhanced cognitions, roles, anxiety). Overall, the effectiveness of the TB interventions in sport (i.e., for all the dependent variables) was found to be positive and moderate in size. Examination of potential moderators attenuating the TB-effectiveness relationship yielded a number of noteworthy findings. In brief, the largest effects were found in TB studies displaying nonexperimental designs, using a goal setting approach, and TB interventions that were longer in du-

ration (see Martin et al., 2009 for a complete summary). One notable finding was that TB had a stronger effect on performance than on cohesion.

Although the results of the Martin et al. (2009) meta-analysis provided some indication of the specific types of TB interventions that have been found to be effective in fostering improvements in outcomes such as cohesion and team performance, the research synthesis approach taken in that study offers little insight into what bodies of literature have shaped TB approaches in sport. Specifically, what are the salient sources guiding major theoretical and applied contributions in the field? Further, what is the diversity of those sources that have contributed to the current state of best practice in TB in sport? One informative and underutilized research synthesis approach that can shed light on TB in sport is citation *network* analysis. Citation network analysis systematically evaluates the integration of the literature on a given topic (Moore, Shiell, Hawe, & Haines, 2005). Specifically, it provides a novel approach to evaluate the interconnections of citations between articles. Through this process, key prominent scholars and articles in a field of study are identified. The most cited articles are referred to as “connectors” or “hubs” (Barabási & Bonabeau, 2003). The citation term “hub” is derived from “airport hubs” that serve to connect many smaller airports and centers (Barabási & Bonabeau, 2003).

A second type of analysis, citation *path* analysis, can also be used to identify a longitudinal path of key linking or “bridging” texts shaping our present understanding in a field over time (Hummon & Doreian, 1989). The term “text” in citation analysis is broadly defined as a unit of scientific work and can be an article, chapter, or book. The citation *path* analysis structurally evaluates the connectivity of the citation practices of the texts in a field with a goal of identifying the incremental development and flow of knowledge over time (de Nooy, Mrvar, & Batajelk, 2005). In essence, this type of analysis creates a genealogy revealing the crucial links in the literature on a particular topic. Together, citation network analysis and citation path analysis hold considerable promise to enhance understanding of TB in sport by identifying bodies of literature, and trends, that have shaped the field as well as identifying potential

restrictions and omissions that have emerged as the field of enquiry developed. Although citation network analysis has been used in a number of research fields (e.g., health promotion, biology), it has only recently been used in applied psychology (Bruner, Erickson, McFadden, & Côté, 2009; Bruner, Erickson, Wilson, & Côté, 2010). As one example in a sport context, previous citation research identified the influential texts and scholars in the area of athlete development (Bruner et al., 2009; Bruner et al., 2010). Of equal importance, the path analysis conducted by Bruner and colleagues identified the key origin and linking texts within and outside of sport psychology (e.g., music, art, mathematics, and science) shaping the present understanding of athlete development. The findings also served to highlight the *absence* of several texts that should be revisited and integrated to advance the area of study. Undertaking a similar citation analysis approach provides a unique genealogical perspective of the influential literature on TB in sport as well as highlight specific future directions for TB research.

Given the identified benefits of citation network analysis, the purpose of this review was twofold: (1) to examine the interconnectedness of the TB literature in the domain of sport using citation *network* analysis and (2) to longitudinally investigate the key origin and linking texts shaping research in TB in sport using citation *path* analysis.

Method

Specification of the Article Population

The selection of texts for the citation analysis for TB in the sport psychology literature was conducted in two phases. Phase I consisted of database searches and personal correspondence with TB experts. Phase I began with searching for peer-reviewed TB articles with “team building,” “team development,” “group development,” or “team enhancement” in the article title, identified keywords, or abstract. The search was conducted in January 2011, using seven databases: (a) Psych Info, (b) Sport Discus, (c) Medline, (d) PubMed, (e) ERIC, (f) EBSCOhost, and (g) CINAHL.

A search of the seven databases yielded 16,276 possible texts (see Figure 1). Fifty-two TB texts were initially selected for inclusion in

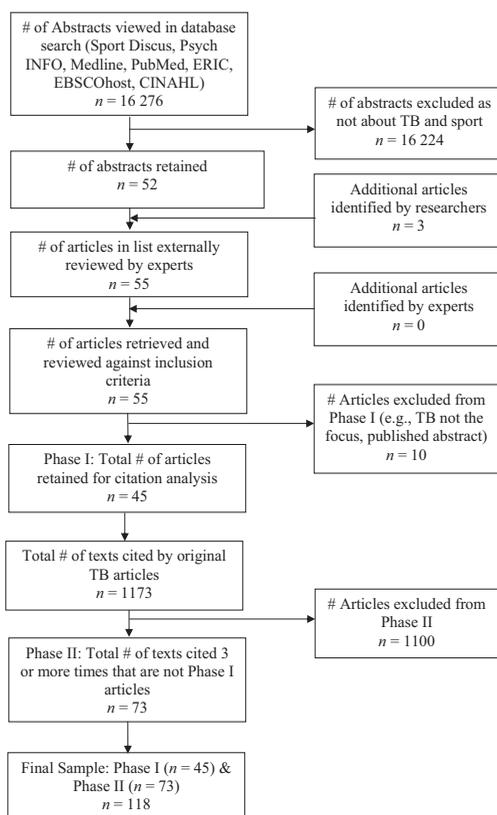


Figure 1. Team building citation flow diagram.

Phase I of the study based on meeting four criteria: (a) “team building,” “team development,” “group development,” or “team enhancement” in the title, identified key words, or abstract; (b) peer-reviewed article; (c) specific to the sport domain; and (d) English language. Upon review of the list, three additional peer-reviewed TB articles were identified and included by the study coauthors. As a part of the validation process for Phase I, two group dynamics experts in the field of sport psychology were contacted and asked to independently review the list of 55 articles and determine whether any others were missed or warranted inclusion. The two experts had multiple publications in the area of group dynamics (>100 articles each in the area of group dynamics). No additional TB articles were identified by the experts. Final full screening of the 55 identified TB articles against the study criteria, in addition to determining whether TB was a major focus of

the article, resulted in a list of 45 TB articles for Phase I (highlighted with an asterisk "*" in the references). Ten articles were excluded as they either did not focus on TB (e.g., only mentioned TB briefly in the discussion section of the article) or ultimately were not peer-reviewed articles (e.g., published conference abstracts).

To identify the key linking texts or "main path" of TB in sport literature, the references of the Phase I articles were analyzed for additional sources. Specifically, this phase entitled "Phase II" involved expanding the text population to include articles, books, and book chapters that were cited three or more times by the 45 Phase I articles in a fashion similar to previous work (Bruner et al., 2009; Moore, Haines, Hawe, & Shiell, 2006). Phase II revealed 1,173 texts overall, with 86 texts being cited three or more times by Phase I articles. Of the 86 texts, 73 were new (i.e., not part of the 45 Phase I articles; available in the supplemental file online). It should be noted that the Phase II texts were not required to be in the field of sport psychology or necessarily appear in the databases used in Phase I (Moore et al., 2006). Collectively, the 45 texts from Phase I and the 73 texts from Phase II constituted the study's sample of 118 texts (see Figure 1).

Procedure

Citation network analysis. Following the specification of the text population ($n = 118$), the reference list for each of the 118 texts was then examined to determine whether each text cited any of the other texts in the population. The citation information extracted from each of the references was entered into UCINET network analysis software (Borgatti, Everett, & Freeman, 2002). Based on this information, centrality scores (i.e., indices that evaluate the prominence of the texts within the network) were calculated for each text. Centrality scores can be further subdivided into in-degree and out-degree centrality scores. *In-degree* centrality scores refer to the number of other texts in the text population that cite the article, whereas *out-degree* centrality scores refer to how many other texts in the text population are cited by a specific text (Moore et al., 2005). Of particular interest in this study was the identification of "hubs" or texts with high in-degree centrality measures indicating more central or influential

roles in the network sample (Barabási, 2003; Barabási & Bonabeau, 2003).

Citation path analysis. Using the software program Pajek (Pajek 1.23; Batagelj & Mrvar, 1996), a main path analysis (Hummon & Doreian, 1989) was conducted to identify the key linking texts shaping the intellectual flow of knowledge in the TB literature. To determine the texts in the genealogy, the program mathematically evaluates all possible paths from "origin" text(s) at the base of the path through to "terminal" or ending text(s) (with no ties leaving each text) (Hummon & Doreian, 1990). Specifically, the program examines the traversal counts of the links between texts in the network (Hummon & Doreian, 1989; Hummon & Doreian, 1990; Hummon, Doreian, & Freeman, 1990). Traversal counts refer to the number of times a text is involved in possible citation pathways from origin to terminal texts within the citation network (Hummon & Doreian, 1990). Based on this information, a main path diagram was created depicting the longitudinal development of knowledge through citations in the area of TB.

Results

Figure 2 presents 118 articles in the TB citation network. Each text is represented by a node in the figure. The size of each node is reflective of the text's in-degree centrality score (i.e., the number of other texts citing the text) as compared with the other texts in the network. The mean in-degree centrality score was 7.20 ($SD = 6.99$), meaning that on average each article was cited approximately seven times in the network. The in-degree centrality scores ranged from zero to 36 citations. Table 1 presents the most cited or hub texts in the population. The most prominent text in the citation network was a group cohesion article by Carron, Widmeyer, and Brawley (1985) with an in-degree centrality score of 36. This article by Carron and colleagues outlined the development of the Group Environment Questionnaire (GEQ), which is an established, conceptually driven instrument commonly used to assess cohesion in sport teams (Dion, 2000). Interestingly, eight of the 10 most prominent texts are on group cohesion, with a particular focus on works led by Carron and his colleagues (Brawley, Carron, & Widmeyer, 1987; Widmeyer, Brawley, & Carron,

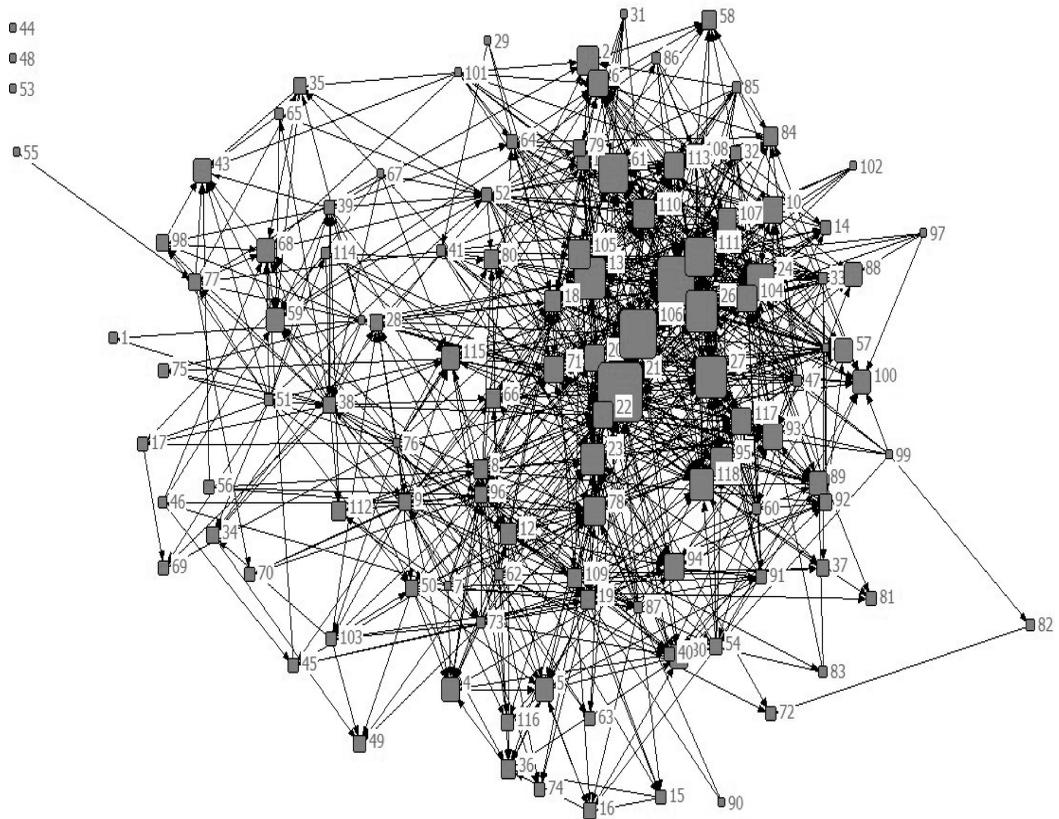


Figure 2. Citation network for the 45 articles in the team building in sport article population. Each article is represented by a node. The size of each node reflects its relative in-degree centrality score. (i.e., bigger nodes represent articles that are being cited more often). In the figure, articles with bigger nodes (i.e., with more arrows pointing toward them) indicate a more prominent article. The number beside each node represents the identification number for the article in the citation network. The numbers for the prominent articles (i.e., largest nodes) can be found in Table 1 (e.g., 21, 106). The diagram also displays several articles located in the top left that are isolated from others in the network (e.g., 44, 48, 53).

1985; Carron, 1982). Collectively, the eight texts, including a seminal chapter by Cartwright and Zander (1968), highlight the instrumental role of group cohesion in the TB sport literature. Two other notable texts include the first group dynamics textbook in sport by Carron (1988) that describes cohesion and team building and the early text by Zander (1971) on motives and goals in groups.

The most cited text with a specific focus on TB is by Carron and Spink (1993) with an in-degree centrality score of 16. The Carron and Spink article introduced and implemented an indirect TB conceptual framework in an exercise setting based upon the organizational psy-

chology literature. Another notable TB text in the table included a quasi-experimental study by Prapavessis, Carron, and Spink (1996) examining the effectiveness of the Carron and Spink (1993) TB conceptual framework in an adult soccer setting. Of further note, three non-sport group dynamics books (Steiner, 1972; Zander, 1971, 1982) emerged as being among the most prominent texts in the citation network.

Twenty-two texts were found to be on the main path (see Figure 3). An important distinction is that the main path texts do not have to be the most highly cited to be identified as key “bridging” texts (determined by traversal

Table 1
Most Frequently Cited Texts in the TB Citation Network

Rank	Title [text identification number in Figure 2]	In-degree score
1	“The development of an instrument to assess cohesion in sport teams: The group environment questionnaire” (Carron, Widmeyer, & Brawley, 1985) [21]	36
2	“The measurement of cohesion in sport teams: The Group Environment Questionnaire” (Widmeyer, Brawley & Carron, 1985)[106]	29
3	“Cohesiveness in sport groups: Interpretations and considerations” (Carron, 1982) [25]	28
4	“Assessing the cohesion of teams: Validity of the group environment questionnaire” (Brawley, Carron, & Widmeyer, 1987) [13]	24
	“The nature of group cohesiveness” (Cartwright & Zander, 1968) [27]	24
6	“Group dynamics in sport: Theoretical and practical issues” (Carron, 1988) [26]	23
7	“Group cohesiveness as a determinant of success and member satisfaction in team performance” (Martens & Peterson, 1971) [61]	21
	“Causal relationships among cohesion, satisfaction, and performance in women’s intercollegiate field hockey teams” (Williams & Hacker, 1982) [111]	21
9	“Cause-effect characteristics of cohesiveness and participation motivation in intercollegiate hockey” (Carron & Ball, 1977) [24]	19
10	“Motives and goals in groups” (Zander, 1971) [118]	17
11	“Team building in an exercise setting” (Carron & Spink, 1993) [23]	16
12	“Group processes and productivity” (Steiner, 1972) [95]	15
	“The cohesion-performance outcome relationship in a coaching sport” (Williams & Widmeyer, 1991) [110]	15
14	“The influence of team cohesion and participation motivation upon performance success in intercollegiate ice hockey” (Ball & Carron, 1976) [2]	14
	“Team-building in sport” (Prapavassis, Carron, & Spink, 1996) [78]	14
	“Predicting cohesion in a coaching sport” (Widmeyer & Williams, 1991) [105]	14
17	“Group dynamics in sport (2nd ed)” (Carron & Hausenblas, 1998) [22]	13
	“Exploring the relationship between cohesion and group resistance to disruption” (Brawley, Carron, & Widmeyer, 1988) [10]	13
	“The relationship between perceived coaching behaviour and group cohesion in professional football” (Westre & Weiss, 1991) [104]	13
20	“Development of a model for predicting team performance” (Bird, 1977) [6]	12
	“The measurement of cohesiveness in sport groups” (Carron, Brawley, & Widmeyer, 1998) [20]	12
	“The relation between cohesiveness and performance: An integration” (Mullen & Copper, 1994) [71]	12
	“Group cohesion and adherence in exercise classes” (Spink & Carron, 1992) [93]	12
	“The effects of team building on the adherence patterns of female exercise participants” (Spink & Carron, 1993) [94]	12
	“A multidimensional group cohesion instrument for intercollegiate basketball teams” (Yukelson, Weinberg, & Jackson, 1984) [113]	12
	“Making groups effective” (Zander, 1982) [117]	12

counts) linking the TB in sport literature over time. The top of the path represents the most recent contributions in the area of TB, whereas the bottom of the path indicates the origin texts in the field. Of notable interest, all 22 of the texts from the path’s origin to the terminal texts focused on cohesion generally or in relation to the TB process. More specifically, 15 of the texts were empirical studies that examined cohesion, including three TB interventions. Eight of the 15 texts investigated cohesion as an independent variable, whereas three investigated

cohesion as a dependent variable. The remaining four empirical study texts included three articles involved in the development and validation of the GEQ and one article that described a qualitative investigation of expert coaches’ perceptions of TB in sport. The remainder of the path ($n = 7$ texts) included a review of TB in youth sport (Bloom, Loughhead, & Newin, 2008), two books on group dynamics in sport (Carron, 1988; Carron & Hausenblas, 1998), two book chapters on cohesion (Carron, Brawley & Widmeyer, 1998; Widmeyer, Brawley, &

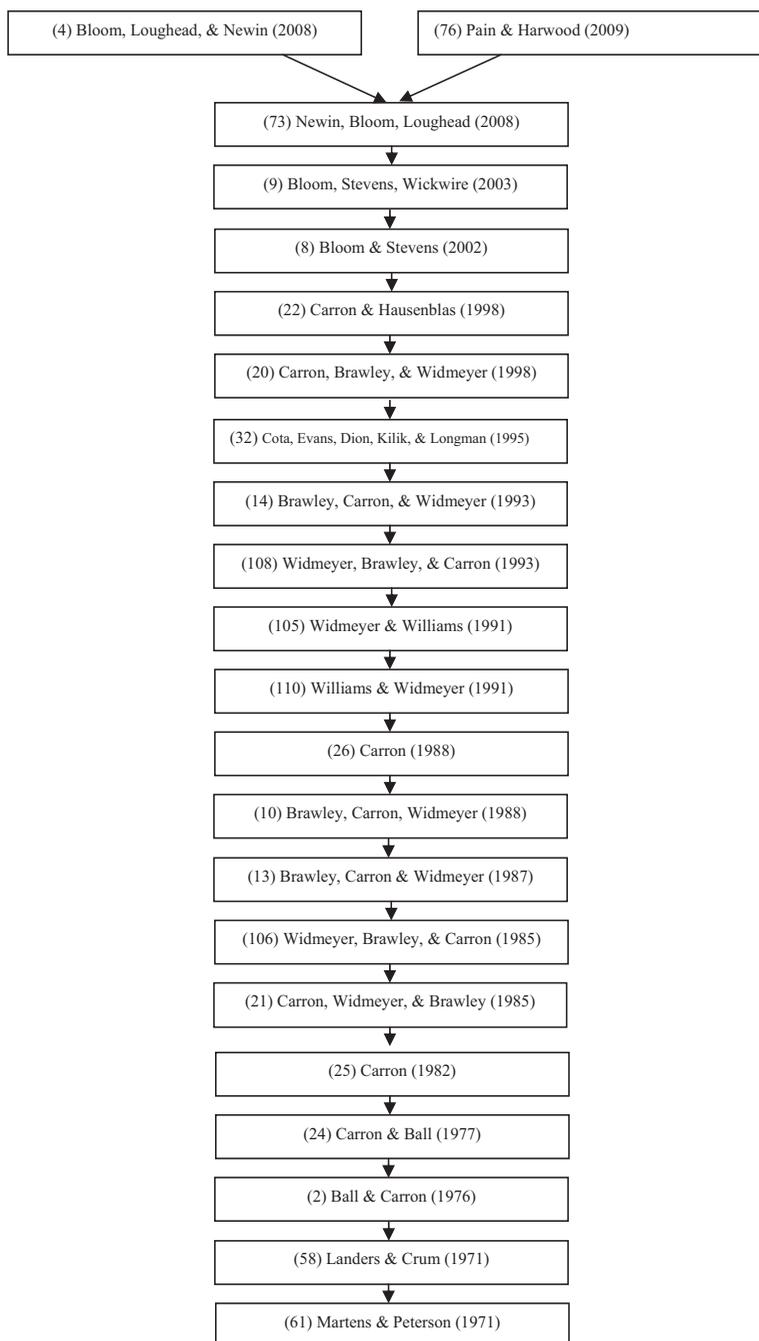


Figure 3. Team building in sport main path diagram. In citation path analysis, it is possible for multiple texts to emerge at the origin (base) or top of the main path diagram. For example, in a citation path analysis of the health promotion concept “social capital,” Moore and colleagues (2006) traced the origins of the concept to two distinct literatures of social support and income inequality. The top of the main path may also have more than one text as the top is the most variable and reflects the recent literature. As such, a replication of the work at a different moment in time may reveal different text(s) based upon the citations of future work.

Carron, 1993), and three review articles on cohesion, including two in sport and one in social psychology (Cota, Evans, Dion, Kilik, & Longman, 1995). Interestingly, none of the texts were from the organizational psychology literature.

Discussion

Over the past four decades, TB has been recognized as being an important team development intervention to foster effective teams (Cannon-Bowers & Bowers, 2010; Shuffler, Diaz Granados, & Salas, 2011). The purpose of this review was twofold: (1) to examine the interconnectedness of the TB literature in the domain of sport using citation network analysis and (2) to investigate the key origin and linking texts shaping research in TB in sport using citation path analysis. An examination of the most frequently cited texts in TB in sport literature revealed the prominent and important role of cohesion. Specifically, the line of work led by Carron and colleagues emerged. The influential role of cohesion was also a finding consistent in the results of the genealogy highlighting the key texts over time shaping the present understanding of TB in sport (see Figure 3). All 22 texts, including the early work cited in the genealogy, focused on cohesion in sport settings (Ball & Carron, 1976; Carron & Ball, 1977; Landers & Crum, 1971; Martens & Peterson, 1971).

The consistent findings of cohesion in relation to TB in sport between the two citation network analysis techniques are compelling but may also be viewed as a concern. On the one hand, cohesion has been identified as a focal construct within the group dynamics literature (Forsyth, 2010) and found to have a moderate to large relationship with performance (Carron et al., 2002). As such, one should perhaps not be surprised that researchers have overwhelmingly focused their research efforts on this construct. On the other hand, the restricted focus on cohesion suggests that research conducted within the field of TB in sport is relatively narrow.

Indeed, the *absence* of diverse texts and conceptual approaches to TB within sport psychology and reference to the broader group dynamics literature (in particular, work from organizational and social psychology) may be as illustrative as the study findings (i.e., *presence* of research on cohesion). For example, the TB

conceptual framework developed by Carron and Spink (1993) initially in an exercise setting was highly cited within the citation network and utilized by all the TB studies within the main path diagram apart from one (Pain & Harwood, 2009). Although Carron and Spink's (1993) TB conceptual framework was successfully implemented in exercise and sport settings with a number of populations (e.g., Prapavessis et al., 1996; Newin et al., 2008), there are other conceptual approaches within sport and organizational psychology that warrant consideration. Other TB approaches that have been introduced and successfully implemented in sport include group goal setting (Senecal et al., 2008; Widmeyer & Ducharme, 1997) and Personal Disclosure Mutual Sharing (PDMS; Dunn & Holt, 2004; Hardy & Crace, 1997; Holt & Dunn, 2006). With respect to the former, despite goal setting being identified as the most efficacious TB approach in sport in Martin et al.'s (2009) recent meta-analysis, the findings from the network analysis in this study suggest that the approach is less frequently cited and implemented. The latter PDMS approach introduced by Yukelson (1997) and further developed by Dunn and Holt (2004; Holt & Dunn, 2006) was used by Pain and Harwood (2009). The PDMS aims to foster a number of outcomes (e.g., understanding of self and others, confidence) in addition to cohesion. Outside of the sport setting, other TB approaches in organizational psychology have been developed such as Appreciative Inquiry (Cooperrider & Srivastara, 1987), Role Development and Definition (Forsyth, 1999), and Problem Solving (Cooley, 1994). The alternative approaches to TB in sport and organizational psychology, and expansion of outcomes, represent opportunities for conceptual and applied growth and consideration from which the field could benefit.

Another surprising omission from the citation network and main path findings was a representative text (or texts) from a 1997 special supplement in the *Journal of Applied Sport Psychology* specifically devoted to TB in sport (to our knowledge this is the only special supplement in any journal on TB in sport). For example, Brawley and Paskevich (1997) wrote a TB primer article in which they highlighted a number of key issues plaguing previous TB research in organizational psychology (cf. DeMeuse & Liebowitz, 1981) including the need for greater

consideration of additional outcomes of the TB process (e.g., satisfying the needs of its members, improve work conditions) along with determining its effectiveness. Brawley and Paskevich (1997) also highlighted processes that are integral to the successful implementation of a TB program, namely diagnosis (pre-screening) and evaluation. These two key processes are evident in the earlier organizational psychology work of Beer (1976), who defined organizational development as “system-wide process of data collection, diagnosis, action planning, intervention, and evaluation” (p. 10). Within the TB sport literature, the communication of diagnostic and evaluative processes and procedures is limited. From a research synthesis perspective, the absence of articles such as Brawley and Paskevich’s from the TB supplement may be perceived as a lack of integration of the issues, approaches, and recommendations put forward to direct the area.

Of equal concern was the absence of organizational psychology articles in the main path and list of most cited texts. This absence suggests that many authors may be relying upon TB texts within the sport psychology literature without seeking out and interpreting the important early and ongoing work of others in the field of group dynamics. As highlighted in a recent article by Shuffler and colleagues (2011), there is a science to team development. However, some solace can be taken from the high citation of the important early group dynamics work of Zander (1971, 1982) and Steiner (1972).

Although the study offered a novel approach to synthesizing the origins and interconnectedness of the TB literature, it is important to acknowledge the limitations of the study. The citation network findings revealing the early cohesion articles by Carron and colleagues may be partially attributed to two mechanisms within the citations—seniority and preferential attachment. A caveat of the study findings and citation network research in general is that high citation rates may be a function of the seniority of the article. Older or more “senior” articles by Carron and colleagues on cohesion have a higher likelihood of being cited in comparison with newer articles because of their longer duration in the literature (Barabási & Albert, 1999). In addition, it is possible that a second related mechanism, preferential attachment,

may have also contributed to the study findings. It has been postulated that authors of newer articles sometimes prefer to cite established, “connected,” or “hub” articles in the field. The perception of preferential attachment being that by linking their work with the visible, established article/authors, the author(s) will garner support for their work (Barabási & Albert, 1999). Thus, high citations may be function of either mechanism or both.

The present citation network analysis identified the most cited literature in TB in sport. It is important to note that the number of citations reflects only the visibility and not the importance of the text. A limitation of citation network and path analysis is that each analysis does not take into account how the citations are being used in the literature (e.g., positively, negatively, substantively, passively) or the number of self-citations. Another limitation was the English language search criteria for the TB articles. This restriction may limit the generalizability of the study findings to some sociocultural contexts (Ram, Starek, & Johnson, 2004). Future research should be expanded to include TB research in other languages.

In sum, it has been suggested that science is proposed to be cumulative and governed by two key processes: (a) the discovery of new knowledge and (b) the assimilation of old and new knowledge (Chalmers, Hedges, & Cooper, 2002). This study focused on the latter. The study findings highlight the need for sport psychology researchers and practitioners to consider diverse TB approaches in sport (e.g., goal setting) and organizational psychology (e.g., Appreciative Inquiry). Greater consideration and integration of theoretical work outside of sport may enhance conceptual growth in the field of TB in sport. The findings also highlight how group dynamics researchers in other disciplines can draw upon research in sport. For example, one key finding from this study was the emergence of Carron and colleagues theoretical and empirical work on group cohesion. While several group dynamics researchers outside of sport have cited Carron and colleagues (1985) multidimensional conceptualization of cohesion (e.g., Cota et al., 1995; Dion, 2000), an appraisal of the group dynamics literature (e.g., Webber & Donahue, 2001) indicated that greater consideration of Carron’s multidimensional perspective of cohesion (e.g., differenti-

ating between task vs. social attractions toward the group) may be instructive. Taken together, the findings support the observed synergies between the organizational and sport domains (Christie & Barling, 2010) and highlight how group dynamics researchers can consider approaches and applications from other disciplines to reduce intellectual isolation and advance understanding.

References

References highlighted by an asterisk (*) are from Phase I. Text identification numbers for Phase I articles are denoted by square brackets [] in the reference. Phase II references are available in the supplemental file online.

- Ball, J., & Carron, A. V. (1976). The influence of team cohesion and participation motivation upon performance success in intercollegiate ice hockey. *Canadian Journal of Applied Sport Sciences, 1*, 271–275.
- Barabási, A. (2003). *Linked: How everything is connected to everything else and what it means for business, science, and everyday life*. New York, NY: Plume.
- Barabási, A., & Albert, R. (1999). Emergence of scaling in random networks. *Science, 286*, 509–512.
- Barabási, A., & Bonabeau, E. (2003). Scale-free networks. *Scientific American, 288*, 50–59.
- Batagelj, V., & Mrvar, A. (1996). *Pajek-program for large network analysis*. Retrieved September 24, 2009, from <http://vlado.fmf.uni-lj.si/pub/networks/pajek/>
- Beauchamp, M. R., Lothian, J. M., & Timson, S. E. (2008). *[3]. Understanding self and others: A personality preference-based intervention with an elite co-acting sport team. *Sport & Exercise Psychology Review, 4*, 4–20.
- Beer, M. (1976). The technology of organization development. In M. D. Dunnette (Ed.), *Handbook of industrial and organizational psychology* (pp. 937–993). Chicago, IL: Rand McNally.
- Bloom, G. A., Loughhead, T. M., & Newin, J. (2008). *[7]. Team building for youth sport. *Journal of Physical Education, Recreation & Dance, 79*, 44–47.
- Bloom, G. A., & Stevens, D. E. (2002)*[8]. *A team-building mental skills training program with an intercollegiate equestrian team*. *Athletic Insight, 4*. Retrieved September 23, 2009, from <http://www.athleticinsight.com/Vol4Iss1/EquestrianTeamBuilding.htm>
- Bloom, G. A., Stevens, D. E., & Wickwire, T. L. (2003). *[9]. Expert coaches' perceptions of team building. *Journal of Applied Sport Psychology, 15*, 129–143.
- Borgatti, S. P., Everett, M. G., & Freeman, L. C. (2002). *UCINET for windows: Software for social network analysis*. Harvard: Analytic Technologies.
- Brawley, L. R., Carron, A. V., & Widmeyer, W. N. (1987). Assessing the cohesion of teams: Validity of the Group Environment Questionnaire. *Journal of Sport Psychology, 9*, 275–294.
- Brawley, L. R., & Paskevich, D. M. (1997). *[12]. Conducting team building research in the context of sport and exercise. *Journal of Applied Sport Psychology, 9*, 11–40. doi:10.1080/10413209708415382
- Bruner, M. W., Erickson, K., McFadden, K., & Côté, J. (2009). Tracing the origins of athlete development models in sport: A citation path analysis. *International Review of Sport & Exercise Psychology, 2*, 23–37. doi:10.1080/17509840802687631
- Bruner, M. W., Erickson, K., Wilson, B., & Côté, J. (2010). An appraisal of athlete development models through citation network analysis. *Psychology of Sport & Exercise, 11*, 133–139. doi:10.1016/j.psychsport.2009.05.008
- Buller, P. F. (1986). The team building-task performance relation: Some conceptual and methodological refinements. *Group & Organization Studies, 11*, 147–168. doi:10.1177/105960118601100303
- Cannon-Bowers, J. A., & Bowers, C. (2010). Team development and functioning. In S. Zedeck (Ed.), *APA handbook of industrial and organizational psychology* (Vol. 1, pp. 597–650). Washington, DC: American Psychological Association.
- Carron, A. V. (1982). Cohesiveness in sport groups: Interpretations and considerations. *Journal of Sport Psychology, 4*, 123–138.
- Carron, A. V. (1988). *Group dynamics in sport: Theoretical and practical issues*. London, Ontario: Spodym Publishers.
- Carron, A. V., & Ball, J. (1977). Cause-effect characteristics of cohesiveness and participation motivation in intercollegiate hockey. *International Review of Sport Sociology, 12*, 49–60.
- Carron, A. V., Brawley, L. R., & Widmeyer, W. N. (1998). The measurement of cohesiveness in sport groups. In J. L. Duda (Ed.), *Advancements in sport and exercise psychology measurement* (pp. 213–226). Morgantown, WV: Fitness Information Technology.
- Carron, A. V., Colman, M. M., & Wheeler, J. (2002). *[18]. Cohesion and performance in sport: A meta analysis. *Journal of Sport & Exercise Psychology, 24*, 168–188.
- Carron, A. V., & Eys, M. A. (2012). *Group dynamics in sport* (4th ed.). Morgantown, WV: Fitness Information Technology.

- Carron, A. V., & Hausenblas, H. A. (1998). *Group dynamics in sport* (2nd ed.). Morgantown, WV: Fitness Information Technology.
- Carron, A. V., & Spink, K. S. (1993). Teambuilding in an exercise setting. *The Sport Psychologist, 7*, 8–18.
- Carron, A. V., Spink, K. S., & Prapavessis, H. (1997). *[19]. Team building and cohesiveness in the sport and exercise setting: Use of the indirect intervention. *Journal of Applied Sport Psychology, 9*, 61–72. doi:10.1080/10413209708415384
- Carron, A. V., Widmeyer, W. N., & Brawley, L. R. (1985). The development of an instrument to assess cohesion in sport teams: The Group Environment Questionnaire. *Journal of Sport Psychology, 7*, 244–266.
- Cartwright, D., & Zander, A. (1968). *Group dynamics: Research and theory* (2nd ed.). New York: Harper & Row.
- Chalmers, I., Hedges, L. V., & Cooper, H. (2002). A brief history of research synthesis. *Evaluation & the Health Professions, 25*, 12–37. doi:10.1177/0163278702025001003
- Christie, A. M., & Barling, J. (2010). Beyond status: Relating inequality to performance and health in teams. *Journal of Applied Psychology, 95*, 920–934.
- Cogan, K. D., & Petrie, T. A. (1995). *[28]. Sport consultation: An evaluation of a season-long intervention with female collegiate gymnasts. *The Sport Psychologist, 9*, 282–296.
- Collins, J., & Durnad-Bush, N. (2010). *[29]. Enhancing the cohesion and performance of an elite curling team through self-regulation intervention. *International Journal of Sports and Science & Coaching, 5*, 343–362. doi:10.1260/1747-9541.5.3.343
- Cooley, E. (1994). Training an interdisciplinary team in communication and decision-making skills. *Small Group Research, 25*, 5–25. doi:10.1177/1046496494251002
- Cooperrider, D. L., & Srivastva, S. (1987). Appreciative inquiry in organizational life. *Research in Organizational Change and Development, 1*, 129–169.
- Copeland, B., Bonnell, R. J., Reider, L., & Burton, D. (2009). *[31]. Spawning sliding success: Evaluating a stress management and cohesion development program for young lugers. *Journal of Sport Behaviour, 32*, 438–456.
- Cota, A. A., Evans, C. R., Dion, K. L., Kilik, L., & Longman, R. S. (1995). The structure of group cohesion. *Personality and Social Psychology Bulletin, 21*, 572–580.
- Crace, R. K., & Hardy, C. J. (1997). *[34]. Individual values in the team building process. *Journal of Applied Sport Psychology, 9*, 41–60. doi:10.1080/10413209708415383
- DeMeuse, K. P., & Liebowitz, S. J. (1981). An empirical analysis of team-building research. *Group & Organization Studies, 6*, 357–378.
- De Nooy, W., Mrvar, A., & Batagelj, V. (2005). *Exploratory social network analysis with Pajek*. New York, NY: Cambridge University Press.
- Dion, K. L. (2000). Group cohesion: From “field of forces” to multidimensional construct”. *Group Dynamics: Theory, Research, and Practice, 4*, 7–26. doi:10.1037/1089–2699.4.1.7
- Dunn, J. G. H., & Holt, N. L. (2003). *[39]. Collegiate ice hockey players’ perceptions of the delivery of an applied sport psychology program. *The Sport Psychologist, 17*, 351–368.
- Dunn, J. G. H., & Holt, N. L. (2004). *[38]. A qualitative investigation of a personal-disclosure mutual sharing team building activity. *The Sport Psychologist, 18*, 363–380.
- Fletcher, T. B., & Meyer, B. B. (2009). *[42]. Cohesion and trauma: An examination of a collegiate women’s volleyball team. *Journal of Humanistic Counseling, Education and Development, 48*, 173–188.
- Forsyth, D. R. (1999). *Group dynamics* (3rd ed.). Belmont, CA: Wadsworth.
- Forsyth, D. R. (2010). *Group dynamics* (5th ed.). Belmont, CA: Wadsworth.
- French, W. L., & Bell, C. H., Jr. (1984). *Organization development: Behavioral science interventions for organization improvement*. (3rd ed.). Englewood Cliffs, NJ: Prentice Hall.
- Gordon, C. I., & Elmore, R. T. (1984). *[44]. Athletic team development through psychological consultation. *Journal of College Student Personnel, 25*, 278–279.
- Grieve, F. G., Whelan, J. P., & Meyes, A. W. (2000). *[47]. An experimental examination of the cohesion-performance relationship in an interactive team sport. *Journal of Applied Sport Psychology, 12*, 219–235. doi:10.1080/10413200008404224
- Hacker, C. M. (2000). *[48]. Women’s World Cup: Performance enhancement through mental skills training. *Professional Psychology: Research and Practice, 31*, 363–364. doi:10.1037/h0092813
- Hardy, C., & Crace, R. (1997). *[50]. Foundations of team building: Introduction to the team building primer. *Journal of Applied Sport Psychology, 9*, 1–10. doi:10.1080/10413209708415381
- Holt, N. L., & Dunn, J. G. H. (2006). *[51]. Guidelines for delivering personal-disclosure mutual sharing team building interventions. *The Sport Psychologist, 20*, 348–367.
- Holt, N. L., & Sparkes, A. C. (2001). *[52]. An ethnographic study of cohesiveness in a college Soccer team over a season. *The Sport Psychologist, 15*, 237–259.
- Hubball, H., & Robertson, S. (2004). * [53]. Using problem-based learning to enhance team and

- player development in youth soccer. *Journal of Physical Education, Recreation, & Dance*, 75, 38–43.
- Hummon, N., & Doreian, P. (1989). Connectivity in a citation network: The development of DNA theory. *Social Networks*, 11, 39–63. doi:10.1016/0378-8733(89)90017-8
- Hummon, N. P., & Doreian, P. (1990). Computational methods for social network analysis. *Social Networks*, 12, 273–288. doi:10.1016/0378-8733(90)90011-W
- Hummon, N. P., Doreian, P., & Freeman, L. C. (1990). Analyzing the structure of the centrality-productivity literature created between 1948 and 1979. *Science Communication*, 11, 459–480.
- Kernan, C. L., & Greenfield, P. M. (2005). *[55]. Becoming a team: Individualism, collectivism, ethnicity, and group socialization in Los Angeles girls' basketball. *Ethos*, 33, 542–566. doi:10.1525/eth.2005.33.4.542
- Klein, C., DiazGranados, D., Salas, E., Le, H., Burke, C. S., Lyons, R., & Goodwin, G. F. (2009). Does team-building work? *Small Group Research*, 40, 181–222. doi:10.1177/1046496408328821
- Landers, D., & Crum, T. (1971). The effect of team success and formal structure on interpersonal relations and cohesiveness of baseball teams. *International Journal of Sport Psychology*, 2, 88–96.
- Mack, D. E., & Gammage, K. L. (1998). *[60]. Attention to group factors: Coach considerations to building an effective team. *Avante*, 4, 118–129.
- Martens, R., & Peterson, J. A. (1971). Group cohesiveness as a determinant of success and member satisfaction in team performance. *International Journal of Sport Psychology*, 6, 49–61.
- Martin, L. J., Carron, A. V., & Burke, S. M. (2009). *[62]. Team building interventions in sport: A meta-analysis. *Sport & Exercise Psychology Review*, 5, 3–18.
- Martin, R., & Davids, K. (1995). *[63]. The effects of group development techniques on a professional athletic team. *The Journal of Social Psychology*, 135, 533–535. doi:10.1080/00224545.1995.9712224
- McClure, B. A., & Foster, C. D. (1991). *[66]. Group work method of promoting cohesiveness within a women's gymnastics team. *Perceptual & Motor Skills*, 73, 307–313.
- Mellalieu, S. D., & Juniper, S. W. (2006). *[67]. A qualitative investigation into experiences of the role episode in soccer. *The Sport Psychologist*, 20, 399–418.
- Moore, S., Haines, V., Hawe, P., & Shiell, A. (2006). Lost in translation: A genealogy of the "social capital" concept in public health. *Journal of Epidemiology & Community Health*, 60, 729–734. doi:10.1177/1046496408328821
- Moore, S., Shiell, P., Hawe, P., & Haines, V. A. (2005). The privileging of communicarian ideas: Citation practices and the translation of social capital into public health research. *American Journal of Public Health*, 95, 1330–1337. doi:10.2105/AJPH.2004.046094
- Newin, J., Bloom, G. A., & Loughead, T. M. (2008). *[73]. Youth ice hockey coaches' perceptions of a team building intervention program. *The Sport Psychologist*, 22, 54–72.
- Newman, B. (1984). Expediency as benefactor: How team building saves time and gets the job done. *Training & Development Journal*, 38, 26–30.
- Pain, M., & Harwood, C. (2009). *[76]. Team building through mutual sharing and open discussions of team functioning. *The Sport Psychologist*, 23, 523–542.
- Prapavessis, H., Carron, A. V., & Spink, K. S. (1996). *[78]. Team building in sport. *International Journal of Sport Psychology*, 27, 269–285.
- Rainey, D. W., & Schweickert, G. J. (1988). *[80]. An exploratory study of team cohesion before and after a spring trip. *The Sport Psychologist*, 2, 314–317.
- Ram, N., Starek, J., & Johnson, J. (2004). Race, ethnicity, and sexual orientation: Still a void in sport and exercise psychology? *Journal of Sport & Exercise Psychology*, 26, 250–268.
- Rosenfeld, L. B., & Richman, J. M. (1997). *[83]. Developing effective social support: Team building and the social support process. *Journal of Applied Sport Psychology*, 9, 133–153. doi:10.1080/10413209708415388
- Ryska, T. A., & Cooley, D. (1999). *[85]. Developing team cohesion: A comparison of cognitive-behavioural strategies of U.S. and Australian sport coaches. *The Journal of Psychology*, 133, 523–539.
- Schinke, R. J., Draper, S. P., & Salmela, J. H. (1997). *[86]. A conceptualization of team building in high performance sport as a season-long process. *Avante*, 3, 57–72.
- Senecal, J., Loughead, T. M., & Bloom, G. (2008). *[87]. A season-long team-building intervention: Examining the effect of team goal setting on cohesion. *Journal of Sport & Exercise Psychology*, 30, 186–199.
- Short, S. E., & Sullivan, P. J. (2003). *[90]. Building, maintaining, and regaining team confidence in sports. *Journal of Physical Education, Recreation, & Dance*, 74, 45–55.
- Shuffler, M., Diaz Granados, D., & Salas, E. (2011). There's a science for that: Team development interventions in organizations. *Current Directions in Psychological Science*, 20, 365–372. doi:10.1177/0963721411422054
- Smith, R. E., & Smoll, F. L. (1997). *[91]. Coach-mediated team building in youth sports. *Journal of*

- Applied Sport Psychology*, 9, 114–132. doi: 10.1080/10413209708415387
- Steiner, I. D. (1972). *Group processes and productivity*. New York: Academic Press.
- Stevens, D. E., & Bloom, G. A. (2003). *[96]. The effect of team building on cohesion. *Avante*, 9, 43–54.
- Stevenson, M., & Durand-Bush, N. (1999). *[97]. The relationship between the development of a university football team and cohesion over a season. *Avante*, 5, 90–100.
- Stillman, J. A., Fletcher, R. B., & Carr, S. C. (2007). Netball team members, but not hobby group members distinguish team characteristics from group characteristics. *Journal of Sport & Exercise Psychology*, 29, 253–266.
- Tannenbaum, S., Beard, R., & Salas, E. (1992). Team building and its influence on team effectiveness: An examination of conceptual and empirical developments. In K. Kelley (Ed.), *Issues, theory, and research in industrial/organizational psychology* (pp. 117–153). Amsterdam, The Netherlands: Elsevier.
- Trninic, V., Papic, V., & Dimec, T. (2008). *[99]. Concepts of developing groups in sports games. *Acta Kinesiologica*, 2, 85–92.
- Turman, P. D. (2003). *[101]. Coaches and cohesion: The impact of coaching techniques on team cohesion in the small group sport setting. *Journal of Sport Behaviour*, 26, 86–101.
- VanRaalte, J. L., Cornelius, A. E., Linder, D. E., & Brewer, B. W. (2007). *[102]. The relationship between hazing and team cohesion. *Journal of Sport Behavior*, 30, 491–507.
- Voight, M., & Callahan, J. (2001). *[103]. A team building intervention program: Application and evaluation with two university soccer teams. *Journal of Sport Behaviour*, 24, 420–431.
- Webber, S. S., & Donahue, L. M. (2001). Impact of highly and less job-related diversity on work group cohesion and performance: A meta-analysis. *Journal of Management*, 27, 141–162.
- Widmeyer, W. N., Brawley, L. R., & Carron, A. V. (1985). *The measurement of cohesion in sport teams: The Group Environment Questionnaire*. London, Ontario, Canada: Sports Dynamics.
- Widmeyer, W., Brawley, L. R., & Carron, A. V. (1993). Group cohesion in sport and exercise. In R. N. Singer, M. Murphy, & L. K. Tennant (Eds.), *Handbook of research on sport psychology* (pp. 672–692). New York: MacMillan.
- Widmeyer, W. N., & Ducharme, K. (1997). *[109]. Team building through goal setting. *Journal of Applied Sport Psychology*, 9, 97–113. doi:10.1080/10413209708415386
- Yukelson, D. (1997). *[115]. Principles of effective team building interventions in sport: A direct services approach at Penn State University. *Journal of Applied Sport Psychology*, 9, 73–96. doi:10.1080/10413209708415385
- Zander, A. (1971). *Motives and goals in groups*. New York, NY: Academic Press.
- Zander, A. (1982). *Making groups effective*. San Francisco, CA: Jossey-Bass.

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