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INTERDEPENDENCE AND INTERPERSONAL INFLUENCE AMONG INDIVIDUAL SPORT TEAMMATES

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INTERDEPENDENCE AND INTERPERSONAL INFLUENCE
AMONG INDIVIDUAL SPORT TEAMMATES

by

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Bachelor of Arts, Laurentian University, 2008

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DISSERTATION

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in partial fulfillment of the requirement for

Doctor of Philosophy in Psychology

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ABSTRACT

As an exploration of the nature of groups and interpersonal influence within individual sport teams, this dissertation combined qualitative, correlational, and experimental methods. A qualitative study was first conducted with fourteen elite individual sport athletes who participated in interviews exploring their sport experiences with teammates. Athletes suggested that teammates were a primary source of motivation, social facilitation, social comparisons, and teamwork. Athletes also described how concepts such as cohesion and competitiveness acted as determinants of interpersonal influence and commented on how these concepts related to group structures. Qualitative reflections formed the basis for the subsequent conceptual paper that identified four individual sport team types by contrasting interdependence in terms of collective goals and compete against each other in the same events. Three empirical studies were then conducted to test whether teammate interdependencies were associated with aspects of the group environment. The first study was a paper and pencil survey completed by 210 individual sport athletes and revealed that athletes who reported structural task interdependence with teammates also reported increased interdependence perceptions that were, in turn, associated with increased cohesion and satisfaction as well as decreased competitiveness. There were no differences according to whether participants competed in the same event as all of their teammates or not. This study was followed by a weekly e-mail survey with 17 athletes who reported weekly interdependence perceptions over the course of a competitive season. Interdependence perceptions were higher during weeks that were close in time to competitions with a collective outcome. A final experimental study was then conducted, as 84 athletes were randomly assigned to read one of four

hypothetical team recruitment letters from a prospective coach and then rated their perceptions of the team's environment. Cohesion was rated highest for teams including a collective team outcome, whereas perceptions of competitiveness were greatest when all members competed in the same event, but with no collective outcome. These studies reveal how interdependence structures shape the group environment and inform applied efforts that consider ways to optimize group functioning. Notably, even among individual sport athletes who are often distinguished according to a lack of task interdependence, team members' relationships are fundamentally influenced by their interdependencies with one another.

FORMAT AND CO-AUTHORSHIP

This dissertation is presented in an integrated article format (multiple manuscript option), meaning that the structure of the document proceeds from an introduction through to a series of several stand-alone papers, followed by a general discussion section. Although research and writing contained within this document is my original work, there were additional contributors who should be acknowledged. First, I would like to acknowledge the contributions of Dr. Mark Bruner (Assistant Professor, Nipissing University), who was co-author on the First Paper included in this dissertation. Dr. Bruner contributed to the paper through continued discussions during the conceptualization of the paper, and provided feedback throughout the writing and revision process. Second, I would like to acknowledge the contributions of Svenja Wolf (Doctoral Student, German Sport University – Cologne), who was coauthor of the Second Paper contained in this dissertation. Svenja provided feedback on the interview study guide as well as the analytic process, and contributed to the preparation of the manuscript for publication. Finally, I would like to acknowledge the contributions of Dr. Mark Eys for his help throughout the development of my research agenda and feedback on data analysis and writing. Dr. Eys is a co-author on all four of the papers presented in this dissertation.

Because of this format, it should be noted that some of the information will be reiterated throughout the introduction and papers presented. Regardless, the papers collectively contribute to the overall purpose of this dissertation.

ACKNOWLEDGEMENTS

Provided that this dissertation examines interdependence, there is some irony in how reliant I have been on others throughout my graduate education. I am most indebted to my wife Brianne and our entire family, who have contributed so much to support me, making it easy to pursue graduate education by sharing a lot of happiness outside of academia. Much like a family, I studied alongside Alex Benson and Mark Surya for four years, along with lab members such as Svenja Wolf, Colin McLaren, and Robyn Bertram for shorter periods of time – all of whom continuously allowed me to feel like a ‘big deal’ despite evidence to the contrary (e.g., my limited bocce skill set). These relationships will hopefully materialize into lifelong friendships and collaborations. I also thank my dissertation committee: composing and defending my dissertation was a generative experience as a result of how engaged Anne Wilson, Roger Buehler, Harry Prapavessis, and Greg Irving were.

I ultimately dedicate this work to the community of academic mentors who shaped my scholarly development: Ranging from those who had a brief but fundamental influence as instructors (e.g., Terry Mitchell and David Gregory), to emerging friends and colleagues, such as Mark Bruner and Luc Martin. Although I could not comprehensively document each individual who shaped my academic path, Mark Eys, Anne Wilson, and Sharleen Hoar are valued mentors. Early-on in my development, Sharleen patiently ignited my passion and led me toward my own path in academia. Furthermore, my time with Anne revealed what it means to develop a collaborative research program based, and influenced my academic writing by helping me to indulge in a creative and active tone. Finally, Mark Eys is a great role model – assuming many roles throughout my education

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INTRODUCTION

Sport involvement is deeply intertwined in Canadian lifestyles. A report based on the General Social Survey (Statistics Canada, 2008) estimated that approximately thirty percent of Canadians participate in sport. As this percentage reveals declining participation over recent decades, the Canadian government has taken steps to increase sport involvement. For example, the Canadian Sport Policy (Canadian Heritage, 2002) promotes a vibrant sport environment that is accessible for all Canadians and justifies these objectives with the benefits of sport participation. The personal and community-based benefits listed in the policy include enhanced social development, health and well-being, culture, education, economic development, as well as entertainment and leisure. Although sport participation also predicts some negative social outcomes such as substance abuse (O'Brien, Blackie, & Hunter, 2005) and delinquent behaviour (Begg, Langley, Moffit, & Marshall, 1996), by and large it promotes well-being and benefits society (Holt, Kingsley, Tink, & Scherer, 2011).

Groups are an essential aspect of the sport experience, as approximately 96 percent of Canadians who participate in sport do so in groups (Canadian Fitness and Lifestyle Research Institute, 2007). The prevalence of groups in sport is not surprising in light of research revealing our need to affiliate with others (Baumeister & Leary, 1995; Fiske, 2009). Baumeister and Leary (1995) theorized that humans have a need to establish and maintain positive relationships, which is manifested as a primary goal that influences cognitions, emotions, and behaviours. In the sport domain, affiliation and group membership are two important social motives (Allen, 2006; Keegan, Harwood, Spray, & Lavalley, 2010) that contribute to choices to engage in physical activity and the

maintenance of sport involvement (Cecchini, Mendez, & Muniz, 2002; Ingledeu, Markland, & Medley, 1998; Ryan, Frederick, Lipes, Rubio, & Sheldon, 1997). As such, group affiliations are valued and serve as motivation to participate in sport.

Groups also impact individual sport performance. Triplett's (1898) article – a pioneering study in social psychology – suggested that cyclists put forth greater effort while competing alongside others compared to racing alone. However, the social influences of groups on performance are not so straightforward, as the presence of others may also impair performance (Zajonc, 1965). Given that groups can exert both positive and negative influences, recent sport research has explored features of group environments that influence whether a productive social influence is likely. For example, social influences change according to group size (Widmeyer, Brawley, & Carron, 1990), norms (Gammage, Carron, & Estabrooks, 2001), and leadership (Jowett & Chaundy, 2004). Ultimately, it is clear that social relationships within groups are a key aspect that may influence whether athletes experience the benefits and affective outcomes possible through sport.

Defining Sport Groups

Hundreds of fish swimming together are called a school. A pack of foraging baboons is a troupe. A half dozen crows on a telephone line is a murder. A gam is a group of whales. But what is a collection of human beings called? A group. Collections of people may seem unique, but each possesses that one critical element that defines a group: connections linking the individual members. (Forsyth, 2010, pp. 2-3)

As described in the quote above, a group is more than simply a collection of individuals. In describing collections of individuals engaging in sport, authors have identified several characteristics that distinguish groups. Defining characteristics of groups include members (a) self-categorizing as a group (e.g., Brown, 1988), (b) sharing formal and informal group social structures (e.g., roles: Sherif & Sherif, 1956), (c) obtaining mutual benefits (e.g., Bass, 1960), and (d) working on a common task (e.g., McGrath, 1984). The definition offered by Forsyth (2010) in his definitive group dynamics textbook also focuses on the presence of relationships that bind group members. Although all of these characteristics do not combine to form a clear-cut definition of a 'group' that emerges across the literature, one characteristic that is explicitly or implicitly evident in nearly all group definitions is the concept of interdependence (e.g., Brown, 1988; Cartwright & Zander, 1968; Lewin, 1951; Mills, 1967). Lewin (1951) highlighted the presence of interdependence (via shared fates and goals) as a key trait of nearly all groups. Regardless of the definition used, most researchers would agree that a group consists of two or more members who define themselves as a group and develop structured relationships connecting them in their pursuit of individual and group level outcomes – outcomes that are contingent on the efforts of all group members (e.g., Carron & Eys, 2012).

In sport research, groups are further categorized into two overarching types according to their structure of competition, including team (e.g., soccer, basketball, hockey) and individual (e.g., running, wrestling, golf) sport. An individual sport team is a group of athletes who train together and may contribute to total team performance, but compete individually and often in opposition to their teammates. The term 'coacting' is

also used to describe individual sport teams in cases where team members contribute to a cumulative team score (Widmeyer & Williams, 1991). Meanwhile, team sports include those in which athletes train together and compete in events requiring member interactions (e.g., passing a ball) to achieve a group objective.

The rationale for making this distinction between sport types is attributed to differences in task interdependence, as teammate interaction during competition is required in team sport but not in individual sport. Therefore, team sports are also described as being interdependent (e.g., Beauchamp, Bray, Eys, & Carron, 2002). Historically, a corresponding assumption is that this fundamental difference dictates how groups will influence sport outcomes – namely, that groups will have greater influence in team sport because interaction is essential (Carron & Chelladurai, 1981; Lott & Lott, 1965). Correspondingly, sport group research primarily involves team sport and there is little understanding of group influences within individual sport. For example, of the 18 published studies from the *Journal of Sport & Exercise Psychology* involving group constructs such cohesion, roles, and leadership between 1995 and 2013, 17 involved exclusively team sports and one study involved a mixture of team sport and individual sport teams. None of the studies featured group dynamics on individual sport teams exclusively. It could safely be stated that much of our understanding about group and social influence in sport is grounded within a specific context: team sport.

Cohesion in Individual and Team Sport

Among the few group dynamics studies that have integrated individual sport, several have investigated the relationship between performance and cohesion; the most prominent construct in group dynamics research (Forsyth, 2010). Cohesion is defined as

the “dynamic tendency for a group to stick together and remain united in the pursuit of its instrumental objectives and/or the satisfaction of member affective needs” (Carron, Brawley, & Widmeyer, 1998, p. 213). After many iterations of its conceptual foundation, cohesion is now widely accepted as a multidimensional construct involving two primary perceptions that members hold regarding their group. Individuals hold perceptions regarding both group integration (closeness and unification of the group) and their own attractions to the group (feelings and motivations that act to keep the individual in the group; Carron et al., 1998). Furthermore, these perceptions are distinguished between two aspects of group involvement: task and social. Four primary dimensions are employed in this conceptualization of cohesion: (a) attraction to group – task (i.e., are members motivated to maintain involvement in the group’s performance-related aspects?), (b) attraction to group – social (i.e., are members motivated to maintain involvement in the group’s social activities), (c) group integration – task (i.e., is the group unified in working towards instrumental outcomes?), and (d) group integration – social (i.e., is the group socially integrated, such as by being close friends?). Group cohesion is predominately assessed in sport using the Group Environment Questionnaire (Carron, Widmeyer, & Brawley, 1985) that uses these four dimensions to conceptualize cohesion.

Cohesion is associated positively with many group and individual outcomes, such as team performance (Carron, Colman, Wheeler, & Stevens, 2002), confidence (Kozub & Button, 2000), positive affect (Terry et al., 2001), and exercise adherence (Carron, Widmeyer, & Brawley, 1988). However, when considering cohesion in individual sport, studies have strictly considered the association between cohesion and performance. With the expectation that the reason cohesion influences performance is because increased

attractions to the group lead to improved communication and task interactions, Carron and Chelladurai (1981) proposed that group cohesion perceptions are irrelevant in individual sport settings where athletes aren't required to interact. Early research by Landers and Lueschen (1974) with intramural bowling teams, as well as Lenk (1969) with rowing teams, supported this line of thought. Both studies reported a negative relationship between cohesion and performance. Landers and Lueschen (1974) suggested that perhaps cohesiveness decreases productive rivalries among teammates – thus, decreasing effort output. It is important to note, however, that these studies used varying and conceptually dated operational definitions of cohesion because the Group Environment Questionnaire was not developed until 1985. As an example, Landers and Lueschen (1974) operationally-defined cohesion using items rating each different team member on perceptions of friendship, communication, status, and interdependence.

More recent individual sport research using the Group Environment Questionnaire reveals a positive relationship between cohesion and performance (e.g., Arroyo, 1996; Kim & Sugiyama, 1992; Kozub & Button, 2000; Matheson, Mathes, & Murray, 1996; Widmeyer & Williams, 1991). Furthermore, a meta-analysis by Carron et al. (2002) presented evidence that the cohesion-performance relationship within individual sport teams ($ES = .77$) is similar to the relationship within interactive teams ($ES = .66$). Although individual sport performance is positively related to cohesion, Carron et al. (2002) also found that overall reports of cohesion were lower in individual sport than in team sport. Ultimately, and in contrast to historical expectations, cohesion positively predicts individual sport performance.

Interestingly, meta-analyses exploring cohesion and performance in organizational (i.e., work) contexts reported conflicting findings – identifying task interdependence as an important moderator (Beal, Cohen, Burke, & McLendon, 2003; Gully, Devine, & Whitney, 1995). Both meta-analyses demonstrated that cohesion had a stronger influence on performance within task interdependent teams. The inconsistency in this research compared to the findings of Carron et al. (2002) raises several considerations. Why isn't the cohesion-performance relationship weaker in individual sport, similar to the non-task interdependent settings in the Beal et al. (2003) and Gully et al. (1995) meta-analyses? When comparing the sport teams to work groups, are there innate differences in group composition that complicate or interact with the influence of task interdependence?

In regard to this question, Widmeyer and Williams (1991) proposed that cohesion has an indirect influence on performance in individual sport, whereby cohesion leads to increases in potential mediating constructs (e.g., motivation or social support) that, in turn, impact performance (see also Gully et al., 1995). Individual sport teams may also involve several ways that members must work together as a source of task interdependence, which are not typically assessed – such as during training and even during competition (e.g., relays). Perhaps more importantly, there are additional interdependence sources that were ignored in past sport research but are relevant for understanding group influence, including interdependence in individual outcomes, collective outcomes, and resources, among other factors. Such interdependence sources could influence team cohesion. The following section will review existing

interdependence literature that emerges through the organizational and educational psychology domains – applying theory and research within a sport group context.

Interdependence

Interdependence, which refers to the degree that group members rely on one another, is either explicitly or implicitly included in all definitions of groups reviewed for this dissertation. Interdependence is both inherent in the structure of the group environment (e.g., task properties, rules about the process, how resources are allocated) and will also emerge over time according to member attributes and personal interactions (Wageman & Gordon, 2005). Furthermore, interdependence is central to relationship development because it guides interactions and distinguishes aspects of the environment that make specific actions more or less desirable (Johnson & Johnson, 2005; Rusbult & Van Lange, 2003). In other words, when relationship partners and group members interact and communicate, they are guided by their needs and goals in relation to one another.

Interdependence is typically referred to in terms of task interdependence, defined as the extent to which group members must exchange efforts, information, or expertise during performance (Thompson, 1967). In sport, task interdependence specifically refers to the degree that team members must collaborate during competition. For example, the striker in soccer cannot score until other team members have brought the ball forward to an appropriate field position. Organizational research has demonstrated that when team members are task interdependent, they invest in developing smooth interpersonal interactions, engage in mutual helping, and enjoy being around one another (Johnson & Johnson, 1989). Task interdependent teams also perform better on tasks when compared

to those with no interdependence (e.g., virtual work teams; Hertel, Konradt, & Orlikowski, 2004). Furthermore, task interdependence acts as a moderator in several relationships, such as how having greater levels of diversity improves performance to a greater extent when task interdependence is also high (Jehn, Northcraft, & Neale, 1999).

In addition to task interdependence, several other interdependence sources influence group member interactions. Resource interdependence refers to the degree that members can achieve desired goals if, and only if, other group members contribute valuable resources (Johnson, Johnson, & Stanne, 1989). At times, resource interdependence overlaps with task interdependence. For example, Wageman and Gordon (2005) included resources when defining task interdependence as “the extent that a group task requires multiple individuals to exchange help and resources interactively to complete their work” (p. 687). Overall, it would appear that task interdependence inherently requires resource interdependence, but that resource interdependence can also exist independently of task interdependence. In an investigation of resource interdependence in classrooms, Buchs, Butera, and Mugny (2004) demonstrated that resource interdependence encourages cooperation and improved performance in student pairs completing a recall task, in comparison to when the students had no required interdependence. However, resource interdependence in the absence of task interdependence may decrease achievement because of process losses due to the interference individuals have on one another’s work (Johnson & Johnson, 2005).

Outcome interdependence is another primary source of interdependence, and refers to the extent that team members are dependent on one another in achieving personal- and group-level outcomes (Wageman, 1995). Furthermore, both negative

outcome interdependence (i.e., the more I get the less you get) as well as positive outcome interdependence (i.e., the more I get, the more you get) settings are possible. Positive outcome interdependence is comparable to a cooperative setting and is associated with prosocial motives, greater responsibility for others' work, and improved individual-level outcomes (De Dreu, 2007; Van der Vegt, Emans, & Van de Vliert, 1998). Meanwhile, negative outcome interdependence is akin to a competitive setting. Although anecdotal reports suggest that such settings will bring about productive rivalries (e.g., Landers & Lueschen, 1974), there is little evidence to suggest that negative outcome interdependence is beneficial when compared to positive outcome interdependence (De Dreu, 2007; Tauer & Harackiewicz, 2004).

Outcome interdependence is comprised of two sources, including: (a) goal interdependence, and (b) reward interdependence (van Vijeijken, Kleingeld, van Tuijl, Algra, & Thierry, 2002). Goal interdependence reflects the way that goal attainment of an individual is influenced by the goal attainment of other group members. Meanwhile, reward interdependence refers to how the provision of rewards to other group members influences rewards provided to the individual (Wageman, 1995). The influence of goal and reward interdependencies are additive, as the combination of the two typically increases performance more than either of them do alone (Johnson & Johnson, 2005).

Although all of the sources of interdependence are potentially applicable to sport teams, only one published study is available on this topic – involving perceptions of social interdependence among sport team members. Specifically, Bruner, Hall, and Côté (2011) investigated how perceptions of outcome and task interdependencies influence adolescent basketball and cross country athletes' personal developmental experiences

(e.g., whether athletes felt that they learned how to regulate emotions, interact with teammates, and develop initiative). Not surprisingly, participants competing in basketball (a team sport) had stronger perceptions of task interdependence than cross country runners (an individual sport). In contrast, perceptions that teammates shared an outcome were similar for athletes in both sports. Furthermore, perceptions of outcome interdependence were positively associated with athletes' developmental experiences.

The Bruner et al. (2011) study revealed that outcome interdependence was evident and meaningful in an individual sport. Nonetheless, this study also raises even more questions about interdependence than it answered. It is still unclear how outcome interdependence perceptions are influenced by formal interdependence structures (i.e., a collective goal) and whether interdependence is relevant in all individual sports, or whether cross country running among adolescents is a 'special case'.

Summary: Individual Sport Teams as Interdependent Sources of Social Influence?

“Team sport builds character in unique ways. ... You have a greater ability to deal with people if you've played a team sport. An athlete in an individual sport just doesn't have that experience.” (*Participant quote from Canadian Team Sports Coalition Report; Bell-Laroche, Corbett, & Lawrie, 2009, pp. 15*)

Current social interdependence literature challenges lay assumptions, revealed in the quote above, that teammates lacking task interdependence will have an ambivalent or even negative influence on one another. Although task interdependence is the most influential source of interdependence in work groups, Johnson and Johnson (1989) recognized additional sources of interdependence including how rewards are allocated,

whether members influence others' goal attainment, and how resources are distributed. When examined in organizational and educational groups, all of these sources of interdependence combine to determine the extent that cooperation and positive interactions are promoted (Wageman, 1995). In considering the representation of these structures, individual sport teammates range widely regarding whether or not interdependence sources are evident – ranging from highly-interdependent contexts (i.e., shared team title, working together in relays, competing against one another in events, daily team training) to truly individual contexts, where athletes compete with little-to-no team affiliation.

As a result, existing literature would support the argument that all team types have the potential to be cohesive and to influence member experiences, and that interdependence is a prominent force that could be used to explore this influence. This proposition regarding the existence of interdependence has implications that range beyond simply justifying why cohesion is related to performance in individual sport. Notably, the implications extend to outcomes such as sport adherence and the satisfaction of needs for personal relatedness that can be promoted by membership on cooperative and cohesive sport teams. As such, it was important to explore the nature of groups and interpersonal influence within individual sport teams and identify factors that influence whether (or not) group members develop cooperative and cohesive relationships. To do so, my dissertation addressed three main objectives:

1) To explore the concept of interpersonal influence in sport (Paper 1). A qualitative study was an initial effort to develop an understanding of the nature of group member interactions and interdependencies among individual sport

teammates. The qualitative study was intended to generate an in-depth understanding of how individual sport teammates influence one another and to identify key concepts for testing in future empirical work.

2) To generate propositions about how interdependence sources influence the group environment (Paper 2). The Second Paper included a review of current group classification literature to explore the term ‘individual sport.’ Reflecting on social interdependence theory (i.e., Johnson & Johnson, 1989) the purpose was to explore interdependence in sport teams, and to develop a sport team typology that was theoretically constructed using sources of structural interdependence. This paper provided a theoretical foundation for future research.

3) To investigate the influence of interdependence sources in individual sport (Papers 3 and 4). The conceptual and qualitative work identified important areas of inquiry that were explored in the remaining two papers. Papers Three and Four describe correlational and experimental studies that tested hypotheses regarding how the presence or absence of interdependence sources influence perceptions of cohesion, satisfaction, and competitiveness among individual sport teammates.

In sum, the following four papers are each self-contained manuscripts that combine and build upon one another to provide a collective and encompassing perspective of interdependence and group dynamics in individual sport teams.

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PAPER 1: EXPLORING THE NATURE OF INTERPERSONAL INFLUENCE IN ELITE INDIVIDUAL SPORT TEAMS¹

From youth to Olympic levels, teams are an integral aspect of many ‘individual’ sport environments. For example, when imagining a high-school cross country race one may call to mind a mass of runners, each clad in a singlet distinguishing them as a member of a team. Why do individual sport athletes readily form into teams when group work is rarely required for performance – and how do these groups influence individual sport athletes’ experiences? Although similar questions framed Triplett’s (1898) pioneering social influence research – and despite extensive research involving group dynamics across sport, educational, and organizational settings (see Forsyth, 2010) – there is little research or theory to understand group influence from a primarily individual sport perspective. The objective of this research was to investigate how teammates influence one another in individual sport groups.

Understanding group influence in sport is important because the group environment is a fundamental determinant of individual outcomes such as performance (Carron, Colman, Wheeler, & Stevens, 2002), interpersonal development (Hanson, Larson, & Dworkin, 2003), and motivation (Keegan, Harwood, Spray, & Lavalley, 2010). At a more general level, groups are important because they are a source of social connections – satisfying the fundamental human need to belong (Baumeister & Leary, 1995). Similarly, isolation or exclusion from social groups brings about perceptions that the group task is less meaningful (Zadro, Williams, & Richardson, 2004) and is

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associated with a number of deleterious affective- and performance-based effects (Baumeister & DeWall, 2005). However, it is not merely being in a group that determines social influences; the characteristics of the environment are important for understanding the kind of effect a group will have. Group characteristics such as cohesion (Brawley, Carron, & Widmeyer, 1993), leadership (Chelladurai, 1980), and role-related properties (Eys, Carron, Beauchamp, & Bray, 2003) all contribute to the group environment.

The majority of sport group research, however, has investigated team sports where athletes must interact with other team members to perform the competitive task (e.g., basketball and soccer), whereas individual sport groups (e.g., wrestling and golf) are less-often studied. Ostensibly, this discrepancy exists because individual sport teammates are not required to interact during competition and should have fewer opportunities to directly influence one another's performance compared to team sport. Likewise, the expectation that group influence is more important in team sport (e.g., Carron & Chelladurai, 1981) and that increases in cohesion will decrease productive rivalries in individual sport (Landers & Luechen, 1974) are two longstanding assumptions originally proposed in seminal sport psychology articles. Two additional assumptions are implicitly evident through the absence of research comparing different individual sport environments and examining how group properties such as cohesion and leadership differ in individual and team contexts. These assumptions are that all individual sport environments are equivalent and group properties, if present, will take on a comparable form in team and individual sport settings.

Despite the limited research with individual sport teams, initial evidence challenges these assumptions. For instance, the majority of group-oriented research

involving individual sport has focused on cohesion and demonstrated a positive relationship between cohesion and performance (e.g., Kim & Sugiyama, 1992; Kozub & Button, 2000; Matheson, Mathes, & Murray, 1996; Widmeyer & Williams, 1991). This research suggests that group cohesion is comparably related to performance in individual and team sports (Carron et al., 2002). Furthermore, Bruner, Hall, and Côté (2011) demonstrated that perceptions of outcome interdependence were positively associated with personal developmental experiences for both basketball players and cross country runners, regardless of sport type. These findings are supported by organizational research demonstrating that interdependence with respect to group and individual outcomes is important for understanding how teammates will interact – even in situations where members are not required to work together on a shared task (Johnson & Johnson, 2005). According to this line of thinking, interdependence is not necessarily lesser in any one individual sport – however the *structure* of interdependence varies and may have implications for group processes. For example, teammates who share a collective goal may develop closer relationships compared to those who merely compete against one another individually.

Regardless, the presence of an interdependence structure distinguishes individual sport teams as bona fide groups (e.g., Forsyth, 2010) that may have distinct influences on group members through a number of group processes (Bruner et al., 2011). In light of this initial evidence, research effort is required to further challenge the validity of earlier assumptions and explore what it means to be a ‘team’ in individual sport contexts. Thus, the specific purpose of this study was to develop an understanding of team-based interpersonal influences that is grounded within an individual sport athlete perspective.

Given that there is currently little conceptual or empirical focus on groups in individual sport, this research involved an exploratory approach and intended to generate theory – albeit within the context of existing knowledge (e.g., Forsyth, 2010). Although interpersonal influence in sport can originate from a wide range of individuals (e.g., friends, family, coaches, teammates), it is important to note that this study was exclusively oriented toward perceptions of teammates as sources of influence. In other words, this study focused on teammate interpersonal influence, which was defined as the ways that an athlete's cognitive, affective, and physical experiences are influenced by interactions with his or her teammates.

Methods

In keeping with the dynamic reality of group environments (Forsyth, 2010) and the need for an exploratory investigation, a grounded theory methodological approach was used (Corbin & Strauss, 2008). A theoretical interpretation of participant responses was developed through an iterative process of data collection and analysis. In addition to this iterative process, a number of underlying methodological processes that contribute to the effectiveness of grounded theory research were employed in this study (e.g., theoretical sampling, constant comparison, and theoretical saturation). For a commentary on the application of grounded theory in sport and exercise psychology research, see Holt and Tamminen (2010).

Participants

Six male and eight female individual sport athletes ($M_{age} = 22.01$ years, $SD = 3.00$; range = 19-29 years) participated in the current study. Participants had an average experience of 3.70 years ($SD = 2.01$) at national and international levels (e.g., World

Junior Championships and Olympic Games) and were full-time members of elite club, university, or national teams in Canada. Thirteen of the fourteen participants were actively competing, whereas one participant was in the off-season. The sample included six mid- and long-distance runners (800m – 10km), six cross country skiers, one mountain biker, as well as one wrestler.

A theoretical (Corbin & Strauss, 2008) and criterion sampling approach dictated the recruitment of participants. The main criteria for inclusion were participation in elite individual sport and current full-time training and competition with a sport team. After conducting the initial interviews with athletes on teams that had no identifiable collective goal, athletes from teams with collective goals were purposely sought, as well as older athletes with elite-level experience with several different team environments. This was done to seek athletes with varied perspectives of group settings and with considerable experience to contrast their experiences. As data collection proceeded, several participants were interviewed from a single team to advance theoretical saturation by gathering varied perspectives of a team environment.

Procedure

Institutional research ethics board approval was obtained prior to participant recruitment and consent was obtained from all participants (see Appendices B and C for approval and consent forms). Access to participants was gained through coaches and administrative staff of elite sport programs, who were asked to forward information about the study to their teams. Athletes were instructed to contact the primary researcher if interested in participating. Semi-structured interviews were conducted face-to-face ($n = 8$) or over-the-phone ($n = 6$). Face-to-face interviews were conducted in public places at

each participant's convenience (e.g., study space on university campus), and over-the-phone interviews were conducted when athletes were unable to meet face-to-face because of geographical limitations. Interviews were staggered over a time period of four months. Following transcription and preliminary analysis of all interviews, follow-up member checking procedures were conducted. Each participant was sent (via email) the transcription from his or her interview as well as a summary of the study results and was asked to check the accuracy of the transcript and comment on the study results. Although the level of participant engagement in the e-mail member checking procedure cannot be guaranteed, all ten participants who replied to the e-mail supported the analysis – six of whom provided extended comments and feedback.

Interviews

The interview guide (see Appendix D) addressed several key concepts that were further explored using probes and follow-up questions. The key concepts in the interview guide included: (a) the extent and nature of teammate influence, (b) recollections of positively and negatively impactful groups, (c) the degree and types of interdependence perceived among teammates, and (d) insights about approaches used to develop ideal group environments. To saturate our understanding, additional probes and questions were incorporated to target specific concepts that were not explicitly included in the interview guide (e.g., perceptions of peer leadership, teammate commitment, influence of groups throughout development). Interview duration ranged from 46 to 70 minutes ($M_{\text{time}} = 55:14$, $SD = 6:01$). All interviews were digitally audio-recorded and transcribed verbatim.

Analysis

The primary goal of analysis in a grounded theory investigation is to advance from descriptions of individual experiences toward a conceptualization of underlying processes that produce such experiences (Corbin & Strauss, 2008). Data analysis was conducted throughout data collection and involved open and axial coding as well as theoretical integration phases in conjunction with memoing (i.e., an ongoing journal completed by the primary researcher) and constant comparisons to explore emergent concepts. The primary investigator engaged in the entire coding process; however, the investigator's supervisor and another group dynamics expert provided insights throughout coding (e.g., commented on the clarity of the proposed categories).

Open coding consisted of breaking the data into comprehensible units (i.e., meaning units; Côté, Salmela, Baria, & Russell, 1993) and developing a series of key concepts. Initial open coding revealed several concepts, including the general benefits of group training, perceptions that groups are a primary motivation for being involved in sport, and ways that team members can work together and/or rely on one another. The data were categorized into 150 different codes before commencing axial coding to condense and refine the concepts. Axial coding involved comparing viewpoints and developing a framework to describe how the concepts fit together. For example, a concept named 'inter- versus intra-group competition' that compared reports of feeling competitive and cooperative with teammates was created to understand how both states can exist within a single group. Axial coding also involved a delayed literature review to examine concepts that emerged during analysis such as jealousy (Kamphoff, Gill, & Huddleston, 2005), interpersonal influences on self regulation (Fitzsimons & Finkel, 2010), and personality processes (Jackson, Colquitt, Wesson, & Zapata-Phelan, 2006).

Finally, theoretical integration was performed to integrate the varying concepts within a theoretical framework (see Figure 1).

A number of processes enhanced the rigor of this study and the theoretical understanding developed from participants' interviews. Confirmability (Tobin & Begley, 2004) was established by the collection of data over an extended period of time, the completion of member-checking, and the triangulation of several athletes' responses from a single team. Meanwhile, dependability was ensured through the identification of researcher subjectivities through memoing as well as working as a research team. It is also important to comment on the degree that the process of conducting this study involved core characteristics that promote the development of grounded theory (e.g., Corbin & Strauss, 2008; Holt & Tamminen, 2010). Specifically, this study employed an iterative process that was sensitive to the emergence of new concepts throughout data collection and analysis. Although it is acknowledged that sampling only elite-level athletes was a limitation to theoretical sampling (i.e., the sample could have been extended to other athletes and coaches), the exploration of concepts using a restrained sample led to theoretical saturation and, ultimately, a substantive framework of teammate interpersonal influence in elite individual sport (see Figure 1).

Results

Team Interpersonal Influences

The primary, overarching concept explored during the analyses was interpersonal influence from teammates; that is, the ways that athletes' cognitive, affective, and physical experiences are influenced by interactions with teammates. Despite the fact that most athletes viewed their sport performances as ultimately individual, they discussed the

primacy of groups in promoting individual-level success. For example, one athlete proposed that “I think about the [athletes] at the national level, and I’m pretty sure that none of them has made it there on their own. It just doesn’t work that way.” Perhaps one of the most telling indicators of the importance of positive group environments was the length that even national-level athletes went to relocate from less-than-ideal social and training conditions to find better team settings. One athlete’s experience included being in a situation where few teammates were available to train with, so she travelled internationally to join other training groups:

So one thing that’s been extremely helpful was just to find good energy wherever you find it. And the training situation [in the new training group] looks a lot like the picture I had when I started as a teenager: a great group of girls – really fit – love to hammer and push and have fun. Achieving success and having a lot of fun at the same time, sharing the ups and downs, supporting each other.

Overall, the concept of interpersonal influence from teammates was robust and athletes identified several aspects of interpersonal influence: the group as ‘the’ reason to compete, motivational influences, social comparison, teamwork, social influences.

Groups as ‘the’ reason to compete. One of the most highly endorsed concepts involved perceptions of the group itself as being an important reason for engagement in elite sport. Athletes felt that, in addition to competitive and achievement-oriented incentives, their teams provided an incentive to remain in their sport and made their participation worthwhile. For example, one athlete emphasized the importance of groups when describing her realizations during injury:

The pursuit itself is great . . . but when I was injured for a year, and the team van – I'd be waving as they rolled away to catch a flight that I was supposed to be on, to go to a race that I really wanted to win. . . . I'm hell-bent on achievement, but when it got pared down to that injury phase I was quite surprised that [the group] was what I was missing the most.

The importance of the group as an incentive to participate also resonated with athletes when they were describing early sport experiences. Athletes vividly recalled early sport groups, and stated that many of the friendships made in these groups have continued later in life, as described in the following quote:

The group I grew up skiing with, it was a unique situation where there were seven guys who were about all within a few years of age, and all loved racing. And all of us are still racing and competing in cross country skiing at some level. And I really believe that happened because we were so close and because, together, we all realized that we enjoyed skiing. . . . And, I still strive to replicate that in any of the groups that I've been skiing with since then.

Sport teams played a particularly influential role during adolescence, as athletes described experiences of both being pushed out of certain groups, and being accepted by others (e.g., "I could have done any sport as a kid, but it would have been with the people I liked the most").

Motivational influences. Athletes reported a number of ways that teammates directly influenced their goal pursuit and performance, many of which can be broadly categorized as social facilitation – the concept that the presence of teammates helped

others achieve greater performance. One middle distance runner, for example, stated that she typically ran slower times when training on her own. In addition to these general statements, athletes explored facets of social facilitation by describing mechanisms of the effect, such as: (a) teammates inducing higher confidence perceptions (e.g., “I train with [my teammate] all the time – if she can do it so can I.”), (b) accountability in training (e.g., “People will know if you slack off.”), as well as (c) ease of self regulation (e.g., “[When sharing the lead] you only have to focus on a small chunk of the race.”).

In specific regard to the last example, perhaps the most intriguing concept involved athletes’ claims that it was easier to train or compete when surrounded by teammates. Athletes inferred that less self regulatory effort was required while training and competing alongside teammates when commenting that, for example, “I said to myself, ‘okay, I know I can stick with these guys. I’m just gonna turn my mind off, bite in, and stick with them.’” Interpersonal influences on self regulation were not limited to effort and performance, and athletes felt that their goal pursuit was also reinforced by teammates who were pursuing similar goals. At the same time, one athlete recalled a group member who had an opposing effect by leading her to question her own level of commitment: “So that can be really discouraging when you have a teammate who doesn’t have to try as hard, and you say to yourself ‘okay, why am I trying so hard if. . .’”

Social comparison. Comparisons were also an ever-present aspect of individual sport environments. Teammates provided continual markers regarding training and development throughout a competitive season (e.g., “If all of a sudden you’re going faster than [your teammates], it shows improvement.”). Teammate comparisons also influenced

perceptions of competence, and some athletes described how superior teammate performances might boost competence perceptions:

If you know how close you can be to them when you're both having a good day, you know that in theory if you'd had a good day then you would have been able to achieve a similar result. . . you have the confidence because you know you have the potential to achieve that kind of result.

Understandably, teammate comparisons can also have a negative influence on competence and athletes expressed their frustration when, for example, others improved at a faster rate: “[It is frustrating] if you're always gauging off of someone and they have a breakthrough and you're no longer as close to them as you were.”

Teamwork. Several athletes also perceived teamwork in training and competition. Although teamwork was not relevant for all athletes (e.g., wrestling), other athletes felt that they were dependent on teamwork. For example, all of the runners in this study went into depth regarding the development of a collective racing strategy among teammates with similar ability levels. As a result of the prevalence of teamwork, training and competing were at times viewed as group efforts where ‘loafing’ (i.e., a reduction in effort) was unappreciated and incited conflict: “It’s really hard to run in front for every interval, and you’ll get angry and call somebody out if they haven’t done work for the whole workout.”

Support and encouragement. Athletes also described their reliance on teammates for social support, social interaction (e.g., making arduous workouts enjoyable), and encouragement. Of these concepts, social support was highly endorsed and was specifically noted during periods of stress and adversity. In defining the

provision of social support, athletes listed examples of their teammates listening to concerns, understanding points of view, and providing perspective: "...the group is really powerful, and [has] helped me through a lot of hard times when I wanted to stop running or...when I was just so frustrated."

The Group Environment

Not all groups were highly influential, and athletes relayed the sentiment that group experiences may differ widely across contexts. As a result, athletes were asked about group characteristics that determine the nature of interpersonal influence, and most athletes responded with one clear answer: the type of group environment. When defining the group environment, athletes focused on concepts of groupness, intra-team competition, and close friendships. Team composition and structure were two additional concepts that particularly dictated the type of group environment that was developed.

Groupness. As a broad concept, groupness was described as the degree that athletes categorize their team as a 'group', with a common fate and identifiable social structure, as opposed to an aggregate of individuals training together. Of note, athletes described how individual sport teams vary in the degree of groupness perceived among members. More specifically, athletes reported that individual sport teammates typically have a choice in the degree that they work as a group, or function independently. For example, athletes provided both personal examples as well as anecdotes of other teams that rarely met outside of competitive days, and whose members did not identify with their group. Nevertheless, athletes idealized groups with a sense of groupness and interdependence.

Intra-team competitiveness. Despite being a widely endorsed concept, athletes provided varying accounts of competitiveness between teammates. The word ‘competition’ had connotations that were positive (e.g., “I think competition is a good thing, right, it motivates us”) as well as negative (e.g., “[Competition] is something we work to acknowledge and avoid”). Thus, positive and negative accounts were compared and contrasted. In a positive sense, ‘healthy’ competition was described by athletes as “a healthy competitive spirit that we have going on between each other. We help each other to be fast and fit as possible, but we also want to beat each other when it comes down to it.” When describing ‘healthy’ competition, athletes reported competition among teammates along with a similar magnitude of desire to contribute to team-level goals and interests. In contrast, negative competitive settings lacked cooperation and had dire consequences:

Competitiveness and being overwhelmed with nervousness about times and performances got infested in the group, and a couple girls on the team were not as unified in the team performance as much as they were thinking about themselves. [There was] definitely a lack of team cohesion in that season. Because of that, I think none of us were performing as well as we were expecting too. We were all getting sick and overwhelmed and at the end of every practice someone would break down in tears and go running off by themselves, and I’d say it was the most chaotic team atmosphere.

This quote highlights the negative consequences of these settings. Negative competitiveness was also described as being unacknowledged (or covert) among teammates – associated with feelings of jealousy.

Competitiveness was also viewed as a shifting group state that could change throughout the competitive season. Early season or team selection periods of time were noted as particularly competitive compared to later in the season and during major competitions. Furthermore, less competition with teammates was perceived when teammates were clearly at different levels (e.g., an Olympic level athlete training with a developmental athlete) or competed in differing events.

Friendships. In regard to the social group environment, athletes discussed the nature of friendship development among teammates. Nearly all participants relayed the sentiment that teammates became their closest friends and were people whom they engaged with over a long period of time. One athlete described his emphasis on developing friendships:

Sometimes it's rough, sometimes you get [angry], and sometimes it is really good. But regardless . . . you're not going to run forever and you're not going to be competitive forever. So I want to make sure that . . . at the end of every workout and every day that I'm making friends that I'm going to have when I stop – when my knees hurt so bad that I can't run.

However, one athlete suggested that a drawback to developing such close friendships was the respective difficulty of establishing relationships outside of their sport: “I think it is hard to break out of that. I don't have many friends who aren't athletes or aren't on the team [and] it could be a good thing and it could be a bad thing.”

Group composition. The characteristics and perspectives of individual group members were described as factors that influence group-level interactions. As such, athletes described the fundamental impact of team members' personality and preferences

for group involvement (i.e., collectivism) versus being on their own (i.e., individualism). Teammate values for collectivism and individualism were influential in group interactions and, when values were unequal, were potential contributors to group conflict. One senior team member described how the entrance of new teammates, with competing beliefs to his own, changed the group environment:

Some people on the team have come from different places with an approach to group dynamics that's much different. What I've always known is the group first, and if the group is successful then the individual is successful. I guess it's an ideological approach that's different from other places and other groups where you're a group by default and everyone is an individual training. . . . So when other athletes come in, it's an interesting dynamic to see what they embrace and what they don't embrace about the philosophy of the group. . . . And [because of the new athletes that are coming in] I'm learning in my approach to competition that sometimes I have to focus a little more on myself rather than on the group.

Commitment to athletic goals was another area where athletes desired similarity between themselves and teammates. For example, one athlete expressed frustration with a group of less-committed athletes: "Running is one of my main priorities, whereas running was something they just did." Athletes also described the particular importance of commitment to the team, as the consequences of poor commitment from teammates included conflict, poor attendance, and deterioration of group norms. For example, a wrestler recalled his frustration when another athlete was non-committal to scheduled training: "[Another athlete] is a good partner for me but I call him and training is just not

a priority for him . . . every third workout he calls me ten minutes before we meet and says that something came up and he can't do it."

In addition to athlete values and commitment, athletes also made references to the ability and status of team members as well as the development of leadership and varying roles within their group. For example, the role of the highest-ability athletes on the team was predominately discussed; among several endurance athletes, they affectionately called such individuals the team 'rabbit'. High-status teammates were often used as role models and performance benchmarks for teammates. However, there were also challenges with being the 'rabbit' in the group, and athletes who occupied this role reported feeling pressure to commit to the group and act as a leader. Correspondingly, athletes commented on the general importance of leaders: "But I would say that we still have leaders on the team, even though everyone's going for the same thing. They're the ones picking you up on a bad day . . . they're the ones who talk to the coach."

Group structure. The group structure refers to the way groups were organized (e.g., type of sport group or number of group training sessions) and was described as a factor that guides group member interactions. Of note, athletes' descriptions of their team structures were complex and varied. As an example, one middle distance runner explained how her track and field team was categorized into successively smaller groups by gender and event, and that she felt closest to other women in her own event. Differences in athletes' team affiliations also impacted the degree that certain members were part of the group: "So two of our girls are on [another] team as well, but that means that they have a whole separate training plan and race schedule so they're gone for half the season and we won't even see them."

Whilst differing event types and team affiliations segregated the group, group members' interdependence on collective outcomes often served to unite team members. In defining group outcomes, concrete forms of team evaluation (e.g., event standings) as well as informal outcomes (e.g., team fundraising) were both included. Athletes reported that these outcomes permeate the group in a number of ways and bring about feelings of interdependence. For example, one athlete stated that, "during practices and workouts we're consciously thinking of what is the end goal – it's [the national championship] and winning that." One wrestler also noticed differences in group interactions when collective outcomes were not evident:

They [a collegiate team] have dual meets where it's them versus one other school. So your lightweight goes against the other team's lightweight, and then the next weight class goes out against one another – it's easier to get into a team atmosphere. . . . [Whereas] I haven't wrestled in a dual meet ever – never internationally. I could wrestle a guy from Bulgaria, whereas my teammate could wrestle a guy from Cuba.

Although group outcomes can have a large impact on the team environment, there are two important considerations: (a) relevance of group outcomes is not guaranteed, and (b) group outcomes may shift in importance throughout the season. In regard to the first point, the presence of group outcomes alone isn't necessarily sufficient to establish greater perceived interdependence. Rather, athletes felt that the group outcome held greater weight when they were on a team that was in contention for overall team titles, and when the group goal was discussed and valued. In addition to group outcomes, other forms of interdependence were also noted by athletes as aspects that united teammates,

including logistical interdependence (e.g., relying on one another when travelling or preparing equipment), and interdependence brought about from competing with teammates in a relay (e.g., “We use the relay as a bonding thing”).

Managing the Group Environment

Given the range of interpersonal experiences in groups, it is not surprising that athletes reported their coaches’ and teammates’ efforts to improve the group environment. The strategies were categorized as (a) efforts to improve team communication, (b) social team building, (c) values assessments, and (d) promoting group outcome importance. Although coaches were primarily reported as the initiators of these strategies, athlete leaders also played a role in developing collaborative group environments: “The coach and the leaders within the team, that’s their importance in making that atmosphere conducive to supporting each other rather than trying to beat each other.” In addition to the strategies described above, athletes also suggested that coaches who developed cohesive group environments balanced the need for individualized training plans with group collaboration:

What I see is that the coaches are trying so hard to give the athlete their perfect special individual physiology thing, and then the athletes are out there following their paper plan to the letter . . . but I would say that I’d prioritize collaboration. . . . At some point someone’s training has to be compromised [when training in a group], but what I’d like to get across is just the power of working in a group to make the athletes better.

Theoretical Framework of Interpersonal Influence in Individual Sport

In the most basic sense, athletes felt that group interactions determined the resulting interpersonal influence (e.g., “However you interact with teammates either wears on you or fires you up, mentally”). Thus, the framework in Figure 1 provides a theoretical integration that illustrates a process whereby groupness, intra-team competition, and friendships were key group environment concepts that determine the extent and type of teammate interpersonal influences. Although healthy competition, close friendships, and perceptions of groupness were identified as ideal group characteristics, this process suggests that additional group and individual characteristics may promote (or detract from) the influence of the group environment. Specifically, athletes referred to aspects of the group structure (e.g., collective outcomes) and individual characteristics (e.g., collectivism) that further contributed to the nature of interpersonal influence. Alternatively, teammate interactions were expected to have either a negative influence or, at the very least, irrelevance for individual outcomes when teams had negative or weak group environments. In sum, interpersonal influence in individual sport teams is based on an interaction involving the characteristics of group members, the structure of group relationships, team-based efforts to manage the group environment, and (ultimately) the resulting group environment.

Discussion

The purpose of this study was to investigate athletes’ perceptions of interpersonal influence within individual sport teams. The athletes communicated that individual sport teammates have important motivational, affective, and behavioral influences in both the

social- and task-based realms – the effects of which were largely determined by the type of group environment the athletes perceived.

An initial consideration of this study involves its contributions to understanding sport groups and, specifically, to the four assumptions that were outlined earlier in this document: (a) group influence is more important in team sport (e.g., Carron & Chelladurai, 1981), (b) increases in cohesion will decrease productive rivalries (Landers & Luechen, 1974), (c) individual sport environments are comparable (i.e., all structured similarly), and (d) group processes are experienced similarly across individual and team sport contexts. In regard to the first and second assumptions, athletes' comments regarding the overall value of group environments, particularly those that are cohesive, suggest that groups are fundamental contributors to individual sport experiences. The value that participants placed on teammate interactions is in line with seminal social psychology theories claiming that individuals have an innate need for group membership (Baumeister & Leary, 1995), that groups form an important portion of identity (Tajfel & Turner, 1986), and that individuals compare themselves with in-group members to develop perceptions of self (Corcoran, Crusius, & Mussweiler, 2011).

Despite these results, athletes still felt that the group was not always highly influential and that the importance of being close with other teammates was context-dependent. Correspondingly, suggestions that groups are not necessarily a major influence for all individual sport athletes led us to question the third assumption that individual sport groups are comparable. As athletes proposed that group structure and composition determined the relevance of groups, it could be assumed that the extent of interpersonal influence may likewise depend on these variables. As an example of this,

one participant reported that groups are important in collegiate wrestling because of competitions between teams, whereas international-level wrestling competitions rarely involve team-based competition. If this is the case, athletes' responses were in agreement with social interdependence theory (Johnson & Johnson, 2005), which suggests that the structure of group members' reliance on one another (e.g., group outcomes) will guide their interactions and partially determine the influence one individual has on another.

In reference to the fourth assumption, although widely-established group concepts such as cohesion, leadership, and roles were described by athletes, this study also identified additional key concepts regarding individual sport teams. For example, the prevalence of comments involving competitiveness, jealousy, and personal values (e.g., collectivism; Jackson et al., 2006) suggests that these concepts are particularly salient in individual sport. Although these three concepts are undoubtedly evident in team sport as well (e.g., Kamphoff, Gill, & Huddleston, 2005), they may have greater bearing on athletes' experiences because of the structure of individual team settings. For example, member values for collectivism may be particularly relevant in individual sport because teammates aren't required to work together. Given that these concepts have been infrequently investigated with sport groups in the past, this study identifies several novel contributors to sport group environments.

An additional theoretical contribution of this study involved perceptions that teammates can directly influence one another's performance (e.g., suggestions that teammates could make it easier to expend physical effort). From these comments, it was deduced that teammates could help one another conserve self regulatory effort (Baumeister, Bratlavsky, Muraven, & Tice, 1998). Under the expectation that individuals

have limited energy to expend on acts of volition (Baumeister et al., 1998), it is conceivable that an athlete training or competing within a group will expend less effort on managing pace or dispelling failure-oriented thoughts and be able to maintain more positive affect (e.g., Baron, Moullan, Deruelle, & Noakes, 2009) – thus, conserving regulatory energy. A related question on this matter is whether athletes need to feel cohesive with their teammates for the benefits of social facilitation and/or self regulatory effort conservation to be realized (i.e., whether cohesion moderates the social influences).

In addition to the theoretical implications stated above, this research has several applied implications. First, the importance of the group environment suggests that coaches should consider structuring their groups to encourage teammate collaboration. For example, teams may consider establishing both task-related and task-unrelated group outcomes to make collaboration more relevant for team members. Teams may also consider ways to incorporate increased team member interaction when possible, such as during training or travel. Given the potential for athletes to have individualistic values, however, any efforts to manage the group should take members' values into account to ensure that the training setting is consistent with athletes' preferences (e.g., it may be alienating to force 'individualistic' athletes into group interactions). As such, coaches and practitioners may be advised to identify athletes who hold more, or less, value in being involved in group environments.

The implications of this research should be interpreted with some caution given the nature of the athlete sample that involved elite athletes from predominately endurance sports. In light of the importance of obtaining and comparing differing perspectives for generating substantive theory (Corbin & Strauss, 2008), the concepts identified in this

research should be further developed and validated through interviews with coaches and a broader range of athletes.

Nevertheless, the responses in this study revealed a variety of future research directions. First, although earlier research proposed that teammate competitiveness opposes group cohesion (Landers & Lueschen, 1974), responses involving ‘healthy’ competition suggested that competitiveness may be orthogonal to cohesiveness (i.e., that it is possible to be high in both competitiveness and cohesiveness). Thus, future research should examine the nature of teammate competitiveness within group settings, and specifically the degree to which ‘healthy’ and ‘unhealthy’ competition are distinct concepts. A second future direction involves comparing group environments that are fostered when there are differing group and individual goal structures. Given athletes’ comments about the influence of collective goals as well as competing against teammates, sport teams may tend to organize themselves according to their competitive structure. For example, teams classified as collective with shared group and individual outcomes may generally tend to develop increased cohesion when compared to teams classified as independent. This research would help coaches and practitioners understand (a) when additional efforts are required to foster desired group processes, and (b) when group processes such as cohesion are more, or less, important.

Another valuable avenue for future research involves athletes’ comments about the importance of groups throughout their development in elite sport. Athletes specifically felt that their groups played an important role during adolescence. Given the widespread interest in the physical and psychosocial development of athletes in elite and recreational sport (e.g., Bruner et al., 2011; Strachan, Côté, & Deakin, 2011), a focus on

group processes would contribute to this work. For example, researchers could consider the substantial positive impact of cooperative goal structures on early adolescents' achievement and peer relationships across a number of domains (Roseth, Johnson, & Johnson, 2008). These considerations could, furthermore, be extended to consider the power that groups have to influence choices to participate in sport and exercise throughout the lifespan (e.g., how the development of interdependent individual sport teams may promote sport participation in masters level sport clubs). Taken together, athletes' comments about developmental influences suggest that sport groups are an important aspect of even elite individual sport developmental pathways and have applicability across sport contexts.

Transition Statement

Athlete reflections from this study provided justification for challenging assumptions rooted in past literature that group dynamics are less relevant in individual sport and that all individual sport group contexts are comparable (Carron & Chelladuai, 1981). Recall as an example that athletes discussed how the relevance of groups differed in teams with different group structure (e.g., collective goals). Given that the term 'individual sport' may apply to a range of distinct team structures, it was essential to first define what was meant by this term when advancing a program of study examining groups within the understudied context of individual sport. As a result, the subsequent paper was conceptual in nature and outlined several team types formed by interdependence structures in individual sport – providing a foundation for further empirical study of individual sport teams.

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PAPER 2: SEEING THE ‘WE’ IN ‘ME’ SPORTS: THE NEED TO CONSIDER INDIVIDUAL SPORT TEAM ENVIRONMENTS²

Individual sport performances are rarely individual efforts. Individual sport athletes (e.g., running, wrestling, and golf) often spend hundreds or even thousands of hours with teammates in training and competition, and build important interpersonal relationships. For example, after calculating the number of hours spent competing to the amount of time spent training and travelling with teammates, Canadian cross country skier Marlis Kromm claimed, “for every minute I’m on the race course I’ve spent almost 7 hours with my team” (Kromm, 2009, para. 1). Group dynamics research has largely overlooked individual sport environments in favor of team sports (e.g., soccer) under the expectation that group influence will only exist to the extent that team members interact during competition (Carron & Chelladurai, 1981). Correspondingly, it is unclear whether individual sport environments involve comparable group dynamics processes to those in team sport settings (e.g., Carron, Colman, Wheeler, & Stevens, 2002) or whether group processes are relatively unimportant (e.g., Landers & Lueschen, 1974).

This understanding is particularly hampered by the typical dichotomous categorization of sports as either individual or team in nature. ‘Individual sport’ is an umbrella term encompassing a number of activities in which athletes are not required to integrate with others on a collective competitive group task. However, sports identified as ‘individual’ based on task type may also differ according to a number of higher-order characteristics including (but not limited to): (a) the use of team scores, (b) training that

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requires the presence of teammates, and (c) identification of distinct leaders and roles. Thus, although individual sport athletes are not interdependent with others on the competitive task, there are a number of additional ways that they may rely on other athletes in a group or team setting (Widmeyer & Williams, 1991). As all sources of interdependence are essential in understanding group interactions and collaboration (Saavedra, Earley, & Van Dyne, 1993), they may be valuable for distinguishing group types.

The purpose of this paper is to promote the investigation of group dynamics and social influence in individual sport settings by proposing a typology that distinguishes types of sport group environments according to levels of structural interdependence and encouraging research involving interdependence perceptions and structures that determine how group members are likely to impact one another's sport experiences. This review makes a distinct call for greater consideration of group dynamics issues within individual sport, and provides a framework to guide such research efforts.

Traditional Sport Team Classification

In discussing group properties, it is first relevant to consider how sport teams are traditionally defined and classified. Although there are a number of traits that are used in definitions of sport teams, most conceptualizations identify a team as at least two people who define themselves as a group and who develop structured relationships connecting them in their pursuit of individual and common group-level outcomes – outcomes that are contingent on the efforts of all group members (Carron & Eys, 2012; Salas, Dickinson, Converse, & Tannenbaum, 1992). Most notably, one group characteristic that is explicitly or implicitly evident in nearly all group definitions and that is particularly evident in sport

team settings (Salas et al., 1992) is the concept of interdependence. Interestingly, sport teams are typically further categorized into two overarching types according to levels of task interdependence; team (interdependent; e.g., soccer, basketball, hockey) and individual sport (independent; e.g., running, wrestling, golf). Team sports include those where athletes train together and compete in events that require frequent interaction between members to achieve a group objective (Widmeyer & Williams, 1991). An individual sport team is a group of athletes who train together and may contribute to total team performance, but compete individually and often in opposition to their teammates. The term 'coaching' is also used to describe individual sport teams (Carron & Chelladurai, 1981).

The rationale for making this distinction between sport types is often attributed to differences in task interdependence, as the interaction among teammates during competition is a requirement in team sport but not in individual sport (e.g., Baker, Yardley, & Côté, 2003). Task interdependence is, indeed, an important factor in understanding group interactions. In comparison to team sports, individual sport athletes report weak team norm perceptions, which also have little influence on performance, adherence, and effort (Colman & Carron, 2001). Coaching behaviors also have relatively little influence on individual sport athletes' coaching satisfaction (Baker et al., 2003). Conversely, recent research also supports the importance of group processes in individual sport environments and, perhaps most notably, a positive relationship between cohesion and performance has consistently been identified (e.g., Carron et al., 2002; Kozub & Button, 2000; Matheson, Mathes, & Murray, 1996; Widmeyer & Williams, 1991). These contrasting findings (i.e., that group processes are/are not important in individual sport

environments) have resulted in a lack of consistency in identifying the role of group dynamics across team and individual sport types.

The inconsistency evident in sport research supports the proposition that task interdependence is not the only important factor in understanding group interactions. For example, Wildman et al. (2012) suggested that:

...*what* teams do says little about the manner in which they interact as a single social entity, but *how* they interact provides a deeper understanding of the higher order traits that make teams unique. Furthermore, as a testament to the importance of these holistic characteristics, most accepted definitions of teams ... focus on the higher order characteristics of teams (e.g., interdependent, shared common goal, roles and responsibilities) and say little or nothing about specific task types because, alone, task types provide little insight into the underlying reasons for differential relationships with various antecedents and outcomes. (p. 120)

In light of this observation, there are a number of potential consequences for using the existing team versus individual sport dichotomy and avoiding further consideration of how individual sport athletes interact. These are discussed in the following sections and include: (a) the dismissal of group influences, (b) the assumption that all individual sport settings involve similar social structures, and, consequently, (c) an under-utilization of group intervention strategies.

Dismissing group influences. If teams are grouped only because of a lack of task interdependence, this may lead to an assumption that group processes such as cohesion are either not relevant or detrimental to performance. A sole focus on task interdependence also led Carron and Chelladurai (1981) to suggest that individual sport

teams should not even be considered groups: “Ad hoc categorizations [i.e., individual sport teams] ... do not possess the qualifying characteristic of inherent required interaction from group members” (p. 24). If task interdependence is the only characteristic acknowledged to distinguish sport types, then there is a conceptual argument to ignore the influence of group dynamics in non-task interdependent environments.

Equivalence of individual sport group environments. The existing dichotomy is also limited by its ambiguity, as it implies that all individual sport environments are comparable. A wide range of individual sports are considered equivalent in terms of the group environment, even within single study samples, such as: (a) swimming, athletics, gymnastics, equestrian, wrestling, golf, triathlon, badminton, and squash (Baker et al., 2003), and (b) wrestling, rowing, swimming, athletics, squash, badminton, and cheerleading (Patterson, Carron, & Loughead, 2005). Inconsistency regarding sport team categorization has incited further confusion, as ‘individual’ events requiring interactions amongst teammates (e.g., relays or rowing teams) have been classified as either interdependent (Bry, Meyer, Oberle, & Gherson, 2009) or individual (Patterson et al., 2005). Generally speaking, there are a number of cases where a task distinction is inadequate to capture the diverse characteristics of different individual sport contexts.

Under-utilized group-oriented interventions. The existing dichotomy also reduces opportunities to develop group-oriented intervention strategies that are targeted to specific group environments to improve performance, adherence, and affective outcomes. Although there are examples of published individual sport group intervention case studies (e.g., Beauchamp, Lothian, & Timson, 2008; Bloom & Stevens, 2002), more

empirical research is required to understand the influence of cohesion manipulations within individual sport. With no framework to identify individual sport settings where group interventions are more (or less) beneficial, applied practitioners have little information to guide team-building.

Classifying Group and Task Types: A Need for a New Typology

When the differences within group types are extensive, it becomes increasingly challenging to identify generalizations that can be applied across the group type (Sundstrom, DeMeuse, & Futrell, 1990). Such are the current circumstances in sport group dynamics research, even though sport psychology researchers have been calling for revised group classification for decades (e.g., Carron & Chelladurai, 1981; Cannon-Bowers & Bowers, 2006).

Accurate classifications are essential for research because they are heuristic, in that they encourage the proposition and testing of hypotheses (Sokal, 1974). An improved sport team classification structure would allow us to identify and make hypotheses about group properties or the influence of group processes (e.g., cohesion, leadership, motivational climates) across differing sport environments. This would also help to identify the situations where key group processes such as leadership will or will not exert an influence on individual and group outcomes. Furthermore, a typology of sport team types would provide a shared classification to communicate empirical, theoretical, and applied insights. In the next sections of this article, relevant advances in group classification structures are reviewed, followed by a discussion of interdependence in sport teams and, finally, the presentation of a novel sport team typology.

Group typologies. The idea for creating classifications to distinguish types of groups is far from novel (e.g., Lundberg, 1940). Group typologies are systems that distinguish a large number of groups (e.g., sport teams) by reducing them into higher-level sets (e.g., sport types). A number of typologies have received attention in the social and organizational psychology literatures, and most are based on theoretical propositions about task differences. Steiner (1972) and McGrath (1984) published two of the most widely cited group task typologies based on the types of tasks that groups are required to undertake (Devine, 2002). Specifically, Steiner (1972) distinguished groups according to whether the collective task was divisible or unitary, maximizing or optimizing, as well as additive, compensatory, disjunctive, conjunctive, or discretionary. As a brief example, compensatory tasks where group member inputs are averaged were considered distinct from disjunctive tasks where the highest performing member's performance represents the group. McGrath's typology (i.e., the task circumplex model) included eight types that were distinguished using three continuums regarding the group task: (a) conflict – cooperation, (b) conceptual – behavioural, and (c) choice – execution. More recent group typologies in organizational psychology have continued with a similar approach to early theorists by separating groups according to the primary task (e.g., Cohen & Bailey, 1997; Saavedra et al., 1993).

Despite their value in distinguishing groups, the existence of a vast number of typologies has created a clutter of different group types. For example, Wildman et al. (2012) reported 17 published attempts to create group typologies and Hollenbeck, Beersma, and Schouten (2012) identified 50 distinct group types across these frameworks. Thus, researchers have identified a need to integrate existing categories into

a more inclusive typology based on key structural and task-based team traits (e.g., Devine, 2002; Hollenbeck et al., 2012; Wildman et al., 2012). For example, Wildman et al. (2012) integrated the available literature to produce an overall taxonomy of 12 group types and proposed a list of higher-order characteristics that are intended to help researchers describe team types. The characteristics included in the list were: (a) task interdependence, (b) role structure, (c) leadership structure, (d) communication structure, (e) physical distribution, and (f) team life span.

When compared to the organizational literature, sport-related attempts to categorize teams are limited, and stem from the task types developed in organizational research (e.g., Saavedra et al., 1993). Initially, Carron and Chelladurai (1981) identified four sport task interdependence types, including: (a) independence (e.g., individual running race); (b) coactive dependence, where participants compete simultaneously (e.g., rowing); (c) reactive-proactive dependence, where one player relies on another to complete an action (e.g., quarterback throwing to a receiver); and (d) interactive dependence (e.g., soccer). The only other attempt to further distinguish sport teams was by Cannon-Bowers and Bowers (2006) and involved four relatively analogous task types to those proposed by Carron and Chelladurai. The typology included pooled, sequential, reciprocal, and team interdependence task types. Similar to many of the early typologies in organizational research, these attempts focused entirely on task attributes and leave a large number of individual sports undistinguished from one another. Furthermore, they have largely gone unused in the sport literature.

Past attempts to distinguish task types may have overlooked individual sport settings because the purpose for the typologies were to understand the influence of

cohesion on task coordination (Carron & Chelladurai, 1981), and to improve team-based interventions focused on improving team task performance (Cannon-Bowers & Bowers, 2006). Although task interdependence plays a primary role in guiding interactions amongst teammates, there are several additional ways that team members may be interdependent that are also valuable for distinguishing group environments.

Interdependence. Across a vast number of definitions and theoretical approaches, interdependence is generally described as the degree and manner in which group members rely on one another and require reciprocal interaction (e.g., Johnson & Johnson, 2005; Thibaut & Kelley, 1959). Interdependence is initially determined by the organizational group structure (i.e., how team members' cooperation, roles, and goals are structured) that continually shapes emergent group member interactions. Interdependence is important because it guides interactions and reliably distinguishes aspects of the environment that make specific behaviours more (or less) appropriate (Johnson & Johnson, 2005). For example, teams with higher *structural* interdependence will typically develop closer *perceptions* of interdependence over time (Wageman & Gordon, 2005). Furthermore, team and individual performance is more strongly influenced by collective efficacy (Stajkovic, Lee, & Nyberg, 2009) on teams with a higher level of interdependence. It is important to note that the majority of interdependence research reported in this review involves organizational or educational settings.

To this point in this article primary discussion has involved task interdependence, or the degree that the group competitive task requires the reciprocal interaction of team members (Wageman, 1995). When team members are task interdependent, they invest in developing smooth interpersonal interactions, engage in mutual helping, and experience

enhanced interpersonal liking and harmony (Johnson & Johnson, 2005). In addition to task interdependence, there are other sources of interdependence that have an influence on group member interaction; namely, outcome interdependence and resource interdependence (Johnson, Johnson, & Stanne, 1989).

Outcome interdependence refers to the extent that team members are dependent on one another in achieving personal and group level outcomes (Johnson & Johnson, 2005). The composition of the individual and group-level goal structures, as well as the provision of rewards, determines outcome interdependence (Wageman, 1995). In regard to sport teams, outcome interdependence is evident at the group structural level to the extent that an overall team performance is comprised of individual team members' efforts. The type of influence that outcome interdependence has in group environments often depends on the corresponding amount of task interdependence. For example, when group members are both task and outcome interdependent, they report more positive affective experiences (Van Der Vegt, Emans, & Van De Vliert, 2000). On the other hand, reward interdependence – one aspect of outcome interdependence – primarily improved performance on a student group learning task when members did not already rely on one another (Buchs, Gilles, Dutrevis, & Butera, 2011). Buchs et al. (2011) proposed that reward interdependence benefits performance mainly because it provides incentive for group interaction where none was otherwise required.

In addition to group-level outcome interdependence, teammates may also be positively or negatively interdependent regarding individual level outcomes. Positive outcome interdependence (i.e., the more I get, the more you get; non zero-sum) is comparable to a cooperative setting and is associated with prosocial motives, greater

responsibility for others' work, and improved individual-level outcomes (De Dreu, 2007; Van der Vegt, Emans, & Van de Vliert, 1998). In contrast, negative outcome interdependence (i.e., the more I get, the less you get; zero-sum) is akin to a competitive setting and is described as being a contrient environment (Deutsch, 1949). Although anecdotal reports suggest that negative interdependence will bring about productive rivalries (Landers & Lueschen, 1974), there is little evidence to suggest that negative outcome interdependence is always beneficial when compared to positive interdependent settings (Tauer & Harackiewicz, 2004). A meta-analysis conducted by Stanne, Johnson, and Johnson (1999) considered 64 laboratory and field studies and identified that competitive (i.e., negative) interdependence resulted in lower performance on motor tasks (e.g., sport-related skills, fitness tests, reaction time, and maze navigation) as well as lowered interpersonal attraction, social support, and self-esteem when compared to positive interdependent and independent environments.

Additionally, resource interdependence refers to the degree to which members feel they can achieve desired goals if, and only if, important resources are contributed by other group members (Johnson, Johnson, & Stanne, 1989). Resource interdependence leads to improved performance primarily when members are interdependent in other ways, because resource interdependence in the absence of task and/or outcome interdependence may decrease achievement because of process losses (Johnson & Johnson, 2005) and because the performance of other group members becomes threatening (Buchs & Butera, 2009).

Considering the impact of interdependence on group dynamics in organizational settings (Tauer & Harackiewicz, 2004), outcome and resource interdependence should

influence individual sport group environments in a similar way. For example, Widmeyer and Williams (1991) identified that golf teams who possessed team goals or outcomes (e.g., outcome interdependence) perceived greater levels of group cohesion. At this point, however, existing typologies don't extend beyond the influence of task interdependence. In the typology presented below, limitations of earlier typologies are addressed as the typology considers several sources of interdependence that are evident in the structure of individual sport groups.

A Sport Team Interdependence Typology

The sport team interdependence typology was developed with the key concepts from interdependence literature as a foundation. The intentions of the typology are to establish several mutually exclusive categories that distinguish sport group settings according to the task and outcome interdependencies evident in the competitive environment. Resource interdependence was not considered as part of the typology because sport competitive structures rarely dictate the sharing of resources amongst teammates. As shown in Figure 2, the hierarchical categorization system presented is thus comprised of three primary interdependence sources: task interdependence, group outcome interdependence, and individual outcome interdependence.

Using the typology. A presupposition of the model is that the group of interest, in fact, identifies themselves as a 'group' with structured relationships connecting them in their pursuit of individual and common group-level outcomes (e.g., Carron & Eys, 2012). Within the typology, groups are then distinguished (via the second and third columns in Figure 2) according to whether they involve integrated task interdependence (e.g., hockey), segregated task interdependence (e.g., baseball), or no task interdependence

(e.g., running). This task distinction is similar to that outlined by Cannon-Bowers and Bowers (2006). Earlier typologies included an additional task interdependence type labeled sequential (Cannon-Bowers & Bowers, 2006) or coactive dependent (Carron & Chelladurai, 1981) that distinguished simultaneous or sequential tasks such as relay or rowing. These settings are equivalent to integrated task settings in the current model, to the extent that the group of interest is the specific task-interacting group (e.g., relay team) rather than a higher-order group (e.g., track and field team); in which case the group would be considered collective.

Groups are then further distinguished according to whether (a) there are group-level outcomes typically identified during competition (e.g., team scores) and (b) whether group members influence one another's personal goals (i.e., whether teammates compete directly against one another). Groups demonstrating task interdependence are assumed to have group outcome and relative individual outcome interdependence because of the nature of the task.

Example classification. To provide an example of how the model would be applied in a specific situation, consider an example of a female collegiate golf team with members who:

- compete within the same conference and consider themselves to be a team
- are not task interdependent, because golf is an individual task
- are interdependent for a collective group goal that is based on contributions from group members, such as tournament or conference titles
- are interdependent on individual outcomes because all members compete in the same events and directly influence one another's individual goal attainment

In consideration of the group environment, the collegiate golf team example would be classified as *collective* using the team type decision tree in Figure 2 because members

identify as a group (column 1) and are not task interdependent (column 2), while being interdependent on both group (column 4) and individual outcomes (column 5).

For further clarification of group classification, Table 1 provides examples of each specific sport team type environment and compares the team types presented in our typology to those of previous sport typologies. When compared to previous attempts, the novel contribution of this typology is the characterization of individual sport settings as collective, cooperative, contrient (Deutsch, 1949), independent, or solitary. In light of these novel contributions, there are several features of the typology that are important to recognize, both for its effective use and in understanding its limitations.

Considerations Pertaining to the Typology

Team types vs. sport types. A first consideration is that this typology establishes a number of sport *team* types rather than *sport* types. We do not explicitly refer to these as sport types because the structural interdependence evident even within one sport may change at different levels of competition and in different settings. For example, wrestling competitions at the high school and collegiate levels are often collective or cooperative settings because they typically involve overall team scores and, at times, ‘dual meets’ where two schools are directly pitted against one another. In contrast, other wrestling environments that don’t include team-related outcomes (e.g., international wrestling competition) would be labeled independent.

Structural vs. perceived interdependence. A second consideration about this typology is that it is purely based on structural interdependence that is inherent in the group environment. However, there are additional levels of interdependence that are important for group functioning but are not considered in this model, including team-

specific structural interdependence sources (e.g., team norms, how often teammates travel or train together) and individual perceptions of interdependence (Wageman & Gordon, 2005). Interdependence structure, alone, was used to distinguish sport team type because the complexity of interdependence perceptions at the individual level would require researchers to have in-depth understanding of each team setting; a situation that is not practical for easily identifying team type. Regardless, it is important to note that individual perceptions of interdependence emerge over time as a combination of team structure and member attributes as well as personal interactions and are fundamentally interrelated with the overt structure of the group environment (Wageman & Gordon, 2005). Overall, the pressures and forces initially (and continually) exerted on a group by structural interdependence provide an important foundation upon which team members' interdependence perceptions grow.

It is worthwhile to note that interdependence perceptions are also related to youth athletes' personal and interpersonal developmental experiences (e.g., teamwork, initiative, and positive relationships). Bruner et al. (2011) investigated how outcome and task interdependence perceptions are associated with personal developmental experiences of adolescent basketball players and cross country runners. Although the basketball players reported higher levels of task interdependence, Bruner and colleagues demonstrated that there were few differences between the two sport types regarding outcome interdependence perceptions. Furthermore, outcome interdependence positively predicted greater developmental experiences for athletes – even after controlling for sport type. Such findings demonstrate that interdependence perceptions predict key outcomes,

and imply that interdependence structures and interdependence perceptions are related but distinct concepts.

Typology effectiveness. A final consideration is that of effectiveness. The need to assess effectiveness is particularly relevant in this case because the distinctiveness of the group types in the current typology have not been confirmed empirically; a limitation held in common with most other group typologies (e.g., Devine, 2002; Hollenbeck et al., 2012; McGrath, 1984; Steiner, 1972; Wildman et al., 2012). In regard to identifying an ideal classification, the evaluation of typology effectiveness involves three primary aspects: internal validity, external validity, and utility (Fleishman & Zaccaro, 1992). Internal validity of the current typology would consider whether there is a comprehensive, mutually exclusive, list of group types that can be reliably identified. External validity concerns the degree that the group types predict expected differences in group processes and individual/group level outcomes. In addition, effective group typologies must – ultimately – balance these validity considerations with the need for a practical tool. Although the effectiveness of this typology can be partially supported through theoretical consistency with existing work (e.g., Johnson & Johnson, 2005) it should also be used in empirical and applied settings to test its validity and utility.

Future Research Directions

As the promotion of hypothesis testing is a central goal for developing a typology (Sokal, 1974), a well-developed system should prompt research questions about the nature of group types. Examples of specific questions that the sport team interdependence typology prompts include (but are not limited to): whether team-based goal and reward interventions will have a larger influence within groups that don't experience structured

group outcome interdependence, whether structural interdependence plays a greater role in group interactions early in a season, and whether there are additional forms of interdependence that bond individual independent teams together. Of particular relevance to the last point, there is potential for additional structural influences to be important interdependence sources within sport teams, such as training interdependence (i.e., the extent that teammates rely on one another for training). In addition to the sources of interdependence identified in this typology, it is important to note that existing organizational group typologies have also addressed additional forms of interdependence (e.g., McGrath, 1984; Steiner, 1972). Although the forms listed in these typologies are not relevant for distinguishing interdependence in individual sport teams because they are based on types of task interdependence, they may be relevant for distinguishing types of outcome interdependence structures. For example, it may be valuable to distinguish whether group outcomes are additive (e.g., cross country running team members' performances are combined) or disjunctive (e.g., a professional cycling team where the lead rider's performance represents the group).

Future research should also consider the extent that additional theoretical perspectives such as social identity theory (Tajfel & Turner, 1986) and social comparison theories (Corcoran, Crusius, & Mussweiler, 2011) should also be applied to this typology in future research. For example, perceptions of interdependence may influence the extent that an athlete identifies with being a member of a team.

Transition Statement

If advancements in group dynamics research with individual sport are to occur, an accurate sport team typology is a crucial addition to the field of sport psychology.

Without distinguishing between team types, it is difficult to predict how research based in one context will or will not apply in other situations (Devine, 2002). The Sport Team Interdependence Typology is meant to be an appeal for more consideration of interdependence structures and perceptions, rather than the 'final word' for distinguishing group environments. Indeed, this facilitated research with individual sport teams to elucidate when team environments may (and may not) influence important individual and group-level outcomes. The subsequent correlational studies described in Paper Three explore how the group environment relates to the three interdependence structures outlined within this paper: Task, collective outcome, and individual outcome interdependence.

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**PAPER 3: COLLECTIVE GOALS AND SHARED TASKS:
INTERDEPENDENCE STRUCTURE AND PERCEPTIONS OF INDIVIDUAL
SPORT TEAM ENVIRONMENTS³**

Interdependence is a fundamental human condition. Nearly every activity that individuals engage in on an everyday basis involves a web of interdependence, whereby the actions and goals of one person reciprocally influences those of others (Keohane & Nye, 2001). This understanding formed the basis of Deutsch's (1949) theorizing about the nature of competition and cooperation. Deutsch suggested that individuals who are placed in situations of positive interdependence – where mutual benefit is possible – will act more cooperatively than those placed in a negatively interdependent situation where mutual benefit is not possible. The Robbers Cave experiment (Sherif et al., 1961) is a profound example of this influence. The simple act of creating overarching cooperative goals that required all members to work together brought two quarreling factions of school boys to forget their pre-existing conflict and act as a united team.

Deutsch's theory about competition and cooperation was the foundation for contemporary theories (e.g., Johnson & Johnson, 1989; Tjosvold, 1990), which reveal that interdependence is central in social situations because it provides the structure that guides interactions by determining how an action by one member is likely to impact another (Johnson & Johnson, 2005). With this in mind, it is not surprising that interdependence is a key characteristic that distinguishes a *group* from a random collection of individuals (Forsyth, 2014). Group member relationships are laden with

³ This article is currently in press with the *Scandinavian Journal of Medicine and Science in Sport*.

interdependencies that bind members together and that determine how members are likely to act toward one another (Saavedra et al., 1993).

Sport groups are valuable to understand this process because interdependence structures are embedded within athletic contexts and are likely to influence group functioning, performance, individual affective experience, and adherence (Evans et al., 2012; Evans et al., 2013). As a hypothetical example, a young female swimmer might respond very differently in encouraging an absentee teammate to attend future training sessions if she relied on that teammate for transportation home, if she needed that individual on her team to participate in relays, or if she competed against that teammate during events. In addition to underscoring the relevance of interdependence for interactions, this example reveals how individual sport teams provide a unique opportunity to examine how group processes emerge according to a complex and potentially conflicting combination of (a) competition for individual outcomes along with (b) cooperation for collective outcomes and shared tasks. Individual sport teams are an understudied group context that could benefit our understanding of interdependence and group dynamics in sport. The current studies were conducted to better understand how team interdependence structures influence individual sport athletes' perceptions of the group environment. The following sections will describe the theoretical and empirical sources that guided our research.

Interdependence in Groups

The current studies were aligned with social interdependence theory (Johnson & Johnson, 1989), which is one of the leading theories used in educational and organizational contexts to investigate interdependence. Using this theory, researchers

have found that relatively inconspicuous characteristics of how groups are designed (e.g., task properties, rules, allocation of resources, individual and group goals) greatly influence relationships in groups. These characteristics are labeled *interdependence structures*, and are specifically described as aspects of the group environment that determine the ways that the actions of one member influences, and is influenced by, other team members. *Task interdependence* is one of the most notable sources. When team members must work together on a group task, they invest in developing smooth interpersonal interactions, engage in mutual helping, and experience enhanced interpersonal liking and harmony (Bertucci et al., 2011; Johnson & Johnson, 1989; Van der Vegt et al., 1998). As an example, virtual work teams with little interdependence improved their performance when working structures were changed to include task interdependence (Hertel et al., 2004).

Collective outcome interdependence is another fundamental interdependence source that refers to the extent that team members are dependent on one another in achieving group level outcomes (Johnson & Johnson, 1989). Similar to task interdependence, shared team-level outcomes are associated with prosocial motives, greater responsibility for others' work, and improved individual-level outcomes (De Dreu, 2007; Van der Vegt et al., 1998). However, regardless of whether a team is task or collective outcome interdependent, several additional interdependence sources are influential. For example, team members can be required to share resources or rewards for performance, which may generate a cooperative environment (Buchs et al., 2004; Johnson & Johnson, 2005).

When considering interdependence in groups, it is important to point out two additional aspects that highlight its dynamic nature. First, although interdependence is based in the *actual* structure of the group environment (i.e., the design of member interactions), its relevance depends on the extent that members *perceive* interdependence with teammates (Van der Vegt et al., 2001). In this sense, the actual structure of interdependence is important because it can influence the degree to which members perceive that their outcomes and actions are bound to their teammates (Wageman & Gordon, 2005). The second aspect to consider is that interdependence perceptions will emerge over time according to member attributes and personal interactions (Wageman & Gordon, 2005). For example, Wageman and Gordon followed several work groups collaborating on a graduate course project throughout an academic term. Although all of the groups initially reported similar levels of interdependence, group member values (e.g., beliefs about how status and merit should be attributed) predicted whether groups adopted high or low levels of interdependence by the end of the term. Such findings have led to the perspective that interdependence involves a process whereby organizational structure dictates the initial group environment, which is then further shaped by the behaviors and perceptions of group members and shifts over time as changes to the organizational structure occur (e.g., new goals or tasks).

Sport Group Interdependence

Social interdependence theory was used by Evans et al. (2012) to develop a novel framework for group influence in sport, which advanced beyond the traditional approach to distinguish sport types through task interdependence (i.e., individual vs. team sport) by considering several interdependence sources that define how teammates' goals

interconnect. In addition to distinguishing teams according to whether members have to work together during competition, Evans et al. (2012) considered whether individuals are united by a shared outcome (collective outcome interdependence as previously defined) and whether members compete in the same event, labeled *individual outcome interdependence*. Regarding the latter concept, sport provides a special context where athletes may differ according to whether they compete in the same event as teammates, which may influence whether goals are competitively or cooperatively framed at the individual level. Although individuals who compete directly against one another are prone to act competitively (De Dreu, 2007), there is little available research to predict how individual outcome interdependence will be perceived among teammates who share team affiliations.

Ultimately, such variations in task, collective outcome, and individual outcome interdependence structures may shape teammate relationships because they alter members' perceptions of whether they depend on one another. Although sport research has not yet explored relationships between interdependence structures and resulting group environments, research in organizational psychology provides evidence to support predictions about these relationships. Notably, members of teams including actual task and collective outcome interdependence structures report increased perceptions of interdependence compared to other team structures (e.g., Comeau & Griffith, 2005). Furthermore, perceptions of task and collective outcome interdependence positively relate to satisfaction and helping behavior, and negatively relate to competitive behaviors (Campion et al., 1996; Van der Vegt et al., 2001). Satisfaction and cooperation among

group members are important outcomes for promoting adherence to teams and members' positive affective experience (Johnson & Johnson, 2005; Van der Vegt et al., 2001).

Interdependence may also have particular relevance for group cohesion – a group process that is often promoted because it is positively related to team performance (Carron et al., 2002) and intentions to adhere to one's team (Spink et al., 2010). Cohesion is described as a perception that group members hold about their group's integration (i.e., closeness and unification) as well as their attractions to the group (i.e., personal feelings that act to keep the individual in the group; Carron et al., 1985). Existing sport research has revealed that cohesion is similarly associated with performance in both team and individual sport (Carron et al., 2002), but has not directly considered how cohesion relates to interdependence structures and perceptions. Nonetheless, numerous team-building activities used with sport groups make use of teamwork on shared tasks and promote collective outcomes to develop cohesion (Martin et al., 2009). Under the expectation that feelings of unity and attraction will be promoted when members feel like they require and mutually benefit from one another's efforts, shared tasks and collective outcomes may be positively associated with cohesion.

It is clear that it is essential to study the role of interdependence structures in shaping perceptions of teammate relationships (e.g., interdependence, cohesion, competitiveness, satisfaction) that are supported as key contributors to outcomes such as adherence, performance, and social development. Although group processes were traditionally studied in team sport under the assumption that groups are only relevant when members work together on a collective task (see Evans et al., 2012), the range of interdependence sources in individual sport teams may provide ideal circumstances to

study interdependence. Whereas team sports prescribe relatively homogeneous task and collective outcome interdependence structures (e.g., working together to win a game), individual sport teams vary – ranging from highly-interdependent contexts (i.e., shared team title, teamwork in relays, competing against one another in events) to independent contexts, where athletes are merely affiliated with one another.

Overview of the Current Research

Two studies were conducted to examine the extent that individual sport athletes' perceptions of interdependence with teammates are predicted by the ways that they must interact with teammates during competition and training (Study 1) as well as by the proximity of shared team outcomes (Study 2). We predicted that both task and collective outcome interdependence structures would be positively associated with perceptions of interdependence among teammates. We also predicted that athletes who compete in the same event as all other teammates will perceive less interdependence for combined tasks and on outcomes. Study 1 extended these hypotheses to consider the implications of interdependence for perceptions of group cohesion (i.e., Attraction to group-social, Group integration-social, Group integration-task), competitiveness, and satisfaction. We predicted that task and collective outcome interdependence structures would be positively associated with all cohesion dimensions and satisfaction, and negatively associated with competitiveness; the opposite relationships were predicted for individual outcome interdependence. Furthermore, we also expected that these relationships would be mediated by interdependence perceptions. Although our predictions for relationships with interdependence structures were grounded within past research (De Dreu, 2007; Van der

Vegt et al., 1998), our predictions regarding individual outcome interdependence were tentative because little evidence was available as a guide.

Study 1

Methods

Participants. Two hundred and ten individual sport athletes (51% men; $M_{age} = 20.08$ years, $SD = 2.07$) completed the study. Participants competed in a range of sports at the Canadian University and College levels, and further sample characteristics are listed in Table 2.

Procedure. To initiate recruitment, coaches from 52 university and college individual sport teams were contacted via phone or e-mail and asked for permission for the first author to recruit team members and conduct the study before or after a group meeting. Coaches of 12 teams invited the first author to present the study and ask for participation. Human participant research committee ethical approval was obtained prior to subject recruitment and written consent was obtained from all participants (see Appendices F and G for approval and consent forms).

The study was conducted with athletes during group sessions following a practice or group organizational meeting. Athletes were told that the purpose of the study was to understand differences in the ways that individual sport teams are structured and to examine how these differences might influence individual- and team-related experiences. Athletes who were interested in participating provided informed consent and individually filled out the paper and pencil study package. After filling out the questionnaire package, participants had an opportunity to provide contact information if they were interested in

receiving feedback about the study results or if they were interested in participating in a secondary weekly online study (see Study 2) at a later date.

Measures. The study package consisted of demographic items, followed by measures of team type, interdependence perceptions, cohesion, competitiveness, and satisfaction. Although the demographic items always appeared at the front of the questionnaire package, the rest of the scales were counterbalanced to control for order effects.

Demographic information. Participants reported their age, gender, competitive sport, team size, and team tenure using open-ended items.

Interdependence structure. Questions were completed to provide an indication of the participants' task and collective outcome interdependence structure (see Appendix H), whereas individual outcome interdependence structure was directly assessed for each team by the primary researcher. The task interdependence item asked participants whether they were required to work with teammates during competition. If answered in the affirmative, participants also completed an open-response question to describe the ways that they were required to work with teammates. The collective outcome interdependence item included the question 'Does your team compete for a collective goal or outcome?' Finally, participants were asked to indicate the sport team that they participated on. This information was used to determine whether the sport context was one where team members competed in a range of events or categories (e.g., track and field, wrestling, rowing, fencing, figure skating) or a single-event context where each member competed in the same event (e.g., middle-distance track, cross country skiing, golf, badminton).

Perceived interdependence. Interdependence perceptions were assessed through an adaptation of scales used in previous studies within sport (Bruner et al., 2011) and organizational psychology (Van der Vegt et al., 2001). The questionnaire was composed of eight items that were assessed on a 5-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). Participants were asked to report the extent to which their experiences reflected those described in four items assessing task interdependence (e.g., I work with my teammates during competition; I depend on my teammates to perform well) as well as four items assessing collective outcome interdependence (e.g., my teammates and I share a collective goal; my teammates' commitment level influences my own achievement). Adequate internal consistency was found with the current sample for both the task ($\alpha = .80$) and outcome ($\alpha = .73$) subscales. The entire list of interdependence items is provided in the associated supplemental materials. See Appendix I for the complete interdependence perceptions scale.

Group cohesion. Group cohesion was measured using the Group Environment Questionnaire (GEQ; Carron et al., 1985). The original questionnaire is composed of 18 items that are responded to on a 9-point Likert-type scale ranging from 1 (strongly disagree) to 9 (strongly agree). The items address four dimensions, including: (a) attractions to the group-task (ATGT; e.g., I'm happy with my team's desire to win; 4 items), (b) attractions to the group-social (ATGS; e.g., I enjoy being a part of the social activities of this team; 5 items), (c) group integration-task (GIT; e.g., Our team is united in trying to reach its goals for performance; 5 items), and (d) group integration-social (GIS; e.g., Our team members often party together; 4 items). Two modifications were made to the GEQ in the present study. First, all items were phrased positively (Eys et al.,

2007). Second, one ATGT item ('I like the style of play on this team') was removed from the questionnaire because it was not relevant for individual sport athletes. Adequate internal consistency was identified for three of the subscales ($\alpha_{\text{ATGS}} = .86$; $\alpha_{\text{GIT}} = .82$; $\alpha_{\text{GIS}} = .80$); however, the ATGT subscale was removed from further analysis because it demonstrated poor internal consistency ($\alpha_{\text{ATGT}} = .57$). See Appendix J for the complete list of GEQ items used in the current study.

Competitiveness. An adapted competitiveness questionnaire was composed of items that were used in work environments (Rossi, 2008). The scale included five items that began with the root: 'During everyday training and competition, my teammates...'. Each item subsequently included a statement reflecting perceptions of competitiveness (e.g., seem threatened when I am highly effective; withhold important information from me) and were rated using a Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). Rossi (2008) reported good internal consistency ($\alpha = .91$) for the scale, which was replicated within the current study ($\alpha = .80$). The entire list of competitiveness items is provided in the associated supplemental materials. See Appendix K for the complete list of competitiveness items.

Satisfaction with team. A single item was specifically created for the present study and used to garner participants' general satisfaction with their team. Participants responded to the question 'How satisfied are you with your current team?' on a 5-point Likert type scale ranging from 1 (not at all satisfied) to 5 (very satisfied).

Data analysis. The first step of analysis was to identify the interdependence structure for each participant. Given that Canadian university and college teams compete for school titles, it is important to note that collective outcome interdependence was not

analyzed in Study 1 because each and every participant reported collective outcomes (See Study 2 for analyses involving collective outcomes). Answers to the interdependence structure item involving interaction during competition were used to code participants as task interdependent (coded as '1') or non-task interdependent (coded as '-1'). Accuracy of these responses was confirmed using the athletes' open-ended responses describing task interdependence. Fourteen participants reported task interdependence but described behaviors that could not be considered as competitive task interdependence (e.g., cheering or moral support). Therefore, these responses were coded as non-task interdependence. Finally, individual outcome interdependence was determined directly by the primary researcher, who identified teams in which all group members competed in the same event (e.g., cross-country skiing; coded as '1') as opposed to mixed-event teams (coded as '-1').

Bivariate correlations were initially used to examine relationships of several variables with actual task and individual outcome interdependence structures. Following this, multiple mediation analyses (Preacher & Hayes, 2008) were used to examine whether interdependence perceptions mediated the relationship between actual task interdependence structure – the independent variable – and dependent variables, including competitiveness and satisfaction, as well as three dimensions of group cohesion. Multiple mediation permits the analysis of multiple mediators simultaneously through the use of a macro developed by Preacher and Hayes to guide multiple regression in SPSS. It features bias-corrected bootstrapping to determine confidence intervals for the effect size of the indirect effect (i.e., B) for each mediator. As opposed to traditional tests of mediation (i.e., Sobel, 1982), confidence intervals reduce potential limitations to the

power of an indirect effect that may be introduced when there is a non-normal distribution (MacKinnon et al., 2004). Within the current study, bootstrapping involved the repeated extraction of 5000 samples from the data to calculate a 95% confidence interval for the effect size of each indirect effect. Significant indirect effect sizes were signaled by p-values below .05 and confidence intervals that were entirely higher or lower than zero (i.e., zero was not within the range). As an example of the use of multiple mediation to study group processes, see Leicht et al. (2013).

Results

Data were first explored regarding missing values. Although no data were missing regarding demographic and categorical data (e.g., age, sport type, interdependence structure), there were fourteen participants who did not respond to at least one scale-scored item (i.e., cohesion, interdependence perceptions, competitiveness, and satisfaction). One participant did not complete two such items. It was inferred that data were missing completely at random because Little's (1988) MCAR statistic did not reject the null hypothesis that missing values diverged from randomness, $\chi^2(299) = 258.06, p = .96$. Missing values were thus replaced for each scale-scored variable using the participant subscale mean. If other subscale items were not available (i.e., satisfaction), then missing values were not replaced. This data imputation approach was appropriate in the current study, where highly-correlated subscale items were available for calculating estimates (Osborne, 2013; Schafer & Graham, 2002). The data were also reviewed to assess the degree that statistical assumptions for the required analyses were met, including assumptions about normality, reliability of scales, a linear relationship between the independent and dependent variables, as well as homoscedasticity (Osborne &

Waters, 2002). T-tests and chi-square analyses were conducted to determine if responses to demographic questions (e.g., age, gender, team size, team tenure) differed between those individuals who reported a task or individual outcome interdependent team versus those who did not. Although athletes with an individual outcome interdependent structure reported smaller team sizes, $t(207) = 7.69, p < .001$, there were no other significant differences between the groups (all p 's $> .05$).

Next, preliminary analyses were conducted to determine means and bivariate correlations of key constructs, which are illustrated in Table 3. An inspection of the correlations reveals several significant relationships. Notably, individual outcome interdependence structure was relatively unrelated with other study variables whereas relationships were evident between task interdependence structure and several study variables (e.g., task and collective outcome interdependence perceptions).

Mediation analyses were finally conducted. Recall the expectation that interdependence structures would predict perceptions of interdependence and, in turn, predict other perceptions of the group environment – including cohesion, competitiveness, and satisfaction. Separate regressions were completed using either task interdependence (i.e., whether there was a shared task) or individual outcome interdependence (i.e., whether or not all members competed in the same event) as the independent variable. None of the multiple mediation models were significant using individual outcome interdependence as a predictor (all p 's $> .05$). In contrast, all five models were significant using task interdependence and are described below. Table 4 lists the five mediations that were analyzed in the left hand column, and provides: (a) regression statistics for each overall model (i.e., the prediction of the dependent variable

using actual task interdependence structure as well as both mediators), (b) the total indirect effect with both mediators included, and (c) 95% confidence intervals indicating the range of indirect effect sizes attributable to each mediator individually. As illustrated in the table, the total indirect effect was significant for all mediation models. This means that participants who reported working with other teammates on a competitive task reported increased perceptions of interdependence, which mediated relationships with perceptions of cohesion, competitiveness, and satisfaction.

Although all five of these mediation models were significant, the magnitude of the relationships and the distinct contributions of task and collective outcome interdependencies as mediators differed from model to model. Regarding Model 1, the relationship between task interdependence structure and ATGS was mediated ($B = .33, p = .002$), although perceived collective outcome interdependence was the only significant mediator ($B = .17, p = .02$). The pattern described above was similar in Model 2 using GIS, which included a significant mediation ($B = .27, p = .004$) although neither of the mediators had a significant indirect effect individually (p 's $\geq .07$). In the prediction of GIT (Model 3), there was once again a significant mediation ($B = .42, p < .001$) and a significant indirect effect was only evident regarding collective outcome interdependence ($B = .28, p = .004$).

Whereas the models above involved cohesion subscales, Model 4 showed that the relationship between task interdependence structure and competitiveness was mediated by interdependence perceptions ($B = .10, p = .03$). Once again, when considered individually, collective outcome interdependence was the only significant mediator ($B = .07, p = .03$). Finally, Model 5 showed that the relationship between task interdependence

structure and satisfaction was mediated by interdependence perceptions ($B = .25, p < .001$). In contrast to models involving cohesion and competitiveness, task interdependence was a significant mediator ($B = .19, p = .002$) and collective outcome interdependence only had a marginal effect ($B = .06, p = .06$).

Discussion

These results show that the actual structure of task interdependence on teams is associated with perceptions of collective outcome and task interdependence, which are associated with higher cohesion and satisfaction as well as lower competitiveness. These findings support social interdependence theory and partially support our study hypotheses. In comparison to task interdependence structure, however, athletes in the present study who competed in the same event as their teammates didn't perceive the group differently from those who did not compete against teammates.

When interpreting these findings it is important to note that individual outcome interdependence was considered according to whether the entire team competes in the same event (i.e., group-level) as opposed to considering how many teammates each participant competed against. An individualized approach would accurately represent each participant's setting and may be more sensitive for revealing relationships to group perceptions. Finally, it is essential to further examine the current cross-sectional mediational relationships, both through (a) longitudinal or experimental research to establish the direction of mediation, and (b) modelling analyses to disaggregate effects involving different dependent variables and further define the network of relationships among study variables.

Study 2

Perhaps the most notable shortcoming to Study 1 was that all athletes reported a shared team outcome. As such, it was not possible to compare groups according to the presence or absence of group outcomes, which is a vital aspect of interdependence. Collective outcome interdependence may moderate the degree of influence that task and individual outcome interdependencies have on teams. Further, past research has shown that collective outcome interdependence is an important predictor in its own right because it is a prominent feature that substantially predicts teammate cooperation (Johnson & Johnson, 2005). In light of the potential for collective outcomes to influence group member interactions, it was necessary to consider shared outcomes as an additional source of interdependence that may be relevant for sport teams.

Although all teams shared collective outcomes in the previous study, this very aspect of the study sample provided an opportunity to consider the relative influence of collective outcomes over time. Specifically, even when teammates are united by a collective outcome, temporal dynamics provide an opportunity to consider how the relevance of team goals influences group perceptions. For instance, depending on the different phases of the season, team-relevant outcomes can be far away (e.g., cross country skiers in November who are training for a group competition that is months away) or very near in time (e.g., rowers in November who are preparing for a team championship that will be contested that month). Given that future outcomes that are closer in time will hold greater relevance and value (Peetz et al., 2009), fluctuations in proximity to group-level outcomes may serve as a proxy for considering group

environments with (and without) collective group outcomes. In essence, a collective outcome may hold less relevance for teammate interactions when it is far off in time.

To consider associations between collective outcomes and group perceptions, our second study involved a longitudinal examination of weekly responses from athletes about the presence of collective outcomes as well as perceptions of the group environment. We predicted that temporal proximity to a group-level outcome would predict increased perceptions of interdependence. This study is an important advancement from Study 1 because it both considers a distinct source of interdependence and uses a different methodological and analytic approach to examine hypothesized relationships.

Methods

Procedures. At the conclusion of Study 1, participants had the opportunity to volunteer for an additional online study. Within two weeks of participating in the original questionnaire study, 38 interested participants were contacted via e-mail. Participants were told that they would be contacted once every week (i.e., Monday mornings) via e-mail, and that they would be asked to complete a series of items regarding their group setting over the past week. Participants were informed that the study would continue until the conclusion of their competitive season or until they no longer wanted to participate in the study.

Seventeen intercollegiate athletes agreed to participate in the study, and provided responses on a weekly basis (see Table 2 for demographic information). Within the e-mail questionnaire (see Appendix L), participants initially responded to two yes/no items asking about whether they had participated in an event in the preceding week and

whether that event featured a group outcome for their current team. Afterwards, participants used a 1 (not at all) to 5 (very much so) Likert-type scale to respond to items regarding perceptions of task ('Over the past week, I depended on my teammates to perform well') and collective outcome interdependence ('Over the past week, my teammates and I shared a collective goal'). These items were selected from questionnaires used in Study 1. In the initial week, the e-mail questionnaire also included items regarding sport type, age, and team tenure. Participants who had not responded to the questionnaire after two days were sent a reminder e-mail to complete the study information. On average, participants completed 7.65 ($SD = 2.98$) weeks of e-mail questionnaires (range = 4 – 11 weeks).

Data analysis. The first stage of analysis included replacing missing values for time-points in which a participant had not provided survey responses; eleven responses were replaced in total for the responses of ten participants (e.g., one participant did not provide two responses amidst the study). Notably, missing values represented 8.5% of the total number of responses. Values were replaced using linear interpolation imputation, which calculates the mean of responses provided from the weeks preceding and following the missing values for that participant. This imputation approach is reasonable when using longitudinal data sets (Twisk & de Vente, 2002). In addition, participant responses were used to compute a variable labeled 'proximity to a team event'. This was an ordinal variable that was computed by assessing whether each response was provided by a participant during the week of a competition with a shared outcome (coded as '3'), one week before or after such a competition (coded as '2'), or two or more weeks before or after a competition with a shared outcome (coded as '1'); greater values represented

increased closeness to a shared outcome. This variable indicated proximity in a general sense, including proximity to collective outcomes that had already occurred as well as those upcoming in the future. There were 55 responses provided during a competition week, 38 responses provided approximately one week from a competition, and 37 responses provided two or more weeks from a competition. Additionally, each response was associated with a variable labeled 'time of the season' that indicated the week of the study in which the response was reported (e.g., possible values ranged from 1 to 11).

Pooled time series analysis (PTSA; Draper & Smith, 1998; Soliday et al., 2002) was then used to test the temporal associations between proximity to collective outcomes and interdependence perceptions. PTSA uses multiple regression and enables investigation of temporal trends within relatively small sample sizes because it considers separate participants' responses over a period of time (i.e., over an entire season) as a single, pooled, time series. To prepare for the analysis, the original file was transposed so that each time-point from each participant (i.e., one individual's responses from one week) was recorded as a separate case. Thus, with 17 participants who had an average of 7.65 weekly responses, the resulting file included 130 cases that each included a single participant's responses for one week. Two PTSA regressions were completed using this file, with collective outcome and task interdependence perceptions as dependent variables and proximity to a team event as the independent variable. The variable 'time of the season' was used as a control variable to account for the likelihood that team members would perceive increased interdependence later in the season.

When conducting PTSA, between-subject variance is factored-out by creating dummy codes for each participant. As such, 16 participant dummy codes were created to

distinguish responses from each participant. Regressions were carried out using the set of participant dummy codes entered in the first step to control for individual differences, followed by the main predictors that were inputted in the second step of the regression. It is also important to control for serial dependence when conducting PTSA (i.e., the tendency for responses close in time to be similar to one another; Soliday et al., 2002). In light of this, a Durban-Watson statistic was obtained after running each regression once and was then used within a formula (Soliday et al., 2002, p. 72) for transforming the dependant variable to account for serial dependence. After performing the transformation, the regression was run again using the transformed dependant variable along with a constant variable entered in the list of predictors. Finally, it is important to note that R-squared values in PTSA are frequently inflated because each participant is accounted for through dummy codes. Thus, parameters for each predictor (e.g., *B*) provide a reasonable estimate of how interdependence perceptions were influenced over time.

Results

Table 5 displays the regression results. The prediction of collective outcome interdependence perceptions required one iteration of transformation to control for serial dependence; the resulting autocorrelation was acceptable, $R = -.13$. Following transformation, the regression equation was significant ($p < .001$). The effect of proximity to a team event was significant ($p < .001$) over and above the effect of 16 dummy code variables as well as the effect of time of season, as interdependence perceptions increased at later time points in the season ($p = .02$). When considering the individual contributions of each of these predictors, proximity to a team outcome event predicted increased collective outcome interdependence perceptions.

This pattern was replicated using task interdependence perceptions as the dependent variable. An acceptable autocorrelation of $R = .15$ resulted after one iteration of transformation. Following transformation, the regression equation was significant ($p < .001$). When considering the individual contributions of each predictor, proximity to a team outcome event predicted increased task interdependence perceptions ($p = .01$). Time of season also had a significant effect on task interdependence perceptions, as participants reported increased perceptions at later time points in the season ($p = .001$).

Discussion

This study provided an initial demonstration of relationships between collective outcome interdependence and perceptions of the group environment on individual sport teams. The results supported our hypothesis that proximity to a shared group outcome would be associated with increased perceptions of interdependence. The use of PTSA to test these hypotheses provides further support for the results because it was possible to factor out between-subject variation (e.g., the influence of individual characteristics) through the use of dummy codes for each participant. Given that the proximity variable was in reference to both past and future collective outcomes, future research is necessary to compare whether the influence of proximity applies both to outcomes being approached as well as those that have already occurred. Furthermore, although proximity to a group event is expected to influence the group environment in a similar fashion to the outright presence or absence of a shared outcome, this possibility cannot be directly assessed within the current study. Future research should be conducted to examine whether these results are consistent when comparing teams with and without shared outcomes.

Regardless of the degree of similarity with the absolute presence of absence of shared outcomes, this study revealed that shared outcomes may be perceived differently throughout a competitive season. For example, individuals encounter points within a season where they perceive themselves to be highly interdependent with group members (e.g., team championship events), whereas other points in time might generate feelings of independence from others (e.g., team selection, off-season training). Along these lines, it is notable that the variable 'time of season' was related to interdependence perceptions – indicating that perceptions of interdependence increased over the duration of participants' seasons. Interdependence structures should thus be viewed as a dynamic group characteristic that unfolds and changes over a team's existence (Wageman et al., 2012).

General Discussion

This research explored interdependence structures in individual sport and demonstrated that task and collective outcome interdependence are two important group components. When members of an individual sport team were closer in time to a shared team outcome or when they were required to work together on a collective task, they were perceived greater interdependence with one another. In turn, increased interdependence perceptions are associated with higher cohesion and satisfaction as well as lower competition with teammates. The influence of the actual interdependence structure in these studies is similar to research from educational and organizational psychology that shows that task and collective outcome interdependence can encourage greater cooperation, closer relationships, better performance, and more satisfaction in group members (e.g., De Dreu, 2007; Van der Vegt et al., 1998; Wageman & Gordon, 2005).

Given that individual sports are typically defined by an expected lack of task interdependence, the presence of interdependence in such settings is striking. Although it is not surprising that rowers reported task interdependence, numerous athletes also reported a range of relatively less frequent task interdependence (e.g., relays). Furthermore, task interdependence perceptions were actually rated relatively high among all participants in both studies (e.g., $M = 3.73$ out of a possible 5). An additional feature of results from both studies is that the presence of a single source of interdependence was associated with increased perceptions of both task and collective outcome interdependence. Regardless of whether participants interacted with other members during competition (Study 1) or were proximal to a group outcome (Study 2), increases in any aspect of structural interdependence were associated with greater perceptions of both task and collective outcome interdependence. Thus, it would appear that even minimal task interdependence relate to feelings that members must work together.

It is important to note that potential interactions among sources of interdependence were not examined in the current study (e.g., whether the influence of task interdependence differs according to levels of collective outcome interdependence). It was not possible to consider the interaction of different facets of the interdependence structure in Study 1 because there were too few participants competing in each of the four possible interaction groupings. Thus, we could not consider whether group-related perceptions differed among task interdependent teammates who did or did not compete against one another. Given the potential for interdependence sources to interact (Saavedra et al., 1993) future research should be conducted to consider optimal combinations of differing sources of interdependence.

Future research is also warranted to consider personality and individual differences (i.e., personal values), which may shape both the extent that one is likely to perceive interdependence with others and how favorably groups are viewed (Beersma et al., 2013; Wageman & Gordon, 2005). For example, research from organizational contexts shows that individuals are more likely to perceive interdependence and act pro-socially with others when they endorse socially oriented values (i.e., evaluate outcomes with an other-promotive viewpoint; Bogaert et al., 2008). As an example of one sport study that addressed this consideration, Bry et al. (2009) reported that relay runners who were primed with a cooperative (as opposed to an individualistic) mindset prior to competition performed better on an interdependent relay task. Future research should consider how socially-relevant individual difference constructs influence perceptions and responses to interdependence.

Transition Statement

This paper demonstrated that shared tasks, collective outcomes, and teammate competition that are frequently evident in individual sport teams relate to members' perceptions of interdependence. Interdependence structures and perceptions may also ultimately play a role in predicting athletes' perceptions of cohesiveness, satisfaction, and competition with teammates. Notably, even among individual sport athletes who are often distinguished according to a lack of task interdependence, team members' relationships are fundamentally influenced by their interdependencies with one another.

This research was, however, correlational in nature. As a result, it is not possible to make causal statements about the relationships between interdependence structures and perceptions as well as other perceptions involving the group environment. Experimental

work is needed to manipulate and compare teams with differing interdependence structures. Additionally, the current paper did not examine possible interactions between sources of interdependence. The presence or absence of one interdependence source has the potential to alter how others are interpreted and acted on by group members. Therefore, the final study of this dissertation examined athletes' perceptions of relationships within hypothetical individual sport teams that were described as having (or not having) a collective outcome and shared teammate competition – allowing comparisons across the collective, contrient, cooperative, and independent team types identified in Paper 2.

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**PAPER 4: AN EXPERIMENTAL COMPARISON OF COLLECTIVE
OUTCOMES AND TEAMMATE COMPETITION WITHIN INDIVIDUAL
SPORT**

Collective outcomes unite team members and facilitate cooperation (De Dreu, 2007; Johnson & Johnson, 2005; Lu, Tjosvold, & Shi, 2010; Van der Vegt, Emans, & van de Vliert, 1998). In contrast, intra-group competition emerges when individuals oppose one another for individual outcomes and has traditionally been linked to negative consequences for interpersonal attraction, group functioning, and motor performance (Raven & Eachus, 1963; Stanne, Johnson, & Johnson, 1999). These two statements are established upon decades of research and support the expectation that teammate interdependencies in small groups fundamentally determine how members behave and perceive the group. Interestingly, however, it is unclear how environments are shaped by the *interaction* of these two sources of interdependence. For example, how might teammates respond and interact when there is a collective goal among members who compete against one another in the same events? This question is particularly relevant in sport, where such sources of interdependence may determine whether teammates will act cooperatively and ultimately have a positive influence on one another's experiences (Evans, Eys, & Bruner, 2012). The current research explored athletes' perceptions of the group environment within teams that differ according to the presence of collective outcomes and team member competition.

Social Interdependence. Interdependence is a construct that has traditionally been examined within educational and organizational group contexts – being defined as the extent that group members reciprocally depend on contributions from one another in

obtaining or completing individual tasks, outcomes, rewards, or resources (Johnson & Johnson, 1989). When considered within sport, interdependence may take many forms and emerges among group members as a result of sport rules, organizational structures, team norms, personal characteristics, and sport cultures. As such, interdependence sources determine the nature of group interactions because they shape the way that members rely on one another (Rusbult & Van Lange, 2003). As an example, one notable source of interdependence is the task: When contrasted with groups that require no task interaction, groups requiring teamwork on a collective task benefit from increased cohesion, social integration, and pro-social interactions (Hertel, Konradt, & Orlikowski, 2004; Van der Vegt, Emans, & van de Vliert, 2001).

Interdependence is particularly notable within individual sport teams because such teams are traditionally defined according to a lack of interdependence. Even a recent exploration into team types by Evans et al. (2012) recognized individual sport teams as those where all members are not required to cooperate on a collective group task. Nonetheless, there are several other influential interdependence sources and Evans et al. (2012) recognized the potential for individual sport environments to differ according to *collective outcome interdependence*, referring to whether or not members' efforts contribute to a group outcome (e.g., a team title). Within organizational settings, collective group outcomes facilitate cooperation and pro-social motives among group members, as well as increased group cohesion (Beersma, Homan, Van Kleef, & De Dreu, 2013; De Dreu, 2007; Tjosvold, Tang, & West, 2004).

In addition to the whether or not a collective outcome exists, individual sport teams can be further distinguished according to *individual outcome interdependence*;

referring to team members' dependence on one another's personal outcomes (Evans et al., 2012). In more specific terms, individual outcome interdependence involves whether all members of a given team compete in the same event (e.g., high school cross-country running). In contrast to collective outcomes, individual outcome interdependence has received little interest regarding its influence in organizational contexts. Although research often reveals that interactions among two competing individuals are often negative (Tjosvold, Johnson, Johnson, & Sun, 2003) competition research is rarely conducted among members of a single team. When combining both individual outcome and collective outcome interdependence sources in an orthogonal manner, Evans et al. (2012) identified four resultant team types, labeled as collective, cooperative, contrient, and independent (See Figure 3).

Regarding how these team types may shape the group environment, existing research would support the expectation that collective outcomes promote cohesive group environments, whereas individual outcome interdependence promotes competition. However, there are two key shortcomings when extending existing findings in this way. One shortcoming is that the majority of past research involves non-sport contexts and may not reflect sport team interdependence. Perhaps more concerning, research has not considered the interaction of these two sources so it is not clear whether the presence or absence of one source of interdependence will change the influence of another (e.g., complex interdependence; Saavedra, Earley, & Van Dyne, 1993). As such, a comparative investigation is valuable in light of the potential for groups to shape the individual and shared experiences of athletes and, accordingly, influence sport development (Bruner,

Hall, & Côté, 2011), participation (Spink, Wilson, & Odnoken, 2010), and performance (Carron, Colman, Wheeler, & Stevens, 2002).

An online experimental approach was used to examine athletes' perceptions regarding the favorability and the nature of groups exhibiting four types of individual sport teams. We expected that teams with a collective goal would elicit greater perceptions of cohesion than settings without a collective goal. We also expected that teams including individual outcome interdependence would elicit greater ratings of competitiveness, because members are competing in the same event against one another. Ultimately, we expected that collective outcomes would promote cohesion, whereas teammate competition would promote competitiveness.

In addition to these hypotheses, it was also prudent to consider how favorably each team context was perceived. Provided that past research reveals the potential for both collective goals and teammate competition to be sought by athletes (e.g., shared goal pursuit, social support, and social comparisons; Evans, Eys, & Wolf, 2013), we expected that favorability would be highest under conditions of both collective outcome and individual outcome interdependence. In other words, this interaction hypothesis was based upon the potential for the increased competitiveness resulting from individual outcome interdependence to be viewed in a favorable light under conditions where members are united by a collective goal.

Methods

Participants

The study sample included 84 track athletes ($M_{age} = 20.52$, $SD = 2.28$, 62% female) involved in teams from across Canada and the United States. Participants

reported being a member of their respective team for an average of 2.45 years ($SD = 1.47$), with 57 participants belonging to teams competing within Canadian Interuniversity sport and United States NCAA (Division I and II) levels as well as 27 participants reporting affiliation with Canadian club teams competing at the provincial level. Also, participants reported involvement in teams of varying sizes ($M = 41.38$ athletes, $SD = 36.64$). With regard to the interdependence structure reported on current teams, 70 participants reported belonging to a team with a collective outcome and participants reported that, on average, they were required to compete against 46.38% ($SD = 33.78$) of their teammates at events.

Procedures

Prior to recruitment, study procedures were approved by the authors' institutional ethical review board and all participants read and agreed to an informed consent statement (see Appendices M and N for approval and consent forms). Coaches from University, College, and club level track teams from Canada and the United States were first contacted with information about the study. This contact e-mail included a description of the study as well as a request for the coach to forward a brief message from the researchers to their athletes regarding participation in the study. The forwarded recruitment message included a description of the study and an invitation to participate.

After accessing the webpage and completing an informed consent statement, participants completed initial items assessing demographic characteristics. Following this, participants were randomly assigned to read one of four hypothetical passages, using a block randomization approach. Participants read initial instructions that stated "We are now asking you to read a passage about a track and field group. As you read this passage,

please imagine what it would be like to be a member of the team that is described.”

Participants then read a brief hypothetical passage from a team coach, which invited them to join a track team in the upcoming season. Recruitment passages were written as a letter to the participant that included a description of the team and the coach’s invitation to become a team member. To enhance realism of the passage, it was presented using a graphical team letterhead that included fictional contact information for the coach as well as a team logo (see Appendix O for a graphic of an example recruitment letter).

Across the four study conditions, however, passages varied according to whether or not the example team included a collective goal, and whether or not all team members competed in the same event. As such, conditions described interdependence structures that were collective (i.e., collective outcome and all members in the same event; $n = 22$), cooperative (i.e., collective outcome with members across many events; $n = 21$), contrient (i.e., no collective outcome and all members in the same event; $n = 22$), or independent (i.e., no collective outcome and members across several events; $n = 19$). Figure 4 contains the passages that corresponded to each condition.

After reading through the passage, participants completed items regarding perceptions of the hypothetical team environment, which included (a) team favorability, (b) group cohesion, and (c) competitiveness among teammates. Participants also completed manipulation check items as well as additional demographic items indicating the interdependence structure on their current team. Subsequently, participants were directed to a debriefing page that explained the study protocol and purpose in detail.

Measures

Demographics. Participants completed a range of open-ended items assessing demographic characteristics such as age, gender, current sport team, and tenure on current team.

Group environment perceptions. To assess perceptions of the sport group environment, it was necessary to adapt items from existing questionnaires to suit the context of the current study, where participants predicted expected group processes in a hypothetical group.

Group favorability. To assess the favorability of the hypothetical team, two items regarding satisfaction (i.e., “*Would you be satisfied as a member of this group?*”) and interest in joining the team (i.e., “*If you had the opportunity, would you be interested in joining this team?*”) were used in an approach similar to past research (e.g., Van der Vegt et al., 2001). Items were rated on a Likert-type scale ranging from 1 (not at all interested/dissatisfied) to 9 (very interested/very satisfied) and averaged to create a composite group favorability score. Although these items have not been used in the past as a scale, the Spearman-Brown coefficient used to indicate inter-item reliability on a two-item measure was acceptable ($r = .84$; see Eisinga, Te Grotenhuis, & Pelzer, 2013). These items are provided in Appendix P.

Group cohesion. Items to assess cohesion were adapted from the Group Environment Questionnaire (Carron, Widmeyer, & Brawley, 1985), using six items that were rephrased to suit the current study context. The items were rated on a 1 (not at all) to 9 (very much so) Likert-type scale. Within the items, three were adapted from social cohesion subscales of the Group Environment Questionnaire (e.g., ‘*Members of the Huntington Flyers would have close relationships.*’), whereas three other items were

adopted from task cohesion subscales (e.g., '*Members of the Huntington Flyers would work well together.*'). Accordingly, the items formed two separate subscales: one three item subscale of social cohesion, and one three item subscale for task cohesion. Adequate inter-item reliability was demonstrated for both the task ($\alpha = .71$) and social cohesion subscales ($\alpha = .91$). These items are provided in Appendix Q.

Intra-group competitiveness. In addition to the items above, a single item was adopted from a scale used to assess perceptions of intra-group competitiveness (e.g., Rossi, 2008). Participants indicated their endorsement of the statement: "*Members of the team would be threatened when I performed well.*" The item was rated on a 1 (not at all) to 9 (very much so) Likert-type scale. These items are provided in Appendix Q.

Manipulation check and current group demographics. After completing dependent variable items, participants provided open-ended responses to manipulation check items that included the percentage of Huntington Flyers who competed in their event, and whether or not the Huntington Flyers competed for an overall collective group outcome (see Appendix R). Following these items, participants responded to similar items describing their current team, including items regarding the number of members on their current team, the percentage of other members who compete against them in their event, and whether their current team competes for a collective outcome. These items were placed at the end of the questionnaire to retain participant naiveté to study protocol.

Results

Preliminary analyses and data cleaning were first conducted. During this process, incomplete participant responses were removed from analysis and missing values were replaced. Although 97 participants visited the study webpage and started completing the

online survey, 13 of these responses were not completed and were removed from further analysis. Data were replaced in the case of missing items regarding cohesion using the scale mean of remaining items; all other missing values were not replaced. No univariate or multivariate outliers were identified across variables assessed in the current study. Additionally, preliminary ANOVA and chi-square analyses were used to examine whether there were pre-existing differences between members of each condition according to demographic variables; no significant pre-existing group differences were identified (all p 's $\geq .12$).

Open-ended responses regarding recall of manipulation details were also coded regarding whether they accurately reflected the passage read by each participant. Inaccurate manipulation check responses were identified when participants provided incorrect responses regarding both manipulation check items. Two participants provided incorrect responses on both items. Results were computed with, and without, these responses included in the dataset. Given that results did not differ with these responses removed, all cases were retained.

Between-group differences involving each dependent variable were then considered using a Univariate ANOVA, provided that the current study formed a 2 X 2 factorial design (individual outcome interdependences vs. no individual outcome interdependence; collective outcome interdependence vs. no collective outcome interdependence). While a factorial design was used, it is important to keep in mind that ultimately each of the resulting groups represented distinct group types as described within the Sport Team Typology (Evans et al, 2012). All group means are presented within Table 6.

Cohesion. Separate analyses were conducted to examine distinct effects across the social and task cohesion subscales. In regard to the first subscale, the highest ratings of social cohesion were provided for teams that included collective outcome interdependence, $F(1, 80) = 8.96, p = .004, \eta_p^2 = .10$. Similarly, task cohesion was rated highest on teams with collective outcome interdependence, $F(1, 80) = 5.86, p = .02, \eta_p^2 = .07$. In contrast, differences in individual outcome interdependence did not influence ratings of task cohesion, $p = .98$, or social cohesion, $p = .53$. Furthermore, the combination of individual outcome and collective outcome interdependence did not result in interaction effects for task cohesion, $p = .97$, or social cohesion, $p = .71$. Ultimately, the highest perceptions of cohesion were attributed to groups with a collective outcome.

Competitiveness. Although competitiveness did not differ according to collective outcome interdependence, $p = .66$, competitiveness ratings were significantly higher for group descriptions involving individual outcome interdependence, $F(1, 80) = 4.73, p = .03, \eta_p^2 = .06$. This main effect was, however, qualified by an interaction effect, $F(1, 80) = 3.96, p = .05, \eta_p^2 = .05$. Follow-up contrasts indicated that perceptions of competitiveness were greater within the condition with no collective outcome and all members within the same event compared to the condition with neither a collective outcome, nor individual member competition, $p = .005$. The relatively higher level of competitiveness in the contrient condition did not, however, reach significance in relation to collective ($p = .08$) and cooperative ($p = .06$) conditions.

Team favorability. In contrast to analyses involving cohesion and competitiveness, there were no significant between-group differences according to ratings of team favorability. Notably, team favorability ratings did not differ according to

collective outcome interdependence, $p = .18$, although differences approached significance when comparing teams with and without individual outcome interdependence, $F(1, 80) = 3.45$, $p = .07$, $\eta_p^2 = .04$. Furthermore, the interaction effect was not significant, $p = .92$. These results reveal that team favorability was rated similarly across all levels of individual outcome and collective outcome interdependence.

Discussion

Collective goals and individual-level competition among individual sport team members are fundamental sources of interdependence for understanding team member interactions (Evans et al., 2012). The current study was the first experimental examination of the joint influence of interdependence sources within sport teams. In accordance with expectations, participants reported the highest ratings of cohesion for team descriptions indicating a collective outcome. These findings provide initial support for expectations that collective outcomes cooperatively shape individual member interactions (Deutsch, 1949). When combined with levels of collective outcome interdependence, competition against team members also had a distinct effect: competitiveness perceptions were highest when teammates competed against one another in the absence of a collective outcome. Furthermore, in contrast with our expectations, team favorability did not differ across the team contexts from the current study.

It appears that collective outcomes have the potential to transform individual sport team environments. Not only did collective outcomes increase cohesion perceptions, but the influence of individual outcome interdependence on competitiveness was not evident when teams included a collective outcome. As such, collective outcomes may lead teammates who must compete with one another to interact in cooperative ways (Stanne et

al., 1999) and may have implications for conflict management in team contexts (Tjosvold, 1990). In regard to the implications of these findings for the Sport Team Typology (Evans et al., 2012), the collective and cooperative team types emerge as the most cohesive interdependence structures, whereas the independent team type was the least competitive interdependence structure. However, these findings more importantly distinguish *each* team type as an interdependence structure with a distinct influence on group perceptions and interactions among sport team members.

It is important to note that the differences in cohesion and competitiveness should be considered alongside the absence of differences according to team favorability. On one hand, these non-significant results may indicate potential for individuals to find benefits with each interdependence structure. On the other hand, it is important to note that sample size and intra-individual variability may have limited the power to detect mean differences according our hypotheses. Although the group mean for team favorability appeared to be highest within the collective condition, large variance limited the chance to reveal this as a significant difference. Perhaps variance regarding team favorability may be a function of preferences and, as a result, is particularly influenced by individual differences in personality traits (e.g., collectivism: Jackson, Colquitt, Wesson, & Zapata-Phelan, 2006). Individual differences should be considered in future research because they may cause great variability in responses (e.g., individualistic individuals may be averse to collective outcomes in contrast to those with collective orientations).

It is important to note that the validity these findings is also limited by athletes' ability to accurately represent hypothetical group contexts that may differ from their own. Researchers should correspondingly consider conducting research that entails either (a)

experimental lab-based research with contrived group settings that differ in interdependence, or (b) field-based interdependence interventions within pre-existing teams (e.g., Senécal, Bloom, & Loughhead, 2008). It is also important to note that competitiveness was operationally defined as perceptions of threat among teammates, whereas recent conceptualizations indicate that competitiveness can take a number of forms and may subsequently have positive or negative effects on performance (Murayama & Elliot, 2012). Alternative perspectives of competitiveness could be explored in future work by contrasting group types to explore whether certain contexts engender more 'constructive' forms of competitiveness (e.g., Tjosvold et al., 2003).

Ultimately, there are several notable implications of this work. From a theoretical standpoint, these findings are important for extending social interdependence theory across contexts because individual outcome interdependence has received little attention. Indeed, individual outcome interdependence is a common condition in organizations where employees may complete similar tasks in competition for a limited outcome (e.g., promotion) within a larger group context. From a practical standpoint, these findings also provide suggestions for managing sport group interdependencies. Notably, although sport organizational structures and rules often dictate certain aspects of interdependence, group leaders still have the opportunity to structure group members' interactions by managing group goals as well as the extent to which members compete with one another. Interdependence structures are a clear point of consideration for group leaders, and provide a direct pathway to design groups that engender member satisfaction and cohesive group-level interactions.

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GENERAL DISCUSSION

Imagine that you are a swimmer stepping-up to the starting block in a championship race. Consider how your thoughts and feelings are shaped by the following questions. Is a teammate one of your competitors? Are you one of several members who must perform their leg in a relay? Does your team's hope in the overall title depend on your performance? Or, alternatively, are you in the race independently – with no team affiliation? This dissertation revealed how such aspects relate to the team environment perceived by individual sport athletes.

Through an initial qualitative study, athletes reflected on how interpersonal outcomes (e.g., social facilitation, teamwork, support) were promoted in groups where members perceive ideal group environments (e.g., healthy competition, friendships, and groupness). Athletes also described how the positive or negative nature of these outcomes was often defined by the structure of group outcomes and competition (e.g., collective outcomes). For example, one athlete indicated that the team environment was different during fall cross country running season (where members run in the same races and share a collective goal) as opposed to winter indoor track season (where members share a collective goal, but compete in different events).

Building from comments in the First Paper involving team structures, the Second Paper identified several relevant sources of interdependence for individual sport groups. By contrasting collective and individual outcome interdependence sources, four individual sport team types were described. Furthermore, although individual sport teams are defined by a lack of task interdependence, there are some cases where subgroups of

teammates work together during competition – an important consideration for following studies.

This conceptual and theoretical framework was tested within the remaining two papers. In the Third Paper, relationships between interdependence sources and the group environment were explored by comparing athlete perceptions of teams involving differing interdependence structures (i.e., correlational study), and by analyzing how shared outcomes relate to group perceptions throughout a competitive season (i.e., longitudinal study). Members of teams who reported task interdependence with other members (e.g., running a relay, working together in a rowing boat) reported greater perceptions of interdependence. In turn, interdependence perceptions further predicted increased cohesion and satisfaction along with decreased competitiveness. Although task interdependence doesn't exist across entire individual sport teams, it can emerge in subgroups of the team and may be important for forming perceptions of cohesion, competitiveness, and satisfaction.

Collective and individual outcome interdependencies were also considered. When athletes were closer in time to an event with a collective outcome, they perceived greater interdependence with other members. Individual outcome interdependence had a comparably weaker influence when considering its presence or absence in teams. Specifically, there were no differences in perceptions of interdependence, cohesion, satisfaction, or competitiveness when comparing responses from teams that were, or were not, all composed of athletes in the same event. One concern with these results, however, was that all teams in Paper Three had a collective goal – as a result, individual outcome interdependence was not considered in teams without a collective outcome.

To further explore the potential interaction of collective and individual outcome interdependencies, Paper Four describes a study that compared athletes' group perceptions of four hypothetical team descriptions – including teams that were collective, contrient, cooperative, and independent. In accordance with expectations, participants reported the highest ratings of cohesion for team descriptions indicating a collective outcome. In comparison, athletes viewed teams with individual outcome interdependence as being more favorable. Combined, the two interdependence sources also generated mean differences, whereby competitiveness perceptions were highest in the contrient condition (i.e., teammates compete against one another in the absence of a collective outcome). These results provide initial evidence that collective, contrient, cooperative, and independent team types each result in distinct perceptions of the group environment.

Practical and Theoretical Implications

Recall that the relationship between cohesion and performance in organizational contexts is moderated by task interdependence, whereby cohesion is a stronger predictor of performance on task interdependent teams (Beal, Cohen, Burke, & McLendon, 2003; Gully, Devine, & Whitney, 1995). Recall further that, despite initial claims that cohesion would be negative for performance on individual sport teams (e.g., Carron & Chelladurai, 1981; Lenk, 1961; Landers & Leuschen, 1974), sport research reveals that the relationship between cohesion and performance is consistent in both team and individual sports (Carron, Colman, Wheeler, & Stevens, 2002). Although the findings from this dissertation cannot resolve the contrast between the findings from sport and organizational domains, the findings provide some guidance regarding why cohesion is

relevant in individual sport. Simple task differences may not reveal the group structure in consideration of the multiple interdependencies that may exist between teammates.

Findings revealing the relationships between interdependence structures and cohesion could advise team-building approaches. Team-building refers to strategies that are applied to develop group cohesion and improve group functioning (Newman, 1984). There are several team-building approaches developed for use with sport teams (e.g., Newin, Bloom, & Loughead, 2008; Sénécal, Loughead, & Bloom, 2008; Spink & Carron, 1993; Yukelson, 1997), including an approach designed for an individual sport team (equestrian riding; Bloom, & Stevens, 2002). However, with the exception of approaches that use group goal setting (e.g., Sénécal et al., 2000), few team-building efforts focus on teammate interdependence. Although interdependence structures are largely dictated by sport rules and cultures, coaches and practitioners have the opportunity to promote interdependence by, for example: (a) emphasizing collective outcomes, (b) managing teamwork on training tasks, (c) attending events with collective outcomes, and (d) stressing the importance of areas where interdependence already exists. Indeed, my qualitative study revealed anecdotal descriptions of how coaches already use interdependence in such a way. One runner described how her track team included several event ‘subgroups’ that had diverse training schedules. As a means of improving integration of athletes in all events, the coach would host mandatory weekly practices where all members completed the same workout. Although not ideal for every athlete’s training regimen, the workout created a context similar to a team where athletes all compete in the same event.

Temporal features are also important for applying interdependence to influence team interactions. The longitudinal study from Paper Three revealed that collective outcomes may be more influential on perceptions of the group when they are close in time. As such, collective outcome proximity could be promoted either through planning frequent events that involve collective outcomes, or by framing collective outcomes as being close in time to ensure that they retain their relevance.

However, using interdependence as a means of team-building relies on assumptions that extend beyond the current findings. First, is the assumption that changes in interdependence will influence cohesion. Second, is the assumption that improved cohesion will, in turn, be beneficial for individual and team outcomes in individual sport. To provide support for these assumptions, further experimental or intervention-based research should be conducted to explore whether shifts in interdependence structures will causally elicit cohesion. Future research should also identify optimal combinations of interdependence sources for promoting not only cohesion, but also more distal outcomes such as team performance, individual performance, and adherence in individual sport.

Beyond applied implications, this dissertation informs theory. Among the key theoretical messages of this research involved the *complexity* of team interdependence structures. Take, for example, the concept of individual outcome interdependence, which is revealed when members compete in the same event. When not affiliated with a team, being in the same event would be described as competition – where goals are structured so one competitor’s performance directly contributes to or takes away from another’s: I win, I get the spoils – I lose, you get the spoils. Competition is widely studied within psychology literature, particularly regarding how individuals or groups perform when in

direct competition for limited rewards (e.g., Murayama, & Elliot, 2012; Seta, 1982; Wittchen, Krimmel, Kohler, & Hertel, 2013).

When immersed within a team context, however, individual outcome interdependence is distinct from the traditional view of competition and has not been explored in past research. ‘Losing’ to one’s teammate in the same event is not *necessarily* a bad thing for an individual sport athlete. Notably, having teammates who compete in your own event not only provides competition, but may also provide the potential to have a training partner, friend, and reference point for social comparisons. Furthermore, social identity theory proponents (i.e., Tajfel & Turner, 1985) would argue that a teammate’s positive performance could also be identified-with and integrated as a personal sign of success. As an extreme example of the complexity of competition between teammates, consider moguls skiers Justine and Chloé Dufour-Lapointe – sisters who compete and train together on team Canada, but who are rivals that recently finished in first and second place at the 2014 Sochi Olympics.

As a result, individual outcome interdependence is a source of interdependence that simply identifies whether individual outcomes are intertwined, without making the assumption that members are bound competitively. Individual outcome interdependence is similarly likely in educational and organizational contexts. Consider an investment firm, where employees are asked to cooperate to provide clients with the greatest gains on a daily basis. All the same, each employee’s performance is tracked and awarded in consideration of their standing within their peers. Considering the frequency with which work settings involve balancing individual and collective outcome interdependencies, it is prudent to research the influence of this goal structure in a range of contexts.

The complexity of interdependence structures is further extended when considering the potential for team members to differ regarding the ways they rely on teammates. Van der Vegt, Emans, and Van de Vliert (2000) discussed the potential for unbalanced interdependence with an example using a surgical team, where “task interdependence is obviously high, but whereas the surgeons and their assistants are mutually task interdependent in the highest possible degree, the anesthetists can perform their tasks relatively independent of the others” (p. 635). Within sport teams, unbalanced interdependence structures are no less likely – an example would be a track and field team with a number of distance runners who compete in the same event and in a relay together, along with a single sprinter who doesn’t compete against (or with) her teammates. It may be important to consider such imbalances in terms of how they may confound the influence of a given interdependence structure on each athlete.

Unbalanced interdependence structures may also be of interest for their potential to generate subgroups (Cronin, Bezrukova, Weingart, & Tinsley, 2011). Sub-groups often emerge within groups as a function of *faultlines*, which are hypothetical dividing lines determined by traits and personal experiences that predispose members to break into subgroups according to shared characteristics (Lau & Murnighan, 1998; Thatcher & Patel, 2012). Within individual sport teams, individual outcome interdependence with some, but not all, teammates may form a faultline where athletes choose to interact with teammates who are within, or outside of, their event group. Similarly, faultlines could also be generated through task interdependence, which typically resides within small subgroups of individual sport teammates (i.e., badminton pairs, 4X100 relay, four person row boat). The resulting subgroups have the potential to either lead to positive outcomes

such as close friendships among some members (Martin, Wilson, Evans, & Spink, *Under review*), or alternatively could divide teammates and limit cohesion (Eys, Loughead, Bray, & Carron, 2009; Fletcher & Hanton, 2003). As a result, such imbalances in the structure of interdependence should be considered for its potential to result in faultlines that predispose members to form subgroups.

Limitations and Future Directions

A predominate challenge encountered throughout this dissertation was the ability to compare each interdependence team type using naturalistic contexts. Although teams are available that have a range of interdependencies, teams that naturally differ regarding interdependence structures may also differ in other ways. As an example, my most accessible population included university sport athletes with collective outcomes. Although teams from other contexts (i.e., national teams, regional clubs) without collective outcomes could serve as comparisons, these contexts may differ regarding the age, skill level, education, and commitment to sport. It is certainly a relevant question to ask: Would perceptions of interdependence differ when assessed within a different population of athletes who are not united by a collective goal?

Although the experimental study (Paper Four) improved upon this by randomly assigning team type, it relied on responses to hypothetical descriptions that may differ from naturalistic teams. As a result, providing a complete and valid comparison of all four team types to test the implications of interdependence theory will involve either (a) selecting very large samples of athletes from each team type to control for other potential differences, or (b) complete applied interventions with teams (i.e., running groups) to form varying interdependence structures.

The sample of athletes who participated – elite or competitive level athletes – also limited the generalization of these results. As a first example of different contexts, conducting similar research in youth or Master's (i.e., adult) sport would further test theory and reveal whether interdependence sources and perceptions influence decisions to join teams and adhere to sport – outcomes that are socially relevant regarding long term health and well-being (e.g., Kjønnsen, Anderssen, & Wold, 2009; Nelson et al., 2011). Furthermore, although the initial exploration of interdependence was triggered by exploring individual sport group dynamics, interdependence is no less applicable in team sport. Whereas team sports inherently include task and collective outcome interdependence, other sources of interdependence (i.e., resources) may shape member relations. Furthermore, even within identical interdependence structures, team sport athletes' perceptions of their structure may influence how they interact. When athletes' perceptions of interdependence are high, they may be more likely to cooperate and respond positively to teammates and group leaders, compared to when members feel independent.

Regarding the latter point, a validated interdependence perceptions scale for sport is essential for future research. Although the items from this dissertation represent task and outcome interdependence perceptions, validation research would empirically test the structure of athletes' responses. As a result, this would advance theory by revealing whether athletes perceive each aspect of the interdependence structure as distinct (i.e., multidimensional, corresponding to the interdependence sources revealed in theory) or perceive interdependence in a generalized way. For example, although distinct sources of

interdependence are established in theory, athletes may perceive interdependence along a generalized dimension.

Extending beyond the main implications of this research, athletes in the qualitative study commented on intriguing concepts that fell beyond the reach of the current dissertation. Among those concepts was 'healthy competition' – a state that athletes viewed as being valuable among teammates, but that has not been explored in current sport group dynamics research. In attempting to consider evidence of healthy competition within existing literature, one could consider its application to the term 'constructive competition' – where competitiveness between team members is fostered, but several conditions exist to mitigate the damaging effects of competition (Johnson & Johnson, 2005). Namely, goals are designed so that: (a) beating one another is relatively unimportant, (b) all participants have an equal chance to win, and (c) overarching collective goals are emphasized above individual competition (e.g., Johnson & Johnson, 2005; Tjosvold, Johnson, Johnson, & Sun, 2003). Continued research would explore the validity of such a concept to show whether teams can be composed where athletes work to beat one another, but find a way to work cooperatively for the betterment of each member.

Closing Thoughts

"When we try to pick out anything by itself we find that it is bound fast by a thousand invisible cords... to everything in the universe." (Muir, 1911/2010, p. 110)

Interdependence is a daily feature of life and culture, which is not lost when one steps onto a field or track alongside teammates in sport. As such, interdependence provides a valuable concept for understanding how teammates interact. Guided by social

interdependence theory, this dissertation package established interdependence as a concept of study within individual sport teams. Shared outcomes, individual competition, and requirements for teamwork are all considerable determinants of the group environment. Combined, the constellation of these interdependence sources shapes team members relationships, with consequences for team functioning and individual experiences. However, what remains to be seen is whether interdependence can be managed by coaches and practitioners to promote positive outcomes for individuals and for the team as a whole.

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APPENDICES

Appendix A: Copyright Release (Paper 1)

Published in the '*Journal of Applied Sport Psychology*'

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Appendix B: REB Approval (Paper 1)**REB approval notification2861**

dissertation x

 **REB@wlu.ca**

8/22/11 ★



to me, Mark, uglisic ▾

August 22, 2011

Dear Michael Blair,

REB # 2861Project, "Finding the 'team' in individual sport: Athletes' perspectives of group influence"
Expiry Date: December 01, 2011

The Research Ethics Board of Wilfrid Laurier University has reviewed the above proposal and determined that the proposal is ethically sound. If the research plan and methods should change in a way that may bring into question the project's adherence to acceptable ethical norms, please submit a "Request for Ethics Clearance of a Revision or Modification" form for approval before the changes are put into place. This form can also be used to extend protocols past their expiry date, except in cases where the project is more than four years old. Those projects require a new **REB** application.

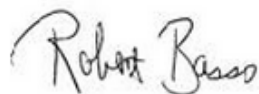
Please note that you are responsible for obtaining any further approvals that might be required to complete your project.

If any participants in your research project have a negative experience (either physical, psychological or emotional) you are required to submit an "Adverse Events Form" to the Research Office within 24 hours of the event.

According to the Tri-Council Policy Statement, you must complete the "Annual/Final Progress Report on Human Research Projects" form annually and upon completion of your project. All forms, policies and procedures are available on the Research Office website at <http://www.wlu.ca/research>.

All the best for the successful completion of your project.

Yours sincerely,



Robert Basso, PhD
Chair, University Research Ethics Board

Appendix C: Consent Form and Information Letter (Paper 1)

Interview Study- Finding the “team” in individual sport Athletes’ perspectives of group influence

Principal investigator: Blair Evans, M.A. (evan5210@mylaurier.ca)

Supervisor: Mark Eys, Ph.D. (meys@wlu.ca)

You are invited to participate in a research study. The purpose of this study is to investigate how athletes feel they are connected with other group members, how these groups influence their sport experiences, as well as what aspects of the groups might influence sport experiences. This research study is being conducted by Blair Evans (PhD student, Department of Psychology) and Mark Eys (Ph.D., Departments of Kinesiology and Psychology).

INFORMATION

Your initial participation involves reading this letter of information, and following the instructions sent to you via e-mail regarding scheduling an appropriate phone interview time. You will be telephoned by Blair Evans, and the interview will begin with a review of this information letter, and a general explanation of the study. The interview itself will then continue through a discussion inquiring about your experiences with group involvement in individual sport. In total, the interview should take 45-60 minutes to complete, and there will be approximately 20 participants who take part in this research. Additionally, the interview will be recorded using an audio recording device. *If you would not like the interview to be taped, feel free to indicate as such and a recorder will not be used.*

RISKS

The potential psychological or emotional risks associated with this study are minimal but may include boredom, regret over the revelation of personal information, and disruption of your personal time. Please feel free to contact Blair Evans, Mark Eys, or the WLU research office (see contact information below) in the event that you have concerns/questions.

BENEFITS

The findings of this project will contribute to current sport group research by describing the individual sport group environment – a topic that has been sparsely researched to this point. This work will have theoretical applications for several research areas (e.g., sport, organizational psychology, group dynamics, social psychology). The applied implications of this work are also relevant for the development of group interventions in

individual sport settings to influence performance and/or to promote participation in sport.

CONFIDENTIALITY

In order to ensure anonymity of your data, all individual responses will also be protected from public disclosure as they will be collected, handled, analyzed, and reported by the main investigators only. All identifying information (i.e., names, contact information, identifiable transcripts, audio files) will be stored in a locked filing cabinet in the main researcher's office and will be deleted by Blair Evans on March 31st, 2012. All processed data from this study (i.e., de-identified transcripts, computer files) will not be duplicated and will be stored on a password-protected computer and disposed of on September 1st, 2017 by Blair Evans. Any publication or communication of the study's results will remove any identifying information from your responses and there will be no method by which you or your responses could be identified. To ensure this, your name, along with any other indication of identifiable people, places, or things will be removed from all results.

The publication of results may include direct quotes from the interview, and you will have an opportunity to review any quotes that may be used to consent for their use. *You may also choose to participate in this study, but not be directly quoted, by indicating this at any time before, during, or after your interview.* Within three months of the original interview, any quotes that may be included will be sent to you via e-mail, for you to consent (or refuse consent) for their use in publication. Please note that because this project employs e-based data collection techniques (the e-mailing of quotations), the confidentiality and privacy of data cannot be guaranteed during web based transmission.

CONTACT

If you have questions at any time about the study or the procedures (or you experience adverse effects as a result of participating in this study) you may contact the researcher, Blair Evans, Department of Psychology, Wilfrid Laurier University, Waterloo, ON, N2L 3C5, via (519) 884-0710, ext. 3691 or via evan5210@mylaurier.ca. You may also contact Mark Eys, Ph.D., Departments of Kinesiology/Physical Education and Psychology, Wilfrid Laurier University, Waterloo, ON, N2L 3C5, via (519) 884-0710, extension 4157 or via meys@wlu.ca. This project has been reviewed and approved by the University Research Ethics Board (tracking number 2861). If you feel you have not been treated according to the descriptions in this form, or your rights as a participant in research have been violated during the course of this project, you may contact Dr. Robert Basso, Chair, University Research Ethics Board, Wilfrid Laurier University, (519) 884-0710, extension 5225 or rbasso@wlu.ca.

PARTICIPATION

Your participation in this study is voluntary; you may decline to participate without penalty. If you decide to participate, you may withdraw from the study at any time

without penalty and without loss of benefits to which you are otherwise entitled. If you withdraw from the study, your data will be removed from the study. You have the right to omit any question(s) you choose.

FEEDBACK AND PUBLICATION

It is anticipated that the results of this study will be communicated at academic conferences, within written journal articles, as well as Blair Evans' dissertation document. If you would like to receive your own copy or summary of results, there will be an opportunity to indicate this when the interview is completed. An executive summary of the study's results will be sent on to all interested participants by February 29th, 2012.

CONSENT

"I have read and understand the above information. I have received a copy of this form. I agree to participate in this study."

Participant's signature: _____

Date: _____

Investigator's signature: _____

Date: _____

Appendix D: Interview Guide (Paper 1)

Now that we've had a chance to go through the information letter, would it be okay if we began the interview? For this interview, I've developed a series of questions to discuss. However, I'd like you to know that I may – at any time – ask you related questions that are relevant to the interview, and that you may add in any information that you think is pertinent, once again, at any point in time. To start the interview, I'm interested in your sport participation. Do you give permission to audio record this interview?

Background: (cueing the athlete to discuss their past and current sport participation)

First of all, what have you been doing recently in relation to [your sport]?

In listening to that history, it sounds like you participated in several individual sports, including [list primary sports]. What I'm primarily interested in during this discussion is to hear about your interactions with other people in individual sport settings.

Describing Interactions with others:

Could you please describe the degree to which you feel your sport participation is entirely individual, or involves interactions with other people?

-prompts to advance discussion of interactions, including: what people do you interact with, in what ways must you interact, when do you have to work with those people.

Group Influence and Attributes:

How do you feel others have influenced your sport experiences?

-probes to investigate influence on performance, enjoyment, and participation.

Similarly, you've likely also had times when you've trained and competed alone. If you were to compare training and competing alone to doing so with others, how are the two settings different?

Could you please describe the most influential group you've been involved with in individual sport, if you can think of one?

How do you feel this group influenced your sport experiences?

What was it about this group that, you feel, brought forth these outcomes?

-probes to further investigate elements of the group that bring about positive outcomes

Could you now describe a group that you were a part of in individual sport that did not influence your experiences as much, or was a less positive experience?

What was it about this group that, you feel, brought forth these outcomes?

Interdependence:

Another aspect that we are interested in is interdependence between individual sport group members. For example, in soccer, players are interdependent on one another during competition because they have to work together to be successful at the task. (further clarify if needed)

In what ways, if any, have you been interdependent with other people in individual sport?

What factors lead group members to become more interdependent on one another?

How, if at all, does the presence of interdependence differ in training and competitive situations?

How does having an overall group outcome, such as team rankings at an event or combined scores of any time, change the group environment?

Could you describe your experiences in individual sport where you were competing in the same event *against* another member of your group... so that the better one of you did, that would mean that the other would not do as well.

‘Mixed’ Environments:

[If participant described being a member of co-ed teams earlier in interview, ask the following question]

At times, individual sport groups consist of only one gender... while at other times it involves different genders. How, if at all, have your sport experiences differed when your sport group involved both males and females?

[If participant described being a member of mixed event teams earlier on, ask the following question]

In your experience, how does having group members from different events, such as is normally the case in track and field, influence the group environment?

Putting it all together:

Given what we have talked about, do you feel it is necessary to participate in individual sport with others?

In your mind, what would the ‘perfect’ individual sport group or team look like?

What advice would you have for coaches and other athletes about managing groups in individual sport?

Is there anything that you would like to add, in addition to what we’ve discussed, that I may not have asked about?

Appendix E: Copyright Release (Paper 2)

Published in '*Canadian Psychology*'



Josee Paliquin <JPaliquin@cpa.ca>

9:24 AM (4 minutes ago) ★



to me ▾

Thank you for your email. Given the fact that you are one and the author, that you are a student working towards you PhD and that it will not be published in any books other than your dissertation, permission is granted, free of charge.

Please use the following:

Copyright **ENTER YEAR HERE**, Canadian Psychological Association. Permission granted for use of material.

Thank you!

Josée Paliquin

Administrative Assistant | CPA Sections/Special Interest Groups and Association Development
Adjointe | Sections de la SCP/Groupe d'intérêts spéciaux de la SCP et développement de la société

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Email/Courriel: jpaliquin@cpa.ca | Website/Site web: www.cpa.ca

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From: Blair Evans [<mailto:evan5210@mylaurier.ca>]

Sent: January 28, 2014 9:20 AM

To: Josee Paliquin

Subject: Permission to use text/figures from Canadian Psychology Article

...

Hello,

My name is Blair Evans, I am the first author on a publication in 'Canadian Psychology' entitled "Seeing the "we" in "me" sports: The need to consider individual sport team environments." by myself, Dr. Mark Eys, and Dr. Mark Bruner. I am completing my Ph.D. dissertation at Wilfrid Laurier University and would like to request permission to reproduce a version of the manuscript in my dissertation. Please let me know if any further information is required. Thank you very much for your time and assistance. I look forward to hearing from you.

Sincerely, Blair Evans.

Appendix F: Research Ethics Board Approval (Paper 3)**REB approval notification3321****REB@wlu.ca**

8/22/12 ★



to me, Mark ▾

August 22, 2012

Dear Michael Blair,

REB # 3321

Project, "Investigating the Influence of Interdependence Structures and Perceptions in Individual Sport"

Expiry Date: April 30, 2013

The Research Ethics Board of Wilfrid Laurier University has reviewed the above proposal and determined that the proposal is ethically sound. If the research plan and methods should change in a way that may bring into question the project's adherence to acceptable ethical norms, please submit a "Request for Ethics Clearance of a Revision or Modification" form for approval before the changes are put into place. This form can also be used to extend protocols past their expiry date, except in cases where the project is more than four years old. Those projects require a new **REB** application.

Please note that you are responsible for obtaining any further approvals that might be required to complete your project.

If any participants in your research project have a negative experience (either physical, psychological or emotional) you are required to submit an "Adverse Events Form" to the Research Office within 24 hours of the event.

According to the Tri-Council Policy Statement, you must complete the "Annual/Final Progress Report on Human Research Projects" form annually and upon completion of your project. All forms, policies and procedures are available on the Research Office website at <http://www.wlu.ca/research>.

All the best for the successful completion of your project.

Yours sincerely,

Robert Basso, PhD
Chair, University Research Ethics Board

Appendix G: Information Letter and Consent Form (Paper 3)

Investigating the Influence of Interdependence Structures and Perceptions in Individual Sport

Principal Investigator: Blair Evans, M.A. (evan5210@mylaurier.ca)

Supervisor: Mark Eys, Ph.D. (meys@wlu.ca)

Department of Psychology, Wilfrid Laurier University

You are invited to participate in a research study. The purpose of this study is to further explore different types of individual sport team settings. Specifically, we are interested in further understanding differences in the ways that individual sport teams are structured, and how these differences might influence individual and team-related experiences. This research study is being conducted by Blair Evans (PhD student, Department of Psychology) and Mark Eys (Ph.D., Departments of Psychology/Kinesiology and Physical Education).

INFORMATION

Your initial participation involves reading and signing the informed consent statement, which should take about 5 minutes. If consent is provided, a brief questionnaire is then completed, asking a number of questions relating to your team and your perceptions of relationships on the team. You will be asked demographic information (e.g., age and gender). The initial questionnaire will take approximately 10-15 minutes and we expect 300 participants, in total, to participate in this study. To participate, athletes must be at least 18 years of age, and both male and female athletes are being recruited from Ontario colleges and universities; specifically, members of intercollegiate track and field, cross country skiing, wrestling, and golf teams.

Following the initial study, you will have an opportunity to indicate whether you are interested in continuing your participation in this study by providing your email address and completing a brief weekly assessment of your training and group experiences. If you participate in this follow-up study, you will be asked to complete weekly assessments until the end of your competitive season, each lasting about 5 minutes – on average, this adds up to about 16 assessments totaling about 80 minutes of time commitment. Please indicate your interest in participating in this portion of the study below.

RISKS

The potential psychological or emotional risks associated with this study are minimal but may include boredom, regret over the revelation of personal information, and disruption of your personal time. These feelings are normal and should be temporary. On the questionnaire, you will be offering responses related to how you view yourself. However, your anonymity will be ensured and group responses only will be revealed in the communication of results. Please feel free to contact Blair Evans, Mark Eys, or the WLU

research office (see contact information below) in the event that you have concerns/questions.

BENEFITS

The present study aims to better understand the ways in which different types of individual sport settings may influence athletes' experiences. This research will advise coaches, practitioners, and athletes about team-related factors that are important to consider, and will guide the development of group interventions to produce ideal training and competitive team environments. Furthermore, participants will benefit directly by developing an understanding of several group-related factors that influence their sport experiences. Participants who participate in the follow-up weekly study will also benefit by developing increased awareness of group influences on a continual basis.

CONFIDENTIALITY

Anonymity of participation in the initial survey cannot be guaranteed because you will complete the consent form and questionnaire at a team meeting (i.e., other team members will know who completed the consent form and questionnaire and who did not). You are asked to complete the study material individually and to not share your responses with other teammates. Your completed questionnaire and consent form will be stored separately at all times. To help ensure the confidentiality and anonymity of your data once collected, a specific non-identifying coding scheme will be employed to separate the information you provide from any other personal information, such as your email address. If you participate in the weekly assessment portion of the study, please note that data collected electronically can never be guaranteed as confidential during the process of online data transfer. The weekly assessment data will initially be linked to your email address when received by the researcher. Upon receipt, the researcher will immediately remove any identifying information from the data and delete the email. All individual responses will also be protected from public disclosure as they will be collected, handled, analyzed, and reported by the main investigators only. All data will be securely stored in the Group Dynamics and Physical Activity Laboratory of Dr. Mark Eys at Wilfrid Laurier University. Electronic data, including an electronic file of participants' contact information, will be stored on password-protected computers of the researchers listed above. All hard copy data, including consent forms, will be stored in a locked filing cabinet. Identifying information will be stored separately from the questionnaire data. Identifying information will be destroyed by May 30th, 2013 by Blair Evans. All other forms of data will be destroyed by May 30th, 2019 by Dr. Mark Eys. Any publication or communication of the study's results will solely focus on combined data from all participants and there will be no method by which you or your responses could be identified.

CONTACT

If you have questions at any time about the study or the procedures (or you experience adverse effects as a result of participating in this study) you may contact the researcher,

Blair Evans, Department of Psychology, Wilfrid Laurier University, Waterloo, ON, N2L 3C5, via (519) 884-0710, ext. 3691 or via evan5210@mylaurier.ca. You may also contact Mark Eys, Ph.D., Department of Psychology, Wilfrid Laurier University, Waterloo, ON, N2L 3C5, via (519) 884-0710, extension 4157 or via meys@wlu.ca. This project has been reviewed and approved by the University Research Ethics Board (tracking number 3321). If you feel you have not been treated according to the descriptions in this form, or your rights as a participant in research have been violated during the course of this project, you may contact Dr. Robert Basso, Chair, University Research Ethics Board, Wilfrid Laurier University, (519) 884-0710, extension 5225 or rbasso@wlu.ca.

PARTICIPATION

Your participation in this study is voluntary; you may decline to participate without penalty. If you decide to participate, you may withdraw from the study at any time without penalty and without loss of benefits to which you are otherwise entitled. You have the right to omit any question(s) you choose. However, once data collection is complete your data cannot be removed, as they are stored without personal identifiers.

COMPENSATION

All participants in this study have the opportunity to be entered in a draw for a chance to win one of six 50 dollar gift certificates to Sport Chek. The odds of being drawn are one in 50. The draw will take place by December 1, 2012 and winners will be notified by email. Winners will receive the gift card by mail. Please indicate your interest in being entered into this draw below.

FEEDBACK AND PUBLICATION

It is anticipated that the results of this study will be communicated at academic conferences and within written journal articles. The results may also be included in Blair Evans' dissertation. If you would like to receive an electronic copy of the results, please provide your email address below. This executive summary will be provided by April 30, 2013, following the completion of data analysis.

CONSENT

“I have read and understand the above information. I have received a copy of this form. I agree to participate in this study.”

Participant's signature: _____

Date: _____

Investigator's signature: _____

Date: _____

STUDY SUMMARY OF RESULTS AND COMPENSATION

Would you like to take part in the Weekly Assessment portion of the study? Yes/No

Would you like to be entered into the draw for the \$50 Sport Chek gift certificate? Yes/No

Would you like to receive an electronic copy of the executive summary? Yes/No

If you answered “Yes” to any of the items above, please provide your email address:

Appendix H: Team Type Questionnaire (Paper 3)

Approximately how many people are on your team?: _____

What percentage of your teammates compete in your event?: _____ (0-100)

Are you required to work with your teammates during competition: Yes No
(e.g., relays)

If so, please explain: _____

Does your team compete for a specific group objective?: Yes No
(e.g., team championship)

If so...

How important is this objective for your team?

1	2	3	4	5
Not at all important				Very important

When compared to your personal goals, how important is this team objective for you?

1	2	3	4	5
Not at all important				Very important

How often do you train with your team?:

1	2	3	4	5
Never				Always

How often do you travel to events with your team?:

1	2	3	4	5
Never				Always

How satisfied are you with your current team?:

1	2	3	4	5
Not at all satisfied				Very satisfied

Appendix I: Interdependence Questionnaire (Paper 3)

Indicate the extent to which your experience reflects the experiences described in the sentence.

Remember that these statements concern your experiences with your current sport team.

1.	I work with my teammates during competition	1	2	3	4	5
		Strongly Disagree				Strongly Agree
2.	I depend on my teammates for advice	1	2	3	4	5
		Strongly Disagree				Strongly Agree
3.	In order to perform well, I have to work closely with my teammates	1	2	3	4	5
		Strongly Disagree				Strongly Agree
4.	If people miss workouts, I feel that they are letting the team down	1	2	3	4	5
		Strongly Disagree				Strongly Agree
5.	It benefits me when my teammates attain their goals	1	2	3	4	5
		Strongly Disagree				Strongly Agree
6.	Training on my own is not as good as training with my team	1	2	3	4	5
		Strongly Disagree				Strongly Agree
7.	My teammates' commitment level influences my own achievement	1	2	3	4	5
		Strongly Disagree				Strongly Agree
8.	I depend on my teammates to travel to events	1	2	3	4	5
		Strongly Disagree				Strongly Agree
9.	My teammates are necessary for my training	1	2	3	4	5
		Strongly Disagree				Strongly Agree
10.	When my teammates succeed in their sport, it benefits me	1	2	3	4	5
		Strongly Disagree				Strongly Agree
11.	When I work with my teammates during training, my workouts have higher quality	1	2	3	4	5
		Strongly Disagree				Strongly Agree
12.	When I perform, I feel like it is a team effort	1	2	3	4	5
		Strongly Disagree				Strongly Agree
13.	My teammates and I must share resources to perform well	1	2	3	4	5
		Strongly Disagree				Strongly Agree
14.	My teammates and I share a collective goal	1	2	3	4	5
		Strongly Disagree				Strongly Agree
15.	I must obtain information from teammates to perform well	1	2	3	4	5
		Strongly Disagree				Strongly Agree
16.	I depend on my teammates or other athletes I practice with to perform well	1	2	3	4	5
		Disagree				Agree

Appendix J: Group Environment Questionnaire (Paper 3)

Please circle a number from one to nine to indicate your level of agreement with each of the statements. Remember these statements concern your experiences with your current team.

1. I enjoy being a part of the social activities of this team.

1	2	3	4	5	6	7	8	9
Strongly Disagree								Strongly Agree
2. I'm happy with the amount events that I compete in.

1	2	3	4	5	6	7	8	9
Strongly Disagree								Strongly Agree
3. I am going to miss the members of the team when the season ends.

1	2	3	4	5	6	7	8	9
Strongly Disagree								Strongly Agree
4. I'm happy with my team's desire to win.

1	2	3	4	5	6	7	8	9
Strongly Disagree								Strongly Agree
5. Some of my best friends are on this team.

1	2	3	4	5	6	7	8	9
Strongly Disagree								Strongly Agree
6. This team gives me enough opportunities to improve my personal performance.

1	2	3	4	5	6	7	8	9
Strongly Disagree								Strongly Agree
7. I enjoy team parties more than other parties.

1	2	3	4	5	6	7	8	9
Strongly Disagree								Strongly Agree
8. I do not enjoy being around my teammates.

1	2	3	4	5	6	7	8	9
Strongly Disagree								Strongly Agree
9. For me, this team is one of the most important social groups to which I belong.

1	2	3	4	5	6	7	8	9
Strongly Disagree								Strongly Agree
10. Our team is united in trying to reach its goals for performance.

1	2	3	4	5	6	7	8	9
Strongly Disagree								Strongly Agree
11. Members of our team would rather go out together as a team than on their own.

1	2	3	4	5	6	7	8	9
Strongly Disagree								Strongly Agree

12. We all take responsibility for any loss or poor performance by our team.
 1 2 3 4 5 6 7 8 9
 Strongly Strongly
 Disagree Agree
13. Our team members often party together.
 1 2 3 4 5 6 7 8 9
 Strongly Strongly
 Disagree Agree
14. Our team members have similar aspirations for the team's performance.
 1 2 3 4 5 6 7 8 9
 Strongly Strongly
 Disagree Agree
15. Our team would like to spend time together in the off season.
 1 2 3 4 5 6 7 8 9
 Strongly Strongly
 Disagree Agree
16. Our team members do not agree on team training plans.
 1 2 3 4 5 6 7 8 9
 Strongly Strongly
 Disagree Agree
17. If members of our team have problems in practice, everyone wants to help them so we can get back together again.
 1 2 3 4 5 6 7 8 9
 Strongly Strongly
 Disagree Agree
18. Members of our team stick together outside of practice and competitions.
 1 2 3 4 5 6 7 8 9
 Strongly Strongly
 Disagree Agree
19. Our team members communicate freely about each athlete's responsibility during competition or practice.
 1 2 3 4 5 6 7 8 9
 Strongly Strongly
 Disagree Agree

Appendix K: Competitiveness Items (Paper 3)

Respond to each item by considering the degree that it represents your experiences:

During everyday training and competition, my teammates:

Seem threatened when I am highly effective.	1	2	3	4	5
	Strongly Disagree				Strongly Agree
Like to show that they know more than I do.	1	2	3	4	5
	Strongly Disagree				Strongly Agree
Seem to get in the way of my growth and development.	1	2	3	4	5
	Strongly Disagree				Strongly Agree
Withhold important information from me.	1	2	3	4	5
	Strongly Disagree				Strongly Agree
Are disturbed by my accomplishments	1	2	3	4	5
	Strongly Disagree				Strongly Agree

Appendix L: E-mail Questionnaire Items (Paper 3)

Dear Athlete,

My name is Blair Evans, and I am a PhD student in sport psychology, looking into how group environments influence athlete experiences in individual sports. **As you may recall, you took part in a sport psychology questionnaire study within the past few weeks, during one of your training sessions.** Thank you for your interest in participating in this weekly training log – a follow-up to the questionnaire study you completed. **In this follow-up portion, interested athletes will fill-out several questions on a weekly basis throughout their season.** We hope to investigate how group environments fluctuate over time.

Below this message, you will see a number of items that refer to your training over the past week. Feel free to respond directly within the email to each item in the highlighted space that follows by replying to this e-mail (e.g., write your answers right beside each question, and send the same e-mail directly back to me). Please send me your completed log as soon as possible after it is received.

For any comments or questions, or to be forwarded another version of the information letter for this study, feel free to contact me using e-mail (evan5210@mylaurier.ca) or at [519-884-0710](tel:519-884-0710) extension 3691.

Sincerely, Blair

Evans

Athlete weekly Questionnaire (please respond as soon as possible)
assessments will conclude at the end of your varsity season

- 1(a). How many hours did you train this week?:
- (b) How many of these hours were spent with your team?:
- 2(a). Did you have any competitions this week? (yes or no):
- (b) If so, do do you feel you did in the event, on a scale from 1-5:
(1 = below expectations, 5 = above expectations)
- 3(a). Was there an overall group outcome for your team at this event? (yes or no):
- (b) If so, do do you feel your team did in the event, on a scale from 1-5:
(1 = below expectations, 5 = above expectations)
4. The following questions involve your perceptions of your group over the past week. Please answer each item with how strongly you endorse it on a scale ranging from 1-5 (1 = strongly disagree, 5 = strongly agree)
- (a) Over the past week, our team was united in trying to reach its goals for performance (1-5):
- (b) Over the past week, members of our team stuck together outside of practice/games (1-5):
- (c) Over the past week, I depended on my teammates to perform well (1-5):
- (d) Over the past week, my teammates and I shared a collective goal(1-5):
- (e) Over the past week, my teammates and I had a healthy competitive relationship (1-5):
- (f) Over the past week, I was satisfied with my team environment (1-5):

You have now completed the questionnaire for this week.

Appendix M: Research Ethics Board Approval (Paper 4)

REB approval notification

DissertationTrackandField x



REB@wlu.ca

4/9/13 ★



to me, Mark ▾

April 09, 2013

Dear Michael Blair,

REB # 3597

Project, "Investigating University Athletes' Group Preferences and Perceptions"

Expiry Date: August 31, 2013

The Research Ethics Board of Wilfrid Laurier University has reviewed the above proposal and determined that the proposal is ethically sound. If the research plan and methods should change in a way that may bring into question the project's adherence to acceptable ethical norms, please submit a "Request for Ethics Clearance of a Revision or Modification" form for approval before the changes are put into place. This form can also be used to extend protocols past their expiry date, except in cases where the project is more than four years old. Those projects require a new REB application.

Please note that you are responsible for obtaining any further approvals that might be required to complete your project.

If any participants in your research project have a negative experience (either physical, psychological or emotional) you are required to submit an "Adverse Events Form" to the Research Office within 24 hours of the event.

According to the Tri-Council Policy Statement, you must complete the "Annual/Final Progress Report on Human Research Projects" form annually and upon completion of your project. All forms, policies and procedures are available on the Research Office website at <http://www.wlu.ca/research>.

All the best for the successful completion of your project.

Yours sincerely,

Robert Basso, PhD
Chair, University Research Ethics Board
Wilfrid Laurier University

Appendix N: Information Letter and Consent Form (Paper 4)

Investigating University Athletes' Group Preferences and Perceptions (REB #3597)

Principal Investigator: Blair Evans, M.A. (evan5210@mylaurier.ca)

Supervisor: Mark Eys, Ph.D. (meys@wlu.ca)

Wilfrid Laurier University, Department of Psychology

You are invited to participate in a research study. The purpose for this research is to investigate differences among athletes' preferences for their sport team environments as well as to understand what team aspects might determine how teammates get along and interact. We cannot fully explain the research at this point, but you will receive an explanation at the end of the questionnaire. This research study is being conducted by Blair Evans (PhD student, Department of Psychology) and Mark Eys (Ph.D., Departments of Kinesiology/Physical Education and Psychology).

INFORMATION

Your initial participation has involved following the instructions sent to you via e-mail regarding how to complete the online questionnaire. You are now asked to first read this informed consent statement (5 minutes). If consent is provided, a brief questionnaire (10-15 minutes) is then completed, asking about general demographic information (e.g., age, gender, and team affiliation) and your beliefs about sport teams. The questionnaire will also ask you to imagine a potential group setting and respond to questions about it. We expect 150 male and female intercollegiate Track and Field athletes from across Canada, in total, to participate in this study. Participants must be at least 17 years of age, and must have been with their team for a duration of 0 to 5 years prior to this study.

RISKS

The potential psychological or emotional risks associated with this study are minimal but may include boredom, regret over the revelation of personal information, and disruption of your personal time. These feelings are normal and should be temporary. On the questionnaire, you will be offering responses related to how you view yourself. However, your anonymity will be ensured and group responses only will be revealed in the communication of results. Please feel free to contact Blair Evans, Mark Eys, or the WLU research office (see contact information below) in the event that you have concerns/questions.

BENEFITS

The present study aims to better understand the ways in which team experiences impact individual sport experiences. This research will advise coaches, practitioners, and athletes about team-related factors that are important to consider, and will guide the development of group interventions.

CONFIDENTIALITY

In order to ensure anonymity of your data, there will be no way to associate your e-mail address with your study responses (i.e., e-mail address will not be provided during questionnaire completion). Thus, there will be no way for coaches, teammates, or even myself to identify who has and has not completed the questionnaire. Thus, coaches will not be given any information about who completed the survey and who did not, and will not have access to any of the participants' personal information. Note too that data collected electronically can never be guaranteed confidential during the process of data transfer (from online to server). All individual responses will also be protected from public disclosure as they will be collected, handled, analyzed, and reported by the main investigators only.

Data from this study will be stored separately from any identifying information on the password-protected computer of Blair Evans in his locked lab at Wilfrid Laurier University. Identifying information consists of the e-mail addresses that will be provided by participants who are interested in receiving a study summary and be entered into the compensation gift certificate draw. Participants will have the opportunity to provide their e-mail address on the final page, after completing the study. All identifying information will be stored on a password-protected computer and will be destroyed by Blair Evans on August 30th 2013. All non-identifying information will be destroyed by Blair Evans by August 30th, 2019. Any publication or communication of the study's results will solely focus on combined data from all participants and there will be no method by which you or your responses could be identified.

CONTACT

If you have questions at any time about the study or the procedures (or you experience adverse effects as a result of participating in this study) you may contact the researcher, Blair Evans, Department of Psychology, Wilfrid Laurier University, Waterloo, ON, N2L 3C5, via (519) 884-0710, ext. 3691 or via evan5210@mylaurier.ca. You may also contact Mark Eys, Ph.D., Departments of Kinesiology/Physical Education and Psychology, Wilfrid Laurier University, Waterloo, ON, N2L 3C5, via (519) 884-0710, extension 4157 or via meys@wlu.ca. This project has been reviewed and approved by the University Research Ethics Board (tracking number 3597). If you feel you have not been treated according to the descriptions in this form, or your rights as a participant in research have been violated during the course of this project, you may contact Dr. Robert Basso, Chair, University Research Ethics Board, Wilfrid Laurier University, (519) 884-0710, extension 4994 or rbasso@wlu.ca.

PARTICIPATION

Your participation in this study is voluntary; you may decline to participate without penalty. If you decide to participate, you may withdraw from the study at any time without penalty and without loss of benefits to which you are otherwise entitled. If you withdraw from the study, your data up to that point cannot be removed because there is

no way to link it to you. If you choose to withdraw from the study, please contact the researchers so you can be sent a copy of the debriefing. You have the right to omit any question(s) you choose. However, once data collection is complete your data cannot be removed, as they are stored without personal identifiers.

COMPENSATION

All participants in this study have the opportunity to be entered in a draw for one of thirty \$5 gift certificates to Tim Horton's. The odds of being drawn are one in five. Draw winners will be determined before August 30th 2013 and winners will be contacted over e-mail and asked to provide an address where the gift certificate can be sent. You will be asked to provide your e-mail address at the end of the debriefing if you would like to be entered into the draw.

FEEDBACK AND PUBLICATION

It is anticipated that the results of this study will be communicated at academic conferences and within written journal articles. These data may also be included in Blair Evans' dissertation. A summary of the study results will be sent to all individuals who indicate interest on the debriefing and provide their e-mail address. This executive summary will be provided by August 30, 2013, following the completion of data analysis.

CONSENT

I have read and understand the above information, and: (check box that applies)

I do not agree to participate in this study

I agree to participate in this study

We suggest that you save or print a copy of this form

Appendix O: Recruitment Letter Example (Paper 4)



Dear Athlete,

My name is Caleb, and I am a coach (and former member) of the Huntington Flyers Track Club. We have noticed that you are the type of athlete that we would like to have compete with us and I am writing this letter to ask whether you might consider joining us. As a member, you will work with our coaching staff, attend our training sessions, and represent us at local and national competitions. Our strong coaching staff provides excellent guidance to athletes who aspire to be their best – and our members range from University-level athletes to Olympic hopefuls. As a group of about 20 athletes, we meet regularly as a group.

You will benefit from specialized training because each and every athlete on our team competes in your distance. Thus, you will compete in the same events alongside other teammates when we attend competitions.

Our members also attend meets as a team and work to achieve the highest team standing that we can attain, with individual performances contributing to the group standing.

As a whole, we are sure that our club is the right place for you, and I encourage you to contact me at any time if you would like more information about us. Otherwise, I wish you all the best as you finish-up your current season.

Sincerely,

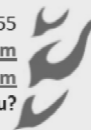
Coach Caleb
coachcaleb@huntingtontrack.com

(647) 752-8392, ext. 2255

www.huntingtontrack.com


info@huntingtontrack.com

Who is chasing you?



Note. This is an example of how each recruitment letter was presented to participants. This example is taken from the collective condition (i.e., collective goal, all members in same event).

Appendix P: Team Favorability Items (Paper 4)

 qualtrics.com

Please answer the following items based on the description of the 'Huntington Flyers Track Club' that you read on the previous page. Please read each question and click on the value that best represents your thoughts:

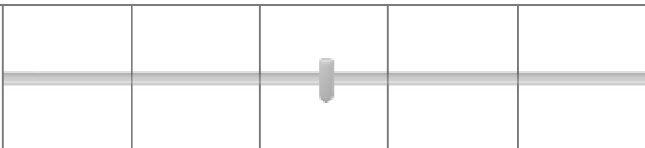
(a)

	Not at all interested	1	2	3	4	5	6	7	8	Very Interested	9
If you had the opportunity, is this a team that you would be interested in joining?		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

(Why or why not?) *Please explain below, using this open-ended item*

If the Huntington Flyers had a registration fee, how much would you be willing to pay to join?

Dollars per year

	0	400	800	1200	1600	2000
(move the slider-bar to the approximate place on the line to indicate the amount)						

(c)

	Very Dissatisfied	1	2	3	4	5	6	7	8	Very Satisfied	9
Would you be satisfied as a member of this group?		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

note: Items (a) and (c) were used in the final paper. Item (b) was not used.

Appendix Q: Cohesion and Competitiveness Items (Paper 4)



Based on the description of the Huntington Flyers, please rate the following items asking about what you think the team would be like...

	Strongly Disagree								Strongly Agree
	1	2	3	4	5	6	7	8	9
Members of the Huntington Flyers would have close relationships	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Members of the Huntington Flyers would work well together.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Members of this team would stick together outside of practice and competitions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Being on this team would give me plenty of opportunities to improve my personal performance.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would make friends on this team.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Members of the team would take pride in each other's accomplishments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Members of the team would share ideas and resources with one another	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Members of the team would be threatened when I performed well	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

note: All items on this page were used in the final paper, with the exclusion of the items second from the bottom. Namely, the first 6 items represented cohesion, and the final item represented competitiveness.

Appendix R: Manipulation Check Items (Paper 4)



The following questions refer to how you've read the questionnaire to this point

Approximately how many people are on the Huntington Flyers?:

Do the Huntington Flyers compete for a specific group objective?
(e.g., team championship)

- Yes
- No



TABLES

Table 1. *Examples of team interdependence types with a comparison to previous typologies*

STIT ^a type	Example	Classification in previous typologies		
		Traditional dichotomy	Carron & Chelladurai (1981)	Cannon-Bowers & Bowers (2006)
Integrated	A soccer team, required to work together during competition with a clear group goal	Team	Interactive dependence	Team
Segregated	A rowing team of 8's, required to work together to achieve a common goal ^b	Team or Individual	Coactive dependence	Sequential
	A baseball team whose members compete together but aren't always required to interact with one another on the task	Team	Reactive-proactive dependence	Reciprocal
Collective	A boys cross country running team, with members who all partake in the same race in competition with one another <i>and</i> to obtain a team 'title'	Individual	Independence	Pooled
Cooperative	A team of collegiate wrestlers who compete in different weight classes (e.g., are not individual outcome interdependent), but contribute to team titles	Individual	Independence	Pooled
Contrient	A national team of trampolinists who compete individually, against one another, with no identified group goal	Individual	Independence	Not applicable
Independent	A training team of triathletes with no identified group goal and who compete at different competitive levels	Individual	Independence	Not applicable
Solitary	Cyclists who, at times, gather together for long distance rides but who wouldn't identify as a group	Individual	Independence	Not applicable

Notes. ^a Sport Team Interdependence Typology. ^b Although earlier typologies have distinguished sports such as rowing and relays as coactive or pooled, we consider these examples of integrated teams to the extent that *all* members must work together on a group task (e.g., rowing 8's).

Table 2. *Participant Demographics*

Demographic Variable	Study 1	Study 2
Gender	103 female, 107 male	5 female, 12 male
Level of competition	201 university and 9 college level	All university level
Primary Sport/Event (<i>f</i>)	Swimming (41) Track and field (35) Wrestling (26) Rowing (25) Figure skating (21) Cross country skiing (19) Fencing (18) Badminton (16) Golf (9)	Swimming (12) Cross country skiing (2) Rowing (2) Badminton (1)
Team tenure (years)	$M = 2.13$ ($SD = 1.41$)	$M = 2.64$ ($SD = 1.32$)
Team Size	$M = 35.15$ ($SD = 18.76$)	Not recorded
Interdependence structure	All reported collective outcome interdependence 128 reported task interdependence 82 reported individual outcome interdependence	All reported collective outcome interdependence

Table 3. *Bivariate Correlations and Descriptive Statistics from Study 1*

Variable	Mean	SD	1	2	3	4	5	6	7	8
1. Interdependence perceptions (Task)	3.73	.90	–							
2. Interdependence perceptions (Collective Outcome)	3.92	.76	.62**	–						
3. Cohesion – ATGS (Attraction to group-social)	7.29	1.46	.32**	.36**	–					
4. Cohesion – GIT (Group integration-task)	6.53	1.31	.48**	.60**	.48**	–				
5. Cohesion – GIS (Group integration-social)	6.76	1.45	.30**	.29**	.60**	.56**	–			
6. Competitiveness	1.73	.67	-.24**	-.31**	-.25**	-.28**	-.26**	–		
7. Satisfaction	4.30	.82	.38**	.35**	.36**	.40**	.36**	-.35**	–	
8. Interdependence structure (Task)	–	–	.29**	.20**	.11	.27**	.19*	-.14*	.05	–
9. Interdependence structure (Individual Outcome)	–	–	-.10	.03	.01	.11	.04	.01	.12	.18*

** $p < .001$, * $p < .05$

Table 4. *Mediation Results Task Interdependence Structure (IV) and Perceptions of Task and Collective Outcome Interdependence (Mediators)*

DV Model	Overall Model		Indirect Effect			Indirect Effect 95% CI	
	R^2	F^{ab}	B	Z	$SE B$	Task Inter.	Outcome Inter.
Model 1: ATGS	.13	11.83	.33	3.14**	.11	[-.06, .39]	[.04, .38]*
Model 2: GIS	.10	9.10	.27	2.87*	.09	[-.03, .39]	[.01, .33]
Model 3: GIT	.39	43.43	.42	3.52**	.12	[-.03, .34]	[.12, .50]*
Model 4: Competitiveness	.09	8.20	-.10	-2.23*	.05	[-.11, .06]	[-.16, -.03]*
Model 5: Team Satisfaction	.16	14.32	.25	4.00**	.06	[.08, .33]*	[.01, .17]

Note. CI = confidence interval. ATGS = Attraction to group-social. GIS = Group integration-social. GIT = Group integration-social. ^a $df = (3, 206)$, with the exception of the team satisfaction model, which was $df = (2, 200)$. ^b All overall regression model F-values were $p < .001$

** $p < .001$, * $p < .05$

Table 5. *Pooled Time Series Regression Results*^a

DV Model	Predictor	<i>B</i>	<i>SE B</i>	β
Model 1: Collective Outcome Interdependence $R^2 = .95, F(19^b, 111) = 130.43^{**}$				
	Time of season	.08	.03*	.12
	Proximity to team competition	.65	.12**	.34
Model 2: Task Interdependence $R^2 = .91, F(19^b, 111) = 69.92^{**}$				
	Time of season	.10	.03*	.22
	Proximity to team competition	.32	.12*	.23

^a $n = 17$, with 130 cases once pooled.

^b each regression was run with 16 participant dummy codes, one constant (i.e., intercept), and two predictor variables.

* $p < .05$, ** $p < .001$

Table 6. *Descriptive Statistics for Dependent Variables across Experimental Conditions*

Dependent Variable	Collective Outcome Interdependent		Non-collective Outcome Interdependent	
	IOI 'Collective' M (SD)	Non-IOI 'Cooperative' M (SD)	IOI 'Contriient' M (SD)	Non-IOI 'Independent' M (SD)
Social Cohesion	6.86 (1.36)	7.22 (1.36)	5.92 (1.92)	6.02 (1.85)
Task Cohesion	7.05 (1.15)	7.05 (1.50)	6.32 (1.43)	6.30 (1.49)
Competitiveness	4.95 (2.17)	4.86 (2.92)	6.23 (2.11)	4.05 (2.27)
Group Favorability	6.80 (1.29)	6.19 (1.91)	6.36 (1.57)	5.68 (1.49)

Notes. IOI refers to individual outcome interdependence or, in other words, whether all members compete in the same event. All scales were rated on Likert-type scales ranging from 1 to 9.

FIGURES

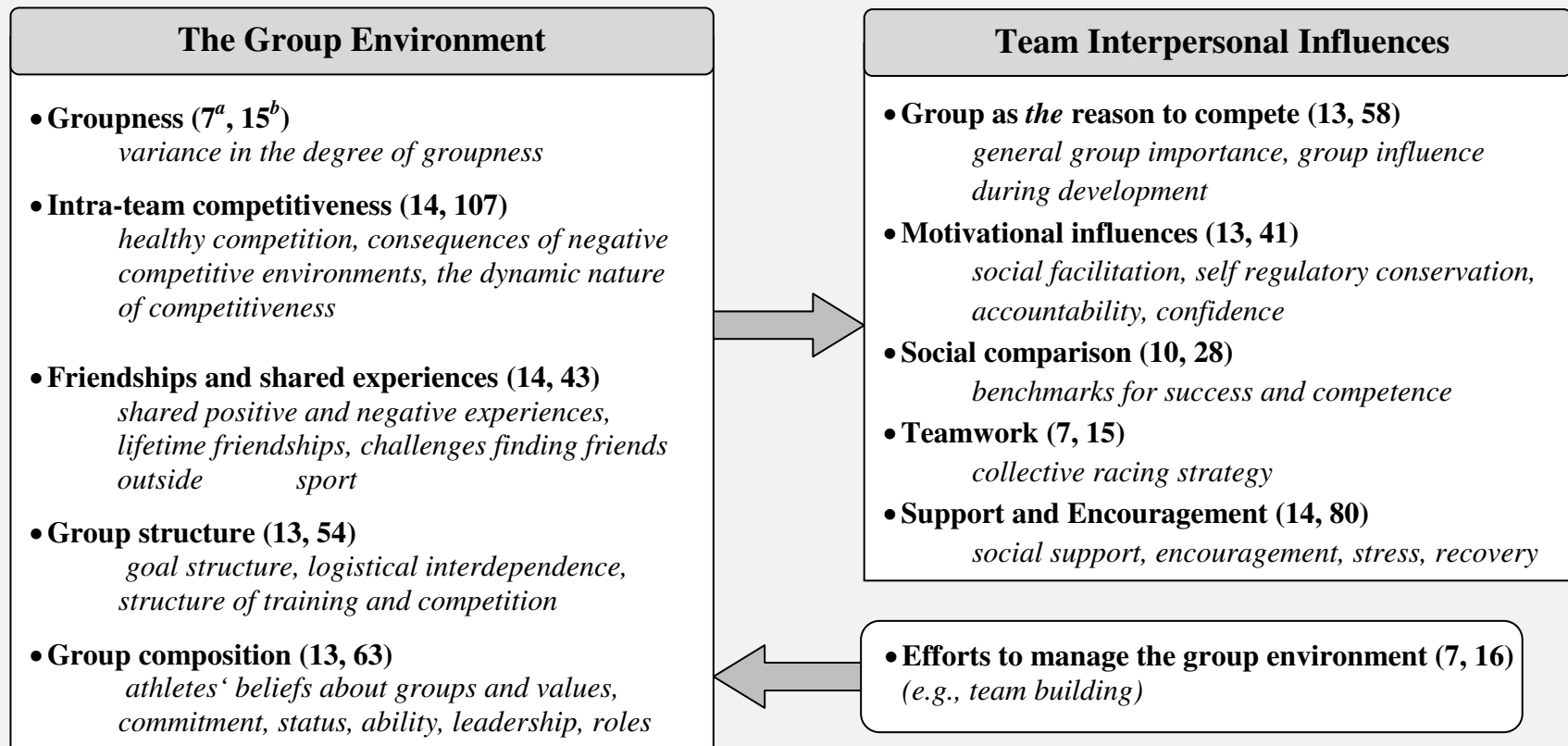


Figure 1. Framework of interpersonal influence in individual sport. This model includes each key concept, accompanied by both the number of athletes reporting that concept^a, as well as the total number of times it was referenced^b, in parentheses. Key concepts are also presented with subthemes, in italics.

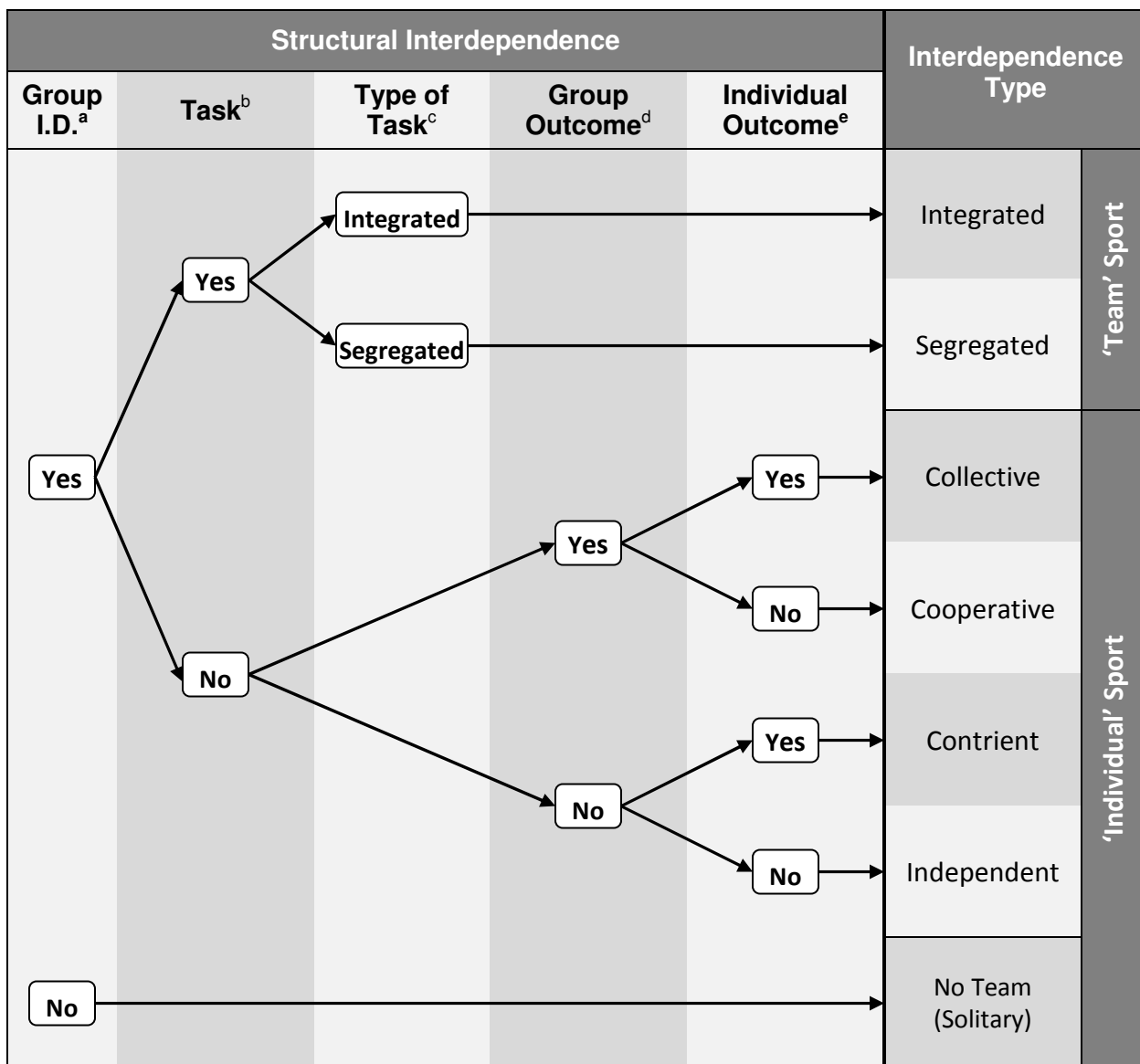


Figure 2. Decision tree for determining team interdependence types. ^aTo be considered in the typology, members must consider themselves to be a group. ^bTask interdependence refers to whether teammates must interact during the competitive task. ^cTypes of task interdependence include integrated, segregated, and none. ^dGroup outcome interdependence refers to whether group-level outcomes are applicable during competition. ^eIndividual outcome interdependence refers to whether group members directly compete against one another during competition.

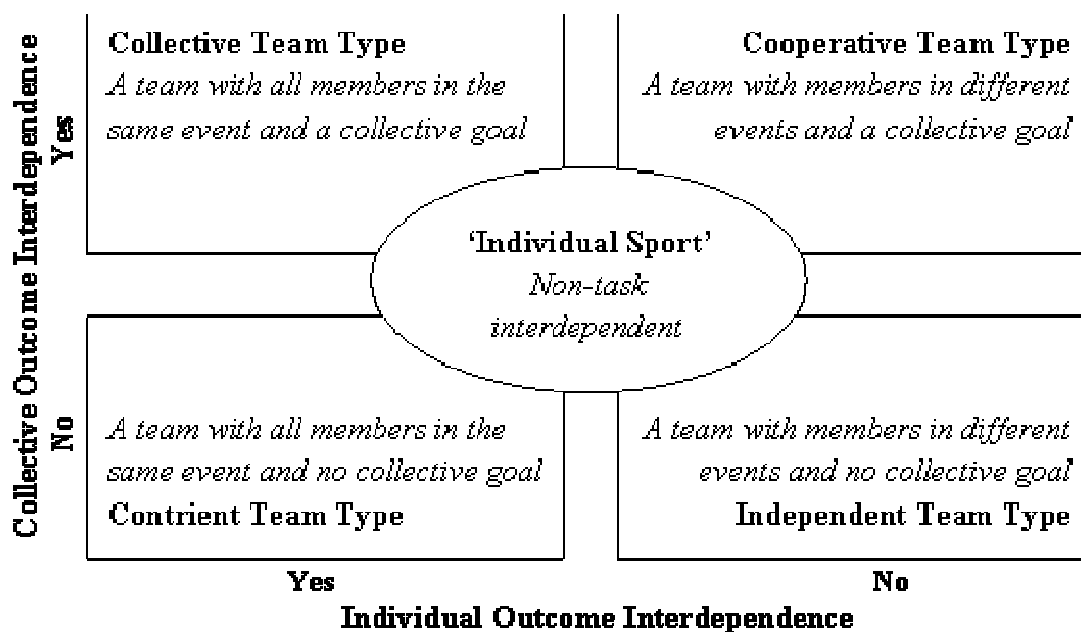


Figure 3. Conceptual framework of individual sport team types. The team types in the figure are based on conceptual work by Evans et al. (2012) and include individual sport contexts that are distinguished according to the presence of a collective outcome and whether all members compete in the same event.

Dear Athlete,

My name is Caleb, and I am a coach (and former member) of the Huntington Flyers Track Club. We have noticed that you are the type of athlete that we would like to have compete with us and I am writing this letter to ask whether you might consider joining us. As a member, you will work with our coaching staff, attend our training sessions, and represent us at local and national competitions. Our strong coaching staff provides excellent guidance to athletes who aspire to be their best – and our members range from University-level athletes to Olympic hopefuls. As a group of about 20 athletes, we meet regularly as a group.

(i) You will benefit from specialized training because each and every athlete on our team competes in your distance. Thus, you will compete in the same events alongside other teammates when we attend competitions.

(ii) You will benefit from specialized training because our club is very diverse with athletes from several events/distances (e.g., sprint, middle distance, hurdles, etc.). Thus, you will compete in different events from most other club members at competitions.

(iii) Our members also attend a range of different meets, in which each member works to achieve the highest individual performance that they can attain – we don't compete in events with team standings.

(iv) Our members also attend meets as a team and work to achieve the highest team standing that we can attain, with individual performances contributing to the group standing.

As a whole, we are sure that our club is the right place for you and I encourage you to contact me at any time if you would like more information about us. Otherwise, I wish you all the best as you finish-up your current season.

Figure 4. Content included within hypothetical recruitment passages. Italicized content indicates that which varied across conditions whereby only one message from each row was included in each letter, creating descriptions of a team that was either collective (i and iv), contrient (i and iii), cooperative (ii and iv), or independent (ii and iii).