AN EXPLORATORY EXAMINATION OF SOCIOMETRIC STATUS, ATHLETE BEHAVIOUR, AND SPORT COMPETENCE IN ADOLESCENT FEMALE VOLLEYBALL

by

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Abstract

Smith (2003) suggested in an influential review paper that behavioural observation and sociometry were two potentially useful but under-utilized methods for the study of peers in youth sport. Despite this call, the methods used to study peers in sport remain largely focused on athletes’ perceptions through questionnaires and interviews (Murphy-Mills, Bruner, Erickson, & Côté, 2011). Thus, the purpose of this project was to examine sociometric status, competence, and athlete behaviour in a youth sport context using an observational coding system. Female volleyball players ($N = 28; \text{Age} = 15.94$) from three competitive teams completed the sport competence and peer connection inventories (Vierimaa, Erickson, Côté, & Gilbert, 2012), and each team was videotaped during three practices. An observational coding system was developed and used to code athlete behaviours in a continuous, time-based manner and this data was compared across sociometric status groups. The results reinforce past research that suggests that sport competence is an important factor in gaining peer acceptance among youth (e.g., Weiss & Duncan, 1992). Behavioural profiles were constructed for each sociometric status group, which revealed differences between groups in relation to interactions with peers, coaches, and overall sociability. Rejected and neglected athletes appeared to be less sociable than average, interacting less with peers and coaches. Coaches also appeared to spend more time interacting with popular athletes who they viewed as more competent, and less with rejected and neglected athletes who they viewed as less competent. Thus, sociometry appears to be a useful approach with which to study young athletes’ behaviour in sport.
Co-Authorship

This thesis presents the original work of Matthew Vierimaa in collaboration with his advisor, Dr. Jean Côté.
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Chapter 1

Introduction

There is a growing body of literature that emphasizes the importance of organized sport as an activity that can ultimately contribute to positive youth development (Eccles & Barber, 1999; Fraser-Thomas, Côté, & Deakin, 2005; Larson, 2000). Over three quarters of Canadian youth participate in extracurricular activities such as organized sport (Guèvremont, Findlay, & Cohen, 2008). Therefore, sport may be an ideal context for instilling positive developmental characteristics in youth (Fraser-Thomas et al., 2005). However, evidence exists to suggest that sport participation can lead to both positive (e.g., prosocial behaviour; Rutten et al., 2007) and negative (e.g., increased aggression; Gardner & Janelle, 2002) developmental outcomes. It is therefore important to closely examine and address the factors in the youth sport environment that influence athletes’ experiences and outcomes.

It is well documented that the interpersonal interactions and relationships that develop through sport participation play an important role in youth’s positive experiences in sport and physical activity (e.g., Brustad, 1993). However, while several studies have explored the role of adult social agents such as parents and coaches (e.g., Côté, 1999; Smith & Smoll, 1990), the role of peers has received far less attention (Smith, 2003). In general, previous research shows that peers help to facilitate skills and behaviours that are important for youth’s development (Rubin, Bukowski, & Parker, 2006). Indeed, positive
peer interactions and relationships have the potential to promote psychosocial
development in youth sport participants (Weiss & Stuntz, 2004). As children develop
and grow older, they tend to rely less on parents and more on peers as a source of
competence information (Horn, 2004), underlining the importance of further studying
peer interactions in sport.

Peers have been shown to influence a multitude of positive and negative outcomes
in youth’s sport experiences. For example, peer acceptance is associated with increased
self-esteem (Daniels & Leaper, 2006), positive physical self-worth, and intrinsic
motivation toward physical activity and sport in adolescents (Smith, 1999). Children and
adolescents also cite the opportunity to positively interact with peers and develop and
strengthen friendships as a principal source of enjoyment in sport (Scanlan & Simmons,
1992). Peers can also play a negative role in sport participation. For instance, studies
indicate that peers can be perceived as a source of stress and anxiety through negative
evaluation and conflict (Gould, 1993; Scanlan, Stein, & Ravizza, 1991). This
dichotomous relationship between peers and youth’s sport experiences suggests that this
is an area of research that should be examined further, specifically in the types of peer
interactions and relationships that lead to different outcomes and experiences.
While this body of literature demonstrates our growing understanding of the important
role of peers in sport, it has predominantly utilized qualitative methods and has focused
on youth’s perceptions of peers (e.g., Daniels & Leaper, 2006). This approach has been
effective in examining how youth sport participants perceive their peers, as well as
investigating the roles that peers appear to play in the sport experiences of young athletes.
However, relying primarily on qualitative accounts of individuals’ opinions of their interactions and relationships with others fails to completely capture the complex and reciprocal nature of the peer dyad (Murphy-Mills, Bruner, Erickson, & Côté, 2011). While assessing individuals’ perceptions allows for a detailed internal account of an athlete’s experiences, it has been suggested that adolescents are not always reliable reporters of their experiences in dyadic or group relationships (Brown, 2004). Youth sometimes distort reports about friends (Kandel & Andrews, 1987) and portray status in groups in self-aggrandizing ways (Stone & Brown, 1999). In order to extend and expand this body of literature, it is important to not settle on one method, but to branch out and look for convergence across multiple methodological approaches. In doing so, commonalities may emerge over time, allowing for a more holistic understanding of peer relations in sport. Thus, there is a need to build upon the sound foundation created by the existing literature by applying methods that are novel to this area of research (Smith, 2003). Sociometry and behavioural observation are two particularly salient methodological approaches that have been under-utilized in the study of peers in sport (Smith, 2003). The present study intends to integrate these two methodologies to investigate the relationship between sociometric status, sport competence, and athlete behaviour in youth sport.
Chapter 2
Literature Review

Conceptual Framework

Before reviewing the extant literature on peers in sport and beyond, it is important to first situate this research within an appropriate conceptual framework. It has been suggested that youth’s peer experiences are best studied within several nested levels of social complexity: in interactions, relationships, and groups (Hinde, 1987; Rubin et al., 2006). Due to the nested nature of the framework, it is presumed that all levels are interrelated and come together to shape an individual’s unique peer experience (Rubin et al., 2006).

Before addressing the first level of complexity in the study of peers, researchers must acknowledge the individual. Rubin and colleagues (2006) believe this level is important to consider in the study of peer relations because each individual brings their own relatively stable social orientation and temperament to social group settings. These internal features predispose an individual to react to social cues in a certain way. For example, elite athletes tend to interpret anxiety as more facilitating than debilitating to performance compared to non-elite athletes (Jones & Swain, 1995).

Interactions between individuals comprise the simplest order of social complexity in Rubin et al.’s (2006) framework. More specifically, this level refers to a discrete social exchange between two individuals, where each individual’s behaviour is
interdependent on the other member of the dyad. The behaviours exhibited during short-term interactions are usually unstable and fluctuate based on the specific circumstances of the social setting. For example, research has shown that coaches tailor their interactive behaviour with athletes based on the specific context in which an interaction occurs (Erickson, Côté, Hollenstein, & Deakin, 2011).

When two individuals interact with each other over a period of time, they derive meanings, expectations, and emotions from these interactions, forming relationships, the next higher-order level of complexity (Rubin et al., 2006). These relationships are formed and characterized by a dyad’s previous interactions, expectations for future interactions, and each individual’s personal characteristics. Friendship is one of the most commonly researched forms of peer relationships (Rubin et al., 2006). Rubin and colleagues define friendship as reciprocal, voluntary, and often affectionate relationships between peers. In youth sport, it has been shown that friendship plays an important, albeit varying role in youth’s sport experiences (Weiss, Smith, & Theeboom, 1996).

The final level of social complexity in Rubin et al.’s (2006) model is the group, which is typified by a collection of relationships within a clear set of boundaries (e.g., a classroom or sport team). Groups possess properties that transcend the relationships, interactions, and individuals that they are made up of. For example, groups often share norms, display a level of cohesiveness, and have a distinct social hierarchy (Rubin et al., 2006). Groups function to constrain and influence the interactions and relationships that transpire within them.

One of the most prevalent areas of study pertaining to peers is popularity, which
can be considered both an individual and group-level construct (Rubin et al., 2006). Popularity, or peer acceptance is a measure of a group’s collective like or dislike of an individual (Bukowski, Sippola, Hoza, & Newcomb, 2000). In light of this definition, popularity (or acceptance and rejection) can be referred to as a group-level construct (Rubin et al., 2006), but is also often treated as an attribute of an individual (Newcomb, Bukowski, & Pattee, 1993).

Despite the widespread acceptance of this nested multidimensional model of peer relations in developmental psychology, its popularity has yet to spread to the study of peers in sport (Holt, Black, Tamminen, Fox, & Mandigo, 2008). It has been recommended that researchers should approach the study of peers in sport using multiple methodologies and levels of analysis (Smith, 2003), and as such, Rubin et al.’s (2006) model will be used to frame the present study.

By measuring athletes’ peer acceptance and sport competence and linking these ratings with how athletes interact with their teammates and coaches, the present study targets three levels of Rubin et al.’s (2006) framework. As mentioned, peer acceptance or sociometric status is regarded as a measure of both the individual and the larger group, while athletes’ interactive behaviour is a measure of interactions between individuals (Rubin et al., 2006). Athletes’ sport competence is measured using self, peer, and coach ratings, and as such, can be conceptualized as either an individual or group-level construct, similar to peer acceptance. In order to better explain the need to target these specific measures, it is important to review the existing literature on peer relations in sport that provides the conceptual foundation for the present study.
Peers Relations in Sport

As youth mature throughout childhood and adolescence, they begin to progressively rely less on the adults in their environment (i.e., parents and coaches), and begin to place more emphasis on their interactions and relationships with peers (Weiss & Stuntz, 2004). Similarly, there is an increasing amount of weight placed on the social domain (e.g., physical appearance and sport competence) as a marker of social status as youth move toward adolescence (Smith, 2007). Given the pronounced influence of social agents in youth’s experiences in sport (e.g., Brustad, 1996; Smith & Smoll, 2007; Smith, 2007), it is logical to study the effect of young athletes’ peers, particularly during adolescence. Previous reviews of literature on peer relations in sport (Smith, 2007; Weiss & Stuntz, 2004) have broadly and succinctly categorized relevant research into four categories: (1) Peer experiences and sport motivation, (2) peer experiences and moral development, (3) friendship, and (4) peer acceptance.

Peer experiences and sport motivation. A review of motivational orientation theories in sport has demonstrated that the continued presence of social relationships, including peer friendships, is an important contributing factor to continued engagement in sport (Weiss & Ferrer-Caja, 2002). For example, in a study of goal orientation profiles in male athletes aged 9-12, Smith, Balaguer, and Duda (2006) found that a high task and low ego orientation tended to predict a task motivational climate, higher levels of peer acceptance, and lower levels of conflict with a best friend. Interestingly, Smith and colleagues found no goal orientation group differences on perceptions of positive friendship quality. The authors posit that this may be because the Sport Friendship
Quality Scale (Weiss & Smith, 2002), only measures friendship quality with a single best friend; it has been theorized that multiple social agents can collectively fulfill an individual’s psychosocial needs, and so researchers may need to assess perceptions of multiple relationships to detect these differences (Smith et al., 2006). A recent group of studies employing achievement goal theory have also shown that peers play a major role in creating a motivational climate in sport settings (Joesaar, Hein, & Hagger, 2011; Ntoumanis & Vazou, 2005; Ullrich-French & Smith, 2006; Vazou, Ntoumanis, & Duda, 2006). In a physical activity context, it has been demonstrated that a peer-influenced task climate was predictive of needs satisfaction, competence, relatedness, and motivation (Moreno, San Roman, Galiano, Alonso, & Gonzalez-Cutre, 2008). Together, these studies demonstrate that peer relations, including friendship, peer acceptance, and peer motivational climate all influence the sport motivation of young athletes (Smith, 2007).

**Peer experiences and moral development.** Sport is commonly referred to as a setting which can both build and weaken character, which has spurred some researchers to examine the relationship between sport and moral development in greater depth. Bandura (1986) theorized that adaptive peer relationships can help facilitate an individual’s moral development and prosocial behaviour. Outside of sport, research has shown a link between peer acceptance, friendship, and moral development. In elementary schools, higher peer acceptance appears to be related to higher moral reasoning in young boys but not girls (Bear & Rhys, 1994). However, in a sample of early adolescent boys and girls, both peer group and friendship relations were linked with increased moral reasoning (Schonert-Reichl, 1999). Curiously, Schonert-Reichl (1999)
also observed a positive relationship between antisocial behaviour and moral reasoning in boys, a finding that is opposite to what has been generally found in previous research (Blasi, 1980). The author posits that this finding may be due to the method in which data on antisocial behaviour was collected (i.e., peer ratings) compared to previous studies which utilized teacher ratings. It is possible that the boys’ conceptualization of antisocial behaviour differed from that of teachers. Schonert-Reichl (1999) further suggests that the peer-assessed measure of antisocial behaviour may have elicited responses on more positive and instrumental forms of aggression. In comparison, observational research on aggressive behaviour on school playgrounds revealed that although girls often score lower than boys on aggression on questionnaires, they were observed engaging in aggressive behaviour at an equal rate as same-age boys (Pepler & Craig, 1995). It is believed that traditional measures of antisocial behaviour (i.e., questionnaires) may lack the sensitivity to detect more subtle forms of aggression (e.g., relational aggression) commonly exhibited by young girls (Pepler & Craig, 1995). Future research should continue to apply alternative methods of assessing antisocial behaviour (e.g., observation), particularly in females, in order to gain a more complete understanding of this complex relationship.

In sport, much of the moral development research has examined the relationship between aggression and antisocial behaviours. A classic study by Smith (1974) investigated youth’s beliefs about the aggressive behaviour of social agents (e.g., coaches, parents, and peers) in the sport environment, and how those beliefs affected their own behaviours and attitudes. In this sample of adolescent male ice hockey players, it
was found that high perceptions of peers’ approval of aggressive behaviour was associated with selection of more violent role models, which was associated with more aggressive penalties during play. However, Smith found no significant findings with respect to either parents or coaches. Similar findings were reported by Stephens (2001) in a sample of female basketball players in grades 4-12, where athletes were more likely to engage in violent behaviour when they perceived that this type of behaviour was accepted by their peers. A study by Stuntz and Weiss (2003) on middle school physical education students revealed that higher scores on peer acceptance and friendship goal orientations appeared to predict increased intention to engage in unsportsmanlike behaviour. In a slightly older population of collegiate-aged athletes, it was found that higher levels of peer rejection predicted high levels of relational aggression, which is also consistent with patterns observed in children and young adults (Storch, Werner, & Storch, 2003). In general, it appears that peers are of particular salience in the socialization of aggressive behaviour in sport, and future research should attempt to examine this relationship in greater detail.

**Friendship.** Friendship can be described as a personal, reciprocal, and voluntary dyadic relationship (Rubin, Chen, Coplan, Buskirk, & Wojslawowicz, 2005). The concept of reciprocity is crucial to the understanding of friendship as a social construct, as is it distinguishes it from peer acceptance or popularity. In developmental psychology, it has been well established that friendship quality and support play an essential role in facilitating positive psychosocial growth (Furman & Buhrmester, 1992; Hartup, 1996; Newcomb & Bagwell, 1995). Due to the fact that expectations and functions of
relationships tend to vary by social context (Zarbatany, Ghesquiere, & Mohr, 1992),
researchers have attempted to develop a sport-specific understanding of friendship quality
and support and its relationship to various psychosocial outcomes in young athletes.

In a qualitative study on perceptions of sport friendship quality in children aged 8-16, Weiss and colleagues (1996) developed a comprehensive description of friendship quality comprised of twelve positive dimensions and four negative dimensions. The twelve positive friendship dimensions were: (1) Companionship, (2) pleasant play/association, (3) self-esteem enhancement, (4) intimacy, (5) emotional support, (6) help and guidance, (7) prosocial behaviours, (8) loyalty, (9) absence of conflict, (10) conflict resolution, (11) attractive personal qualities, and (12) things in common. The four negative friendship dimensions were: (1) Conflict, (2) betrayal, (3) unattractive personal qualities, and (4) inaccessible. A number of age and gender-related differences emerged from the findings. Intimacy and attractive personal characteristics were cited more often by older participants while loyalty and prosocial behaviour were mentioned more commonly by younger participants. The only observed gender difference was that girls more often mentioned emotional support than boys. The overall findings were generally in line with previous research in developmental psychology, but certain underlying characteristics appeared to be unique to the sport context, providing a good basis for subsequent research. Weiss and Smith (1999) utilized these findings to guide the development and validation of the Sport Friendship Quality Scale (SFQS), which is a quantitative instrument designed to assess the degree of friendship quality in young athletes. Subsequent work has provided further psychometric support for the SFQS
(Weiss & Smith, 2002), and the instrument has since been applied in the study of many related constructs in sport, including motivation and moral development (e.g., Smith et al., 2006). While research has shown that friendship is an important psychosocial construct in youth sport, it is based on a collection of dyadic relationships. An individual’s perceptions of these relationships may not be indicative of the group’s overall perception of that person, and as such, group-level constructs such as peer acceptance should also be considered in the study of peers.

Peer acceptance. Much of the early research on peers in sport focused on understanding youth’s perceptions of the characteristics important for being popular or accepted within one’s peer group. Popularity, social acceptance, peer acceptance, and social status are all interchangeable group-level constructs which are simply defined as the experience of being liked or accepted by one’s peer group (Weiss & Stuntz, 2004). In particular, researchers have been interested in the relationship between peer acceptance and athletic ability or competence. It was found that youth consistently cited athletic ability as one of the most important qualities for acceptance into one’s peer group. This finding has held true for both boys and girls (Holland & Andre, 1994), and young children (Buchanan, Blankenbaker, & Cotten, 1976; Chase & Dummer, 1992) and adolescents (Adler, Kless, & Adler, 1992; Williams & White, 1983).

Previous research suggests that subtle gender disparities exist between peer acceptance and sport participation. While athletic ability is considered to be important by both males and females, young males tend to place relatively more weight on being good at sports. Previous research has consistently illustrated that males rank athletic ability
above other characteristics (e.g., physical appearance, academic ability, and financial standing) as a criterion for social acceptance (e.g., Boivin & Begin, 1989; Coie & Dodge, 1988; LaFontana & Cillessen, 2002). Conversely, while females highly value athletic ability, it is to a lesser degree than their male counterparts, and its importance to peer acceptance appears to be related to the gender appropriateness of the sport (Holland & Andre, 1994; Kane, 1988). Holland and Andre (1984) found that female athletes were rated as more popular by their peers if they participated in traditionally feminine sports (e.g., volleyball or gymnastics) while the same was true for male athletes and traditionally masculine sports (e.g., baseball or football). Despite these findings, more recent research suggests that athletic ability appears to be a strong and stable predictor of social status in both elementary school-age and adolescent females (Lindstrom & Lease, 2005).

The bulk of the extant research on peer acceptance and athletic ability has focused on school-age children. Elementary school samples are traditionally preferred due to the stability of peer groups and classes throughout a given school year (Brown, 2004), which facilitates the measurement of peer acceptance and related constructs. As a result, there is no shortage of research that has demonstrated the link between peer acceptance and athletic ability in this population (e.g., Boivin & Begin, 1989; Causgrove Dunn, Dunn, & Bayduza, 2007; Coie & Dodge, 1988; Lease, Kennedy, & Axelrod, 2002). However, there is also a significant group of studies that have examined this linkage throughout adolescence, and they have collectively shown that athletic ability continues to play an equally important role in the determination of youth’s social status throughout
adolescence (e.g., Buhrmann & Bratton, 1977; Holland & Andre, 1994; Vannatta, Garstein, Zeller, & Noll, 2009). A study of athletic ability and popularity in a sample of male and female children in grades 4-8 found that peer acceptance (or peer-perceived popularity) was more closely related to athletic ability than self-perceived popularity (LaFontana & Cillessen, 2002), highlighting that both types of popularity are conceptually distinct.

The benefits ascribed to athletically skilled individuals also appear to extend beyond a high degree of peer acceptance. A study on a group of boys in grades 3-6 suggested that the most highly skilled athletes were afforded greater opportunities to develop leadership qualities (Evans & Roberts, 1987). It can be espoused that playing significant roles in games allowed these athletes to further develop their athletic and interpersonal skills (e.g., develop friendships). Similar findings have also demonstrated this link between athletic ability, peer acceptance, and leadership in adolescent athletes (Glenn & Horn, 2003; Moran & Weiss, 2006).

Limitations

While the extant literature has effectively demonstrated the important role that peers play in youth sport, a number of gaps and methodological limitations exist that should be addressed. First, in the study of peer acceptance in youth sport, the vast majority of research has examined its relationship with athletic ability. As was previously outlined, existing research has demonstrated a stable link between these two factors across gender, age, and sport context. A few studies exist that have demonstrated a link between peer acceptance and loneliness (Causgrove Dunn et al., 2007) and
aggression (Storch et al., 2003), but there is a relative dearth of research in the sport
domain on the relationship between peer acceptance and other constructs (Smith, 2003).

The study of friendship quality and support has gained in popularity among sport
researchers in recent years, and as a result, we have learned a great deal about the
uniqueness of friendship in a youth sport context (Smith, 2007). However, the method in
which friendship is most commonly measured in both interviews (e.g., Weiss et al., 1996)
and questionnaires (e.g., Weiss & Smith, 1999) is limiting (Smith et al., 2006). In both
instances, athletes are asked to provide their perceptions of friendship with a single best
friend. However, in almost all cases, athletes’ peer groups in sport are larger than a
single dyad; it is limiting to assess an individual’s overall perceptions of friendship based
on their experiences with a single best friend. It has been proposed that in sport, multiple
friendships can collectively fulfill an individual’s psychosocial needs (Smith et al., 2006);
therefore, assessing an individual’s perceptions of a single friendship dyad may not tell
the entire story. It is also possible that an athlete could have two very close friends, but
with very different relationships with each one; using existing methodologies, this athlete
would be required to choose one over the other, omitting potentially enlightening
information about the other friendship dyad. In order to draw more accurate conclusions
about the nature and function of friendship in sport, researchers need to develop a
methodology to simultaneously assess multiple friendship dyads. Furthermore, given the
inherent reciprocal nature of friendships (Hartup & Stevens, 1997), it is limiting to assess
dyadic friendship from the perspective of a single individual (Murphy-Mills et al., 2011).
In order to better understand the complex, dynamic nature of peer interactions in sport,
researchers need to assess the contributions of both members of a given dyad, recognizing that peer experiences are a product of the bidirectional social interactions that occur between two or more individuals (Murphy-Mills et al., 2011).

Finally, while existing research has demonstrated that peer interactions can help to facilitate positive sport experiences and psychosocial outcomes (e.g., Bigelow, Lewko, & Salhini, 1989; Causgrove et al., 2007; Joesaar et al., 2011; Moran & Weiss; 2006), the behaviours that comprise these interactions are largely unknown (Murphy-Mills et al., 2011). The call for subsequent observational research on peer interactive behaviour in sport (Murphy-Mills et al., 2011; Smith, 2003) is further emphasized by research outside of the sport context which has shown a relationship between peer interaction patterns, acceptance, and social skills (Asher & Coie, 1991; Dishion, Nelson, Winter, & Bullock, 2004; Steenbeek & van Geert, 2007). By collecting rich, descriptive observational data on the content and structure of peer interactions in youth sport, and linking this information with peer acceptance (i.e., sociometric status), it is possible to address multiple shortcomings in the current peer literature and advance our understanding of the influence of peers in the psychosocial development of young athletes.

Sociometry

The sociometric approach to understanding social development has grown out of Moreno’s (1934) model of sociometric judgment. Moreno posited the existence of two fundamental aspects of the interpersonal experience: Attractions (acceptance), or positive forces that bring people together, and repulsions (rejection), or negative forces that keep people apart. He viewed attractions and repulsions as not opposing, but instead a part of
a triangular model that is completed by the dimension of indifference. This means that according to this model, a person could either be attracted, repulsed, or indifferent toward others. Moreno went on to suggest that these three dimensions (attraction, repulsion, and indifference) could be used in two ways to describe individuals’ experiences with others. Individuals could be described based on how they view their peers or how they are viewed by their peers. Moreno originally measured individuals’ views by asking them how they felt about interacting with the rest of their peer group (i.e., their levels of attraction, repulsion, and indifference toward their peers). Next, Moreno proposed that this data could be used to group individuals into two sets of groups based on how individuals are viewed by their peers and individuals’ views of their peer group.

Since Moreno’s (1934) foundational piece, sociometric research has been mostly unilateral; how individuals are perceived by a group has been more closely examined than how an individual perceives a group (Cillessen & Bukowski, 2000). Sociometric research underwent continual changes until Peery (1979) suggested the use of two classification dimensions called social impact and social preference. Social impact refers to the social visibility of an individual within a group, which is quite simply a measure of how much an individual is noticed by their group. Social preference, on the other hand, refers to the extent to which individuals are liked or disliked by their peers, a measure of the valence of the ratings or nominations an individual receives. These dimensions served as the basis for the two most popular sociometric classification systems, namely the nomination (Coie, Dodge, & Coppotelli, 1982) and rating scale (Newcomb & Bukowski, 1983) approaches. Both systems have since been widely used in sociometric
research and can both be used to reliably measure the same phenomena (Bukowski et al., 2000). However, nomination and rating scale systems have a number of primary differences that can sway researchers to choose one technique over the other to measure sociometric status.

At the most fundamental level, nomination and rating systems differ in the type of data that is collected. In Coie et al.’s (1982) nomination approach, participants select individuals that correspond to their perceptions by circling the name(s) on a list or writing them down. The rating scale system (Newcomb & Bukowski, 1983), on the other hand, has participants rate the likeability of each member of the peer group based on a pre-determined Likert scale. It is evident that Coie et al.’s (1982) method is much simpler and quicker to administer, as participants only need to nominate a small number of peers (usually 3) rather than individually rate each member of the peer group. It can be argued that Newcomb and Bukowski’s (1983) rating scale approach provides a more sensitive measure since each participant must take the time to rate each member of the peer group (Rubin et al., 1998). However, the rating scale technique can be very time-consuming and frustrating to participants (especially children and adolescents), which is why the nomination technique is generally preferred for the ease of data collection and analysis (Terry, 2000).

The method by which both systems classify participants into these groups differs. For instance, Newcomb and Bukowski (1983) developed cut-off values using binomial probabilities, while Coie and colleagues (1982) used a standard score procedure to establish cut-offs for group membership. Both sociometric systems classify participants
into five groups: (1) Popular (many positive and few negative nominations); (2) rejected (few positive and many negative nominations); (3) neglected (few positive and negative nominations); (4) controversial (many positive and negative nominations); and (5) average (average number of positive and negative nominations).

A great deal of research has been conducted in general psychology utilizing sociometric methods and a number of robust findings regarding the behavioural correlates of sociometric status in youth have been found (for a review, see Newcomb et al., 1993). In general, youth of higher sociometric status tend to display more adaptive social skills and peer interactions than youth of lower sociometric status. Popular youth, who are most well-liked by their peers, tend to have the social abilities to maintain positive relations with peers (Asher & Parker, 1989) and achieve interpersonal goals (Dodge, Asher, & Parkhurst, 1989). Rejected youth seem to be polar opposites of their popular peers, with a tendency to be less cognitively skilled and sociable and more aggressive and withdrawn (Newcomb et al., 1993). The behavioural correlates of controversial youth seems to parallel their receipt of both positive and negative nominations; they appear to be more aggressive (similar to rejected peers), but also show greater sociability (similar to popular peers; Newcomb et al., 1993). Finally, there is some controversy regarding the neglected sociometric status because individuals classified into this group tend to exhibit the fewest behavioural differences compared to the average group (Newcomb et al., 1993). However, the meta-analysis performed by Newcomb and colleagues (1993) did reveal that overall, neglected youth tend to exhibit a lower level of social interaction and are less visible within their peer group.
While a large volume of articles have been published on the behavioural correlates of sociometric status in youth, the vast majority of them have been conducted in an academic setting. It should not be assumed that findings related to peer relations in one context automatically apply to other contexts (Weiss & Stuntz, 2004; Zarbatany et al., 1992). There is a belief that peer interactions should be studied within specific salient social contexts, such as the sport environment (Hartup, 1999; Newcomb & Bagwell, 1995; Sheridan, Buhs, & Warnes, 2003). Indeed, social competencies that enable youth to gain acceptance with one context (e.g., school) may not translate well to other contexts (e.g., sport) due to different expectations, norms, and social cues (Smith, 2007). The wealth of research already conducted on peer relations outside of sport should therefore be interpreted with caution until it is corroborated by context-specific research.

Furthermore, despite the wealth of research utilizing sociometric methods, it has predominantly been conducted with young children, while relatively fewer studies have used this method to study adolescents. This older age group has been studied less often because research using sociometric techniques is best suited to stable, closed peer systems (Brown, 2004). In elementary schools, children most often stay in the same class for an entire given school year, and so their peer group remains relatively stable for that time period. However, as children progress to middle and high school, they begin to rotate through different classrooms and groups of students throughout the day and year, and as a result their peer group becomes much less stable (Poulin & Dishion, 2008). This group instability makes it difficult to assess peer acceptance using sociometry because students have less time to interact with members of their peer group. In contrast to the
school environment, organized sport represents a unique context that is ideal for the study of peer relations in youth across both childhood and adolescence. In most cases, organized sport teams are chosen at the beginning of the sport season and this group of athletes interacts on a regular basis at practices, games, and team functions. Youth sport teams also remain relatively stable, barring any athletes who drop out over the course of the season. Therefore, organized sport represents a useful context to study peer relations in adolescence using sociometric methods.

However, relatively few studies in the youth sport literature have employed sociometric techniques to study peer acceptance and interactions (Smith, 2003). The bulk of sport and physical activity research that has measured peer acceptance using sociometry has examined its relation to athletic ability. Collectively, this small but growing body of literature in sport and physical activity has shown that athletic competence is a major predictor of social status across age, gender, and sport context (e.g., Causgrove Dunn et al., 2007; LaFontana & Cillessen, 2002; Vannatta et al., 2009).

It is interesting to note that although researchers employing sociometric methods are often interested in social behaviours associated with sociometric status, there have been relatively few studies in general psychology (e.g., Putallaz & Gottman, 1981; Markell & Asher, 1984) and none in sport that have measured peer interactive behaviour directly. Traditionally, a variety of questionnaires are administered to gather youth’s perceptions of social behaviours, and this data is then analyzed in relation to youth’s sociometric status in a given social group (e.g., Coie et al., 1982; de Bruyn & van den Boom, 2005; LaFontana & Cillessen, 2002). This type of method is convenient for
collecting large samples of data from many social groups, as is evident from the size and breadth of many previous studies on sociometric status (e.g., Parkhurst & Hopmeyer, 1998). This is indicative of the inherent difficult and time-consuming nature of behavioural observation (Ralph, Williams, & Campisi, 1997).

As a result, Ralph and colleagues (1997) attempted to quantify informal peer interactions in adolescents through the development of a structured diary called the Adolescent Social Interaction Profile. This tool was used to measure who the youth interacted with, on which day, where the interaction occurred, what activities were involved, the duration of the interaction, and the enjoyment of the interaction. The authors found a positive correlation between popular children and higher levels of peer interaction. Further, less-popular children had significantly fewer peer contacts on most measures. Statistical analysis suggested three factors associated with peer interactions: scope (range of settings and activities), scale (number of interactions), and enjoyment. This study highlights the importance of examining peer interaction patterns and social status in youth, and provides support for further research in this area employing a more systematic approach to assessing interpersonal behaviours.

Observation of Athlete Behaviour

Organized sport has been recognized as a fertile potential context for employing observational methodologies in the study of behaviour and sport performance (Smith, Smoll, & Christensen, 1996). The use of behavioural observation is crucial in addressing some of the current gaps in the peer literature in sport, while also helping to advance the knowledge about peers interactions in sport. It has been widely shown that, in general,
Peer interactions can help to facilitate positive sport experiences (e.g., Chase & Dummer, 1992; Smith, 1999; Weiss & Smith, 2002). However, researchers have yet to fully embrace this research opportunity and empirically evaluate and consider the actual behaviours that make up these interactions (Murphy-Mills et al., 2011).

There is a paucity of literature on the observation of interpersonal interactions in sport, and when athlete behaviours are observed in sport research, it is most commonly in relation to coaching or sport performance (Smith et al., 1996). Erickson and colleagues (2011) recently conducted an observational study of coach-athlete interactions in synchronized swimming where athlete behaviours were indirectly analyzed. In this study, the primary unit of analysis was the coach-athlete dyad, but athletes’ behaviours were initially coded individually. Erickson and colleagues (2011) developed a coding system which included six categories for athlete behaviour: Technical talking, clarification, acknowledgement, general talking, engaged, and disengaged. In an older example, Hanin (1992) assessed athlete communications in elite basketball, volleyball, and handball teams and found that each team displayed different communication profiles, with the most successful teams displaying the most stable profiles. The coding system used was made up of five categories: orienting, stimulating, evaluative, task irrelevant, and performance behaviours. Hanin (1992) highlighted the importance of context, in that the content of athletes’ communications was dependent on the specific sport context and game situation, and that athletes’ level of communication was dependent on their status on the team. More recently, LeCouteur and Feo (2011) analyzed athletes’ interactions and conversations during defensive netball play. LeCouteur and Feo (2011) adapted
Hanin’s (1992) coding system and classified behaviour into four categories: Tactical, motivational, other, and none. Analysis of the frequency of athletes’ interactions revealed that a greater amount of interactions occurred during less successful defensive situations, which contrasts with existing literature (Lausic, Tenenbaum, Eccles, Jeong, & Johnson, 2009). However, further analysis of the patterns of interactions suggested that a higher frequency of communication on its own was not enough to facilitate successful defensive play; the specific nature and quality of the communicative patterns were equally important to defensive performance (LeCouteur & Feo, 2011). These previously outlined coding systems provide a solid conceptual base for peer interactive categories during competition, but fail to provide adequate detail on the full breadth of interactive behaviours that athletes display during the downtime in games and practices. In order to capture the full range of social interactions that occur among athletes in practice and competition, it is necessary to draw upon relevant research from other domains.

In developmental psychology, peer interactions have been studied using behavioural observation. Two popular observational coding systems developed by Dishion and colleagues are the Peer Process Code (PPC; Dishion et al., 1989) and Interpersonal Process Code (IPC; Rusby, Estes, & Dishion, 1991) systems. The PPC was specifically developed with the purpose of assessing the interpersonal process of adolescent relationships, while the IPC is an integrated coding system designed to be used across multiple social contexts (e.g., family and peer interactions). The PPC has predominantly been used in the study of aggressive and antisocial behaviour in adolescent males (e.g., Dishion, Nelson, & Crosby, 1995; Dishion et al., 2004). The IPC,
on the other hand, has mostly been employed in research on parent-child and family interactions (e.g., De Garmo, Forgatch, & Martinez, 2003; Rhule, McMahon, & Spieker, 2004). However, the PPC and IPC were both designed to systematically code verbal, non-verbal, and physical interpersonal behaviours, as well as the affective valence of an interaction. Not surprisingly, the content codes of the two systems share many similarities, and can be summarized in four broad-band groups: Negative engagement, directives, converse, and positive engagement (Dishion & Nelson, 2007). Negative engagement refers to all behaviours that appear to have a negative interpersonal impact (e.g., name calling, threats). Directives refers to all behaviours where there is an attempt to instruct or guide the behaviour of a peer. Converse refers to all general social conversations between individuals. Finally, positive engagement refers to all positive behaviours (e.g., compliments, encouragement). It is evident that these coding systems were designed to capture the social dynamics of peer interactions in much more detail than the limited work performed in the sport domain. The synthesis of both bodies of research into a comprehensive and integrated coding system for all types of peer interactions in youth sport settings would help to facilitate further observational research in this area.

The State Space Grid Method

There is a need to move beyond our current focus on youth’s perceptions of their peer interactions in sport, and actually examine what constitutes these interactions. Herein lie the strengths of behavioural observation; this approach allows researchers to empirically measure and analyze interactions between young athletes in a naturalistic
setting (Sackett, 2000). Murphy-Mills and colleagues (2011) have recently advocated for the use of a dynamic systems approach called state space grid (SSG) analysis in the study of peer interactions in sport. The SSG methodology was first developed in the developmental psychology area for research on parent-child interactions (Lewis et al., 1999). Since then, much of the research using SSG methodology has focused on child and family interactions (Hollenstein, 2007); however, sport researchers have also recently applied this methodology to the study of coach-athlete interactions (Erickson et al., 2011; Murphy-Mills et al., 2011). These studies have yielded rich data that has helped to further our understanding of coach-athlete interactions and athlete outcomes. The success of these previous studies is encouraging for the use of SSG analysis in the study of peer interactions in sport.

Dynamic systems research has suggested that youth of high social status demonstrate adaptive social skills and interaction patterns while youth of low social status often demonstrate maladaptive interaction patterns (Steenbeek & van Geert, 2007). Given the support for this link between youth’s sociometric status and interaction patterns, it is prudent to apply similar methods to the study of peers in sport. There are two potential ways that SSG could be used in the study of peers in sport. First, it could be applied in a similar method to the coach-athlete interaction research (Erickson et al., 2011) where a peer dyad could be mapped onto a grid, with each athlete representing the x and y axes respectively. A detailed outline for this specific application has recently been published by Murphy-Mills and colleagues (2011). A second method of utilizing SSG in the analysis of peers approaches the interactions at a group-level, as opposed to
analyzing dyadic interactions.

Group-level analysis was first used in the study of the social dynamics of young children, specifically examining the roles of sex and behavioural similarity in the self-organization of a preschool classroom (Martin, Fabes, Hanish, & Hollenstein, 2005). The results of this study showed an increased in sex-segregated behaviour (e.g., boys playing with boys) and also showed other behavioural patterns (e.g., competent girls had a tendency to play with each other the most). Martin and colleagues (2005) demonstrated that the SSG method could be expanded from the analysis of dyadic interactions to the analysis of interactions between types of peers.

In the context of the proposed project, instead of constructing grids for each peer dyad in a sport team, it is possible to construct grids representative of the interactions of entire groups of athletes, such as sociometric groups (i.e., popular, rejected, neglected, average, and controversial). This method allows for the analysis of what type of behaviours a target athlete exhibits, through measures of frequency, duration, and variability, as well as what group(s) the targeting athlete is interacting with. Frequency and duration refer to how often and for how long athletes display certain behaviours. Variability refers to the degree to which an athlete changes his/her behaviour over the course of an observation. This type of grid could be constructed with a target athlete’s interactive behaviours on the x axis, and the type of peers (i.e., sociometric groups) on the y axis. These grids would allow for the quantification of what type of interactive behaviours a target athlete or group exhibits, as well as who (e.g., type of peers) they are interacting with at each point in time during a practice. Collectively, this method has the
potential to provide novel detailed information on the nature of peer interactions in sport (Murphy-Mills et al., 2011). This type of analysis has the potential to accurately test the previously described behavioural correlates of sociometric status in sport, as well as shed further light on the nature of peer interactions in youth sport.

**Research Questions**

The purpose of this study is to examine athletes’ interactive behaviour and self, peer, and coach rated sport competence in sport in relation to peer-rated sociometric status. More specifically, the current study sought to address the following two research questions regarding peer interactions and sociometric status in sport: (1) Are sociometric status groups characterized by varying levels of sport competence? and (2) are athletes’ behaviours consistent across all sociometric status groups (i.e., popular, rejected, neglected, and controversial) or are they unique to specific groups?
Chapter 3

Methods

Participants

Members of three female competitive club volleyball teams from eastern Ontario were recruited to participate in the study. The participants were female adolescent volleyball players \(N = 28\) aged 14-17 \((M = 15.94, SD = 1.30)\), with an average of 3.66 years of experience playing volleyball. The athletes were members of three similar-aged teams ranging from 15U to 18U. While coaches were not directly analyzed, team selection criteria were based in part on a head coach with a minimum of five years of coaching experience. The coaches were both female \((n = 1)\) and male \((n = 2)\), with 7-42 years of experience coaching volleyball.

Procedure

The coaches, athletes, and the athletes’ parents were all required to provide active written consent prior to participation in the study. Further, a brief explanation of the nature of the project was provided to all athletes at the beginning of a practice prior to the commencement of data collection. Three practices of each participating team were videotaped using two video cameras, one of which was set up with a wide angle to capture the entire play area while the other captured selected interactions in greater detail. The first recording of each team served two purposes: (1) To acclimate the coaches and athletes to the presence of the research team and recording process to help minimize reactivity (Smith et al., 1977), and (2) to act as pilot video to test and refine the coding.
system. The two subsequent recordings of each team that were used for data analysis were recorded during the middle of each team’s season within four weeks of one another. Athletes’ verbalizations were captured with the combination of an omni-directional microphone mounted to one of the video cameras and a parabolic microphone that was operated by a member of the research team.

While the coaches were never directly asked to alter their practice structure, all of the recorded practices included warm-ups, structured drills, and team scrimmages. This standardization allowed for the consistent opportunity to record athletes’ behaviour in multiple naturally-occurring practice contexts.

Following each team’s final recorded practice session, the sport competence and sociometric nomination questionnaires were administered to the athletes as part of a larger questionnaire package. Prior to completion, the research team explained the purpose of the questionnaires and emphasized the strict confidentiality of the athletes’ responses. Multiple members of the research team were present to monitor the activity and prevent chatting among athletes (Bell-Dolan & Wessler, 1994).

**Measures**

**Sport competence.** The participants’ sport competence, or athletic ability was assessed using the Sport Competence Inventory (SCI; Vierimaa, Erickson, Côté, & Gilbert, 2012). The SCI is a 3-item questionnaire adapted from Causgrove Dunn and colleagues (2007) which assesses athletes’ technical, tactical, and physical sport skills via self, peer, and coach ratings. Athletes rated themselves and each of their teammates on the same three items using a 5-point Likert type scale ranging from ‘not at all competent’
to ‘extremely competent’. The average of the three items was used as an overall indicator of competence, and ratings for the self, peer, and coach perspectives were calculated. Self and coach ratings were reflective of the individual ratings of each athlete and their respective head coach. For each athlete, the mean rating from one’s teammates was calculated and used as the peer perspective. The triangulation of multiple ratings allows for a more accurate composite representation of athletes’ competence in sport (Dirks, Treat, & Weersing, 2007).

**Sociometric status.** Sociometric status was assessed using a peer nomination-style questionnaire adapted from the work of Coie and colleagues (1982). This approach is a widely used and accepted method of measuring sociometric status in children and adolescents (Bukowski et al., 2000). Participants completed two questions—the first asked the athletes to identify the three teammates that they enjoy participating in their sport with the most, and the second required athletes to identify the three teammates that they enjoy participating in their sport with the least. Athletes indicated their selection for each question by circling the corresponding teammates’ names on a randomly-ordered roster (Poulin & Dishion, 2008).

**Athlete behaviour.** Athletes’ interactive behaviour was coded using a newly developed contextually based coding system. The development of this coding system is in line with Brewer and Jones’ (2002) recommendations for the development of systematic observation instruments in sport psychology research. Brewer and Jones (2002) recommend modifying existing observation instruments so that the coding system can produce valid data within the specific sporting context that it is used. They further
suggest that the development of a contextually valid observation instrument should include establishing context-specific validity, extensive observer training, and testing of observer reliability. The newly developed Athlete Behaviour Coding System (ABCS; Appendix A) is intended for observation of competitive practices of youth volleyball teams. The ABCS provides an exhaustive categorization of athlete behaviour content and practice context. All categories within a particular dimension (e.g., content) are mutually exclusive. The selection of behavioural categories within each dimension is discussed below; for detailed descriptions of each category refer to the attached coding manual (Appendix A).

**Athlete behaviour content.** Unlike coaching research, which often utilizes systematic observation (e.g., Smith et al., 1977; Erickson et al., 2011), researchers have yet to apply this type of methodology to the study of peers in sport (Murphy-Mills et al., 2011). Therefore, the present coding system draws upon relevant behaviour categories from existing coding systems outside of the specific area of peer interactions in youth sport. The athlete behaviour categories from the Coach-Athlete Interaction Coding System (CAICS; Erickson et al., 2011) served as the basis upon which to develop the ABCS. The CAICS was developed to continuously measure coach and athlete behaviour content, affect, and context in adolescent female synchronized swimming teams (Erickson et al., 2011), and has since also been adapted for use with athletes with disabilities in a competitive youth swimming context (Murphy-Mills, Erickson, & Côté, 2011). The CAICS is a continuous coding system, providing a theoretically similar basis for the development of the ABCS; it is designed to provide a mutually exhaustive
categorization of all possible athlete behaviours exhibited in a synchronized swimming context. The CAICS is comprised of 7 categories that are used to code athlete behaviour: (1) Technical talking, (2) clarification, (3) acknowledgement, (4) general talking, (5) engaged, (6) disengaged, and (7) not codable. While the CAICS provides a good basis for athlete behaviour categories, its principal focus is on coaching behaviour; as a result, it lacks sufficient detail to be applied in its present state to a study examining athlete behaviour exclusively.

Aside from the exclusion of the coach’s behaviour, one of the other marked differences of the ABCS in comparison to the CAICS is in the detail and type of video it has been used to code. The CAICS assessed athlete behaviour by reviewing a single audio and video stream which was focused on capturing the coach’s actions and verbalizations. In comparison, the present study captured athletes’ behaviour through the use of a wide angle camera and parabolic microphone, in addition to a set-up similar to the one used in the development of the CAICS. This more complex observational approach allowed for more detailed observations of athlete behaviour, and in turn necessitated the collection and review of pilot video to ensure that the ABCS would be constructed with an appropriate level of complexity.

The development of the ABCS therefore began with the seven categories from the CAICS (Erickson et al., 2011), which were then modified and expanded upon based on review of pilot video and coding systems from other relevant areas of research. Pilot video from multiple youth sport contexts (e.g., soccer, swimming, tennis, and volleyball) was reviewed to determine the appropriateness of the CAICS categories, and helped to
reveal any other types of athlete behaviour that was not accurately described by the previous coding system. Also, an abundance of literature on the observation of peer interactions both in sport (Le Couteur & Feo, 2011; Murphy-Mills et al., 2011) and beyond (e.g., Dishion et al., 1989; Rusby et al., 1991) was reviewed to extract and integrate relevant categories from existing research and coding systems. This process produced a total of 8 athlete content categories: (1) Prosocial communication, (2) technical/tactical communication, (3) directive communication, (4) general communication, (5) engaged, (6) non-cooperative/disruptive, (7) antisocial communication, and (8) uncodable.

The first notable change from the structure of the CAICS was the inclusion of prosocial and antisocial behaviour categories. These categories were added due to their prevalence in much of the psychology literature on peer interactions and sociometry (e.g., Dishion et al., 2004; Newcomb et al., 1993; Rusby et al., 1991) as well as their suggested inclusion in future observational research on peer interactions in sport (Murphy-Mills et al., 2011). Prosocial behaviours also appear in the coding system used by LeCouteur and Feo (2011) in their study of athlete communication and performance, but are included in a more general category labeled ‘motivational’.

Another addition to the ABCS was the inclusion of the directive communication category. Directive communication is often examined in the study of peer interactions outside of sport (e.g., Dishion et al., 1989; Rusby et al., 1991), and as such, it is prudent to include a similar category in the ABCS. It is not surprising that no similar category existed in the CAICS because its primary objective was to assess athlete behaviour while
they were interacting with a coach. It is unlikely that young athletes often directly command a behaviour change in their coaches; instead, it is more likely for coaches to be commanding changes in the behaviour of their athletes. However, in the study of peers, this power imbalance is not present, and therefore we are more likely to observe directive communication between teammates.

**Coder training.** Three prospective coders followed a multi-step process in order to gain experience with the ABCS and learn to code video reliably. The first stage in this process had all prospective coders independently study the coding manual for seven days in order to develop a basic understanding of its intended utility and of the various categories. Following this stage, the three prospective coders met with the primary researcher and had a group discussion regarding any questions that arose during the independent study period.

The coders then engaged in multiple sessions of free group-based coding with the primary researcher. During these sessions, the group would review video while informally discussing how certain behaviours and situations would be coded using the ABCS. Any disagreements would be debated until a consensus was reached. In some cases, minor modifications were made to the structure or wording of the coding manual in order to clarify any potential areas of confusion.

After the prospective coders had become comfortable viewing video while thinking in terms of the coding system, a group session was planned where the primary researcher introduced the Observer XT software and how it would be used in conjunction with the ABCS to code the video. The coders were given a step-by-step guide to coding
using this software package. The group then engaged in a coding session where each prospective coder was given an opportunity to manually code using the software. The coding manual continued to undergo refinement throughout this stage as any conceptual issues arose.

Once each coder felt comfortable enough with the process, independent coding assignments were provided whereby each prospective coder would code the same 10 minute video clip. These practice segments were compared with a gold-standard coded by the primary researcher. The entire group reviewed how each coder compared with the gold-standard, while common errors were noted and clarified. This process continued until the three independent coders met an average frequency agreement of 75% with the gold-standard for two 10 minute video segments (Erickson et al., 2011; Hollenstein, Granic, Stoolmiller, & Snyder, 2004). Frequency agreement refers to the total number of occurrences that all coders activated the same behaviour category within a three second window of time. Once coders reached the 75% minimum standard, they were cleared for coding the video segments designated for analysis. One of the three prospective coders was then chosen to aid the primary researcher in coding video designated for analysis on the basis of potential availability.

**Data Analysis**

Effect sizes \( (d) \) were calculated and reported alongside \( p \)-values where appropriate to aid in interpreting the data (Cohen, 1992; Hoyle, 1999; Ivarsson, Andersen, Johnson, & Lindwall, 2013). By convention, effect sizes of 0.20, 0.50 and 0.80 were considered small, moderate and large effects, respectively (Cohen, 1992).
Effect sizes will be used an indicator of strength of relationship.

**Sociometric status.** Participants’ sociometric status was determined based on Coie and colleagues’ (1982) classification procedure. First, the total number of positive and negative nominations that each participant received from the peer nomination questionnaire were tallied and converted into standardized enjoyed most (zEM) and enjoyed least (zEL) scores. Social preference (SP = zEM-zEL) and social impact (SI = zEM+zEL) were calculated and standardized for each participant. These standardized scores were used to classify all participants into one of five sociometric status groups: (a) Popular, who received a SP score greater than 0.8, a zEM score of greater than 0 and a zEL score of less than 0; (b) rejected, who received a SP score of less than -0.8, a zEM score of less than 0, and a zEL score of greater than 0; (c) neglected, who received a SI score of less than -0.8, and zEM and zEL scores of less than 0; (d) controversial, who received a SI score of greater than 0.8, and zEM and zEL scores of greater than 0; and (e) average, consisting of all remaining participants.

This procedure is slightly more lenient than the one originally employed by Coie and colleagues (1982) due to the small group sizes in the present study. The original procedure was designed for administration in larger classroom sizes as opposed to smaller sport teams. The classification criteria was relaxed slightly (from a +/- 1.0 z-score cut-off to +/- 0.8) in order to increase membership in the extreme groups (i.e., popular, rejected, neglected, and controversial). The modifications employed in the present study are consistent with previous research that has examined social status in smaller groups (Dodge, Coie, Pettit, & Price 1990; Wright, Giammarino, & Parad, 1986).
Wright and colleagues (1986) note that in smaller groups, participants are more likely to receive at least one nomination, which can significantly affect one’s resultant classification.

**Sport competence.** Past research in physical activity settings suggests that social status is closely linked with ratings of sport competence (e.g., Causgrove Dunn et al., 2007). In line with this presumption, the self ratings of the extreme participants (i.e., popular, rejected, neglected, and controversial) were compared with the average participants using independent samples t-tests. The same comparisons were examined for the peer and coach ratings using dependent samples t-tests. The Bonferonni-corrected alpha-value was set at .0125 to control for multiple comparisons within each conceptual grouping.

Multiple independent and dependent samples t-tests were used instead of one-way and repeated measures ANOVAs due to the interest in using the average participants as a comparison group with which to compare to the other four extreme groups. This comparative approach is in line with researchers in developmental psychology who are interested in how sociometric status groups differ from average on a variety of psychological and behavioural indicators (Newcomb et al., 1993).

**Athlete behaviour.** Similar to the analyses of sport competence, for each behaviour category, the “average” participants were used as a comparison group with which to compare the other four extreme groups (i.e., popular, rejected, neglected, and controversial). To do so, independent samples t-tests were performed with a corrected alpha-value set at .0125.
Figure 1. *Example of a SSG for One Athlete Displaying Athlete Behaviour Categories and Practice Contexts*

Behavioural measures of each athlete were analyzed using state space grids (SSGs). An example of a SSG which was used to track individual athletes’ behaviour is shown in Figure 1. In this grid, the x and y axes represent the various behaviours that an athlete may exhibit, and the multiple practice contexts in which those behaviours could be displayed. Thus, each cell represents a distinct situation representative of the type of behaviour displayed, and the practice context in which it was exhibited. Measures of athlete behaviour were calculated using GridWare software (Lamey, Hollenstein, Lewis, & Granic, 2004). For each athlete, state space grids were constructed and measures were derived for variability, frequency, and duration of behaviour.
The variability of athlete behaviour was assessed by measures of the mean number of cells visited and mean number of transitions between cells. The number of cells visited indicates the number of different behaviours displayed by an individual, with higher numbers indicating more variable, less patterned behaviour. In reference to the example grid in Figure 1, this measure is represented by the number of columns that contain at least one point; this means that a given athlete displayed the behaviour represented by that column at least once during practice. A higher number of transitions between cells are also indicative of more variable or flexible behaviour. Transitions provide slightly different information than number of cells visited in that while an individual may only visit a few different cells, they may transition between those cells on a frequent basis. This measure is typified in Figure 1 by the total number of points, where each the transition from one behaviour to another is visualized by the addition of another point on the grid.

The content of the athletes’ behaviour was assessed through measures of the mean number of events and duration. Mean number of events illustrated the average number of times in which an athlete would display a particular behaviour during a practice session. Mean duration indicated the average summed amount of time an athlete would spend displaying a specific behaviour during a practice session. The number of events, or frequency of specific behaviours is represented in Figure 1 by the number of points in each column, or behaviour category. The mean duration of behaviours is illustrated by the size of each point in the grid, where a larger point is indicative of a behaviour event of longer duration.
Chapter 4

Results

Twenty-two of the 28 participants (78.6%) attended both practices, with six participants attending only one of the two practices. For the participants who attended both practice sessions, the averaged data from the two sessions will be presented. The data for the participants who attended a single practice session will only be reflective of that practice.

Coding System Reliability

The videos used for analysis were coded in 20-minute segments, with each segment comprised of an average of 773.05 events ($SD = 235.55$), or 15,461 total events. Each event was comprised of a unique behaviour which involved individual components for the participant, behaviour content, target, directionality, and modifiers (where applicable). Therefore, in order for two coders to be in agreement on a single event, each person needed to activate the same string of four to five behaviour components within a three-second time window (Appendix A).

The primary researcher and research assistant reached a minimum of 75% frequency agreement prior to coding video designated for analysis (frequency percent agreement = 83.20; kappa = .83). Later in the coding process, a full 20-minute segment was randomly selected to be coded by both coders, after which the data were compared in a further inter-rater reliability check. Again, percentage agreement for frequency of behaviours was calculated, with both coders meeting adequate reliability (frequency
percent agreement = 79.10; kappa = .78).

**Sociometric Status Group Classification**

Once the coding process was complete, the next step was to determine the sociometric status of the participants. Of the 28 participants, nine (32.1%) were classified as popular, three (10.7%) as rejected, seven (25%) as neglected, three (10.7%) as controversial, and six (21.4%) as average. The sociometric status classification breakdown for each of the three teams can be found in Table 1. These groupings will be used to compare the participants in all subsequent analyses.

Table 1. *Sociometric Status Group Classification by Team*

<table>
<thead>
<tr>
<th>Team</th>
<th>Popular (n = 9)</th>
<th>Rejected (n = 3)</th>
<th>Neglected (n = 7)</th>
<th>Controversial (n = 3)</th>
<th>Average (n = 6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Team A (18U)</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>(n = 10)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Team B (17U)</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>(n = 8)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Team C (15U)</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>(n = 10)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Sport Competence**

Based on the multidimensional conceptualization of sport competence as being comprised of three distinct dimensions (i.e., technical, tactical, and physical skills; Vierimaa et al., 2012), it was not expected that participants would necessarily score similarly on all three items. However, the three formats (self, coach, and peer ratings) of
the three item questionnaire demonstrated adequate internal consistency with Cronbach alpha values of .60 (self), .72 (peer), and .72 (coach). Correlations between the three formats showed a strong relationship between peer and coach ratings of competence with a Pearson coefficient of .81, while self-ratings of competence appeared to be weakly correlated to the other two perspectives with Pearson coefficients of .18 (coach) and .31 (peers) respectively. This suggests that the coach and peer ratings were closely related. Basic descriptive statistics of the mean self, peer, and coach ratings of sport competence with the participants grouped by sociometric status are presented in Table 2.

Table 2. *Descriptive Statistics for the Ratings of Sport Competence*

<table>
<thead>
<tr>
<th></th>
<th>Popular M (SD)</th>
<th>Rejected M (SD)</th>
<th>Neglected M (SD)</th>
<th>Controversial M (SD)</th>
<th>Average M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Self Ratings</strong></td>
<td>3.76 (0.23)</td>
<td>3.06 (1.08)</td>
<td>4.00 (0.26)</td>
<td>3.78 (0.09)</td>
<td>3.50 (0.24)</td>
</tr>
<tr>
<td><strong>Peer Ratings</strong></td>
<td>4.27 (0.31)</td>
<td>3.23 (0.50)</td>
<td>3.65 (0.30)</td>
<td>3.46 (0.39)</td>
<td>3.64 (0.10)</td>
</tr>
<tr>
<td><strong>Coach Ratings</strong></td>
<td>3.86 (0.42)</td>
<td>3.00 (0.67)</td>
<td>3.37 (0.45)</td>
<td>2.94 (0.25)</td>
<td>3.25 (0.17)</td>
</tr>
</tbody>
</table>

Table 3 displays the results of the *t*-tests for the self, peer, and coach ratings of sport competence. The Bonferonni-corrected *p*-value was set at .0125. No groups differed significantly from the popular athletes on self ratings; however, the difference between the neglected and average groups was approaching significance (*p* = .02). For peer ratings, popular athletes received significantly higher ratings compared to average athletes, while rejected athletes received significantly lower ratings compared to average
athletes ($p < .0125$). No significant differences emerged for coach ratings; however, the comparisons of popular and average athletes ($p = .03$) and popular and controversial athletes ($p = .01$) were both approaching statistical significance.
Table 3. Comparison of Average and Extreme Groups on Sport Competence

<table>
<thead>
<tr>
<th>Behaviour</th>
<th>Average vs. Popular</th>
<th>Average vs. Rejected</th>
<th>Average vs. Neglected</th>
<th>Average vs. Controversial</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>t (df)</td>
<td>p</td>
<td>d</td>
<td>t (df)</td>
</tr>
<tr>
<td>Self Ratings</td>
<td>-1.79 (9)</td>
<td>.11</td>
<td>-1.24</td>
<td>0.82 (5)</td>
</tr>
<tr>
<td>Peer Ratings</td>
<td>-4.64 (27)</td>
<td>.00*</td>
<td>-0.88</td>
<td>3.66 (18)</td>
</tr>
<tr>
<td>Coach Ratings</td>
<td>-5.28 (2)</td>
<td>.03</td>
<td>-3.05</td>
<td>1.00 (1)</td>
</tr>
</tbody>
</table>

*Note.* *p* < .0125. Self-ratings reflect results of independent samples *t*-tests, while peer and coach-ratings reflect results of dependent samples *t*-tests.
**Athlete Behaviours**

Due to a lack of observation of these specific behaviours in all athletes, the few instances of sport-related directive communication were collapsed within the technical communication category, and antisocial communication was excluded from further analyses. All of the remaining active communicative codes (i.e., prosocial, technical, and general communication) were further broken down into categories reflective of whether a given athlete was interacting with a coach or teammate (e.g., prosocial communication with coach). Post-hoc power analyses revealed that the $t$-tests were underpowered with all comparisons well below the .80 threshold (the highest being .08) to detect significant medium effects, given the limited sample size of the study. The following sections will therefore consider the observed trends in terms of effect size ($d$); specifically, effect sizes larger than 0.5 (medium) will be noted in order to highlight the strongest observed trends.

**Variability.** In general, there appeared to be only minute differences between the groups on the mean number of transitions and cells visited (Table 4). Results of the corresponding $t$-tests revealed no statistically significant differences between groups (Appendix D, Table 9). However, a medium effect size ($d = 0.54$) was observed between the neglected and average groups for cells visited, suggesting that the neglected group tended to be more rigid in their behaviour, displaying fewer behaviour categories during a practice.
Table 4. *Descriptives for Measures of Behavioural Variability per 60 Minute Practice*

<table>
<thead>
<tr>
<th>Behaviour Category</th>
<th>Popular M (SD)</th>
<th>Rejected M (SD)</th>
<th>Neglected M (SD)</th>
<th>Controversial M (SD)</th>
<th>Average M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cells Visited</td>
<td>8.52 (2.35)</td>
<td>9.84 (3.14)</td>
<td>8.02 (2.09)</td>
<td>8.80 (1.57)</td>
<td>9.31 (3.05)</td>
</tr>
<tr>
<td>Transitions</td>
<td>45.01 (21.47)</td>
<td>46.56 (24.72)</td>
<td>42.23 (19.72)</td>
<td>40.94 (14.38)</td>
<td>41.98 (16.12)</td>
</tr>
</tbody>
</table>

**Behaviour content.** Table 6 displays basic descriptives for the mean number of events for each behavioural category. A square root transformation was applied to the raw scores of mean number of events to account for a skewed distribution. Raw means and standard deviations are reported, but the *t*-tests were carried out using the transformed scores. The sociometric status groups tended to score similarly in most categories, but it appeared that the rejected and neglected groups interact with the coaches on fewer occasions. Also, the average and controversial groups appeared to display general communication with athletes more often than the other groups.
Table 5. Descriptives for Mean Number of Behaviour Events per 60 Minute Practice

<table>
<thead>
<tr>
<th>Behaviour</th>
<th>Popular M (SD)</th>
<th>Rejected M (SD)</th>
<th>Neglected M (SD)</th>
<th>Controversial M (SD)</th>
<th>Average M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prosocial Coach</td>
<td>4.52 (3.99)</td>
<td>3.26 (0.79)</td>
<td>3.01 (1.92)</td>
<td>5.69 (4.82)</td>
<td>5.33 (5.23)</td>
</tr>
<tr>
<td>Prosocial Athlete</td>
<td>12.41 (10.98)</td>
<td>14.03 (10.24)</td>
<td>10.31 (7.90)</td>
<td>8.44 (3.35)</td>
<td>10.64 (9.50)</td>
</tr>
<tr>
<td>Technical Coach</td>
<td>15.66 (11.30)</td>
<td>10.73 (3.13)</td>
<td>10.66 (5.99)</td>
<td>12.63 (4.78)</td>
<td>13.08 (5.96)</td>
</tr>
<tr>
<td>Technical Athlete</td>
<td>21.14 (14.17)</td>
<td>19.79 (12.32)</td>
<td>18.21 (20.08)</td>
<td>17.73 (8.11)</td>
<td>18.23 (8.56)</td>
</tr>
<tr>
<td>General Coach</td>
<td>0.36 (0.61)</td>
<td>-</td>
<td>0.33 (0.43)</td>
<td>0.13 (0.22)</td>
<td>-</td>
</tr>
<tr>
<td>General Athlete</td>
<td>2.78 (2.31)</td>
<td>1.95 (1.08)</td>
<td>2.18 (2.56)</td>
<td>4.62 (4.77)</td>
<td>4.55 (5.21)</td>
</tr>
<tr>
<td>Engaged</td>
<td>50.97 (21.30)</td>
<td>47.08 (21.43)</td>
<td>43.04 (24.84)</td>
<td>45.38 (14.35)</td>
<td>47.98 (11.34)</td>
</tr>
</tbody>
</table>

The results of the independent samples t-tests for mean number of events are presented in Table 6. No significant differences were found between groups; however, numerous medium to large effect sizes were observed. Medium effects ($d = 0.52-0.58$) were observed for the rejected and neglected groups on prosocial communication with coach, suggesting that rejected and neglected athletes tended to display prosocial communication with their coaches less often as compared to the average athletes. Similarly, a medium effect ($d = 0.51$) was observed for the neglected group on technical communication with coach, indicating that neglected athletes may also engage in
technical communication with their coaches less often, compared to the average group. Large effect sizes \((d = 1.50-1.72)\) suggest that the popular, neglected, and controversial athletes spent more time discussing non-sport related topics with their coach during practice compared to their average peers. Finally, medium to large effect sizes \((d = 0.56-0.83)\) indicate that the popular, rejected, and neglected athletes engaged in general communication with their peers less often than the average athletes.
Table 6. *Comparison of Average with Extreme Groups on Mean Number of Behaviour Events per 60 Minute Practice*

<table>
<thead>
<tr>
<th>Behaviour</th>
<th>Average vs. Popular</th>
<th>Average vs. Rejected</th>
<th>Average vs. Neglected</th>
<th>Average vs. Controversial</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$t$ (df)</td>
<td>$p$</td>
<td>$d$</td>
<td>$t$ (df)</td>
</tr>
<tr>
<td>Prosocial Coach</td>
<td>.29 (13)</td>
<td>0.77</td>
<td>0.17</td>
<td>.59 (5.73)</td>
</tr>
<tr>
<td>Prosocial Athlete</td>
<td>-.17 (13)</td>
<td>0.87</td>
<td>-0.1</td>
<td>-.51 (7)</td>
</tr>
<tr>
<td>Technical Coach</td>
<td>-.21 (13)</td>
<td>0.83</td>
<td>-0.12</td>
<td>.59 (7)</td>
</tr>
<tr>
<td>Technical Athlete</td>
<td>-.26 (13)</td>
<td>0.8</td>
<td>-0.15</td>
<td>-.13 (7)</td>
</tr>
<tr>
<td>General Coach</td>
<td>-2.28 (8)</td>
<td>0.05</td>
<td><strong>-1.65</strong></td>
<td>-</td>
</tr>
<tr>
<td>General Athlete</td>
<td>.99 (13)</td>
<td>0.34</td>
<td><strong>0.56</strong></td>
<td>.91 (7)</td>
</tr>
<tr>
<td>Engaged</td>
<td>-.16 (13)</td>
<td>0.88</td>
<td>-0.1</td>
<td>.19 (7)</td>
</tr>
</tbody>
</table>

*Note.* Effect sizes $> 0.50$ are in boldface.
Descriptive statistics for the mean duration of each athlete behaviour category can be found in Table 7. In general, it appears that the rejected and neglected athletes spent less time displaying prosocial and technical communication with coaches and peers, less general communication with their peers, and more time engaged, signifying an overall lower level of sociability compared to their popular, controversial, and average counterparts.

Table 7. Descriptives for Mean Duration of Behaviour (Seconds) per 60 Minute Practice

<table>
<thead>
<tr>
<th>Behaviour</th>
<th>Popular M (SD)</th>
<th>Rejected M (SD)</th>
<th>Neglected M (SD)</th>
<th>Controversial M (SD)</th>
<th>Average M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prosocial Coach</td>
<td>12.46 (14.02)</td>
<td>6.77 (1.25)</td>
<td>6.60 (4.77)</td>
<td>17.25 (20.39)</td>
<td>11.97 (12.07)</td>
</tr>
<tr>
<td>Prosocial Athlete</td>
<td>36.61 (32.58)</td>
<td>34.88 (27.01)</td>
<td>22.17 (15.12)</td>
<td>23.06 (12.30)</td>
<td>30.81 (32.04)</td>
</tr>
<tr>
<td>Technical Coach</td>
<td>129.17 (123.56)</td>
<td>61.48 (32.84)</td>
<td>65.11 (47.02)</td>
<td>82.83 (36.91)</td>
<td>108.66 (81.79)</td>
</tr>
<tr>
<td>Technical Athlete</td>
<td>144.79 (96.08)</td>
<td>126.72 (84.81)</td>
<td>131.97 (100.69)</td>
<td>162.71 (15.10)</td>
<td>130.28 (74.64)</td>
</tr>
<tr>
<td>General Coach</td>
<td>3.87 (7.99)</td>
<td>-</td>
<td>5.04 (7.74)</td>
<td>0.41 (0.72)</td>
<td>-</td>
</tr>
<tr>
<td>General Athlete</td>
<td>58.40 (60.77)</td>
<td>48.63 (28.41)</td>
<td>48.00 (73.71)</td>
<td>104.97 (155.37)</td>
<td>147.22 (155.37)</td>
</tr>
<tr>
<td>Engaged</td>
<td>3216.80 (308.25)</td>
<td>3390.55 (46.10)</td>
<td>3353.68 (225.38)</td>
<td>3237.09 (212.26)</td>
<td>3164.78 (231.56)</td>
</tr>
</tbody>
</table>

The distribution of the variables representing the mean duration of athletes’ behaviour was severely positively skewed (i.e., multiple skewness values >2, where normal distribution = 0). Therefore, while raw means and standard deviations are provided, the reported comparison t-tests were conducted using square root
transformations of the raw scores. No statistically significant differences were observed between the average and the other sociometric status groups for any of the behaviour categories (Table 8). However, similar to the comparisons of mean number of events, multiple medium to large effect sizes were observed. Large effect sizes ($d = 1.08-1.48$) suggest that the popular athletes engaged in more general communication with coaches and less technical communication with peers in comparison to the average athletes. Rejected and neglected athletes appeared to be less sociable overall, compared to average athletes, given the large observed effect sizes ($d = 0.89-2.04$). Similarly, medium and large effect sizes ($d = 0.58-1.23$) were observed for prosocial and technical communication with coaches, and general communication with athletes, suggesting that rejected and neglected athletes spent less time displaying these behaviours compared to their average peers. Neglected athletes also displayed higher levels of general communication with coaches, as evidenced by a large observed effect size ($d = 1.64$). Finally, large effect sizes suggest that the controversial athletes spent more time than their average teammates engaged in technical communication with peers and general communication with coaches ($d = 1.12-1.5$).
### Table 8. Comparison of Average with Extreme Groups on Mean Duration of Behaviour (Seconds) per 60 Minute Practice

<table>
<thead>
<tr>
<th>Behaviour</th>
<th>Average vs. Popular</th>
<th>Average vs. Rejected</th>
<th>Average vs. Neglected</th>
<th>Average vs. Controversial</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>t (df)</td>
<td>p</td>
<td>d</td>
<td>t (df)</td>
</tr>
<tr>
<td>Prosocial Coach</td>
<td>.08 (13)</td>
<td>.94</td>
<td>.05</td>
<td>.69 (5.4)</td>
</tr>
<tr>
<td>Prosocial Athlete</td>
<td>-.19 (13)</td>
<td>.85</td>
<td>-.11</td>
<td>-2.60 (7)</td>
</tr>
<tr>
<td>Technical Coach</td>
<td>-.09 (13)</td>
<td>.93</td>
<td>-.05</td>
<td>.97 (7)</td>
</tr>
<tr>
<td>Technical Athlete</td>
<td>-.10 (13)</td>
<td>.92</td>
<td>-.06</td>
<td>.14 (7)</td>
</tr>
<tr>
<td>General Coach</td>
<td>-2.05 (8)</td>
<td>.08</td>
<td><strong>-1.48</strong></td>
<td>-</td>
</tr>
<tr>
<td>General Athlete</td>
<td>1.83 (13)</td>
<td>.09</td>
<td><strong>1.04</strong></td>
<td>1.28 (7)</td>
</tr>
<tr>
<td>Engaged</td>
<td>-.32 (13)</td>
<td>.75</td>
<td>-.18</td>
<td>-2.29 (5.69)</td>
</tr>
</tbody>
</table>

*Note. Effect sizes > 0.50 are in boldface.*
Chapter 5

Discussion

The purpose of this study was to examine athlete behaviour during practice sessions and sport competence according to youth’s sociometric status. Specifically, this study aimed to uncover differences between sociometric status groups with respect to: (1) Sport competence and (2) Behavioural characteristics during practice sessions. In order to do so, the sport competence findings and behavioural analyses will be discussed in an integrated fashion where the popular, rejected, neglected, and controversial groups will be separately compared to the average group to illuminate the observed differences between groups and derive unique profiles. Findings which were statistically significant and/or had medium to large effect sizes will be reviewed. While no causation can be inferred from the study’s design, sociometric status provides an interesting framework within which to discuss the present findings.

Popular Athletes

The popular athletes received the highest peer and coach ratings of sport competence compared to the other sociometric status groups. These athletes received peer ratings that were significantly higher than average athletes and coach ratings that were nearly significantly higher than average athletes. The question stem of the questionnaire used to assess sociometric status asked athletes to base their nominations on who they most enjoyed participating in sport with. The questionnaire also specified
that these nominations should be made based on experiences within that sport team exclusively, omitting any external social interactions outside of the team context. It therefore appears that the athletes most enjoyed participating with the most competent teammates. It is not surprising that the popular group in the present study received the highest peer ratings of sport competence. These findings are in line with previous research that suggests that athletic ability is an important determinant of social status in groups of children and adolescents (e.g., Causgrove Dunn et al., 2007; LaFontana & Cillessen, 2002; Vannatta et al., 2009; Weiss & Duncan, 1992).

In terms of behavioural trends, the popular group appeared to spend less time discussing general, non-sport related topics with their peers, and more time displaying this category of behaviour with their coach, compared to the average group. If we also consider the popular group’s elevated sport competence, it could be suggested that they spent less time engaged in non-sport related communication with their peers because they are so highly invested in their sport. These highly competent, popular individuals may have spent extra time on skill development that could have otherwise been spent chatting with their peers. Similarly, the work of Solomon and colleagues (1988) on coaches using expectancy theory may help to explain the increased amount of time popular athletes spent communicating with their coaches during practice. Research on coaches of adolescent athletes has suggested that coaches provide more feedback and attention to athletes they perceive to be more skilled (Solomon, DiMarco, Ohlson, & Reece, 1998; Solomon, Golden, Ciapponi, & Martin, 1998). Therefore, as coaches in the present study perceived popular athletes to be the most competent, they may have been more inclined
to spend more time communicating with these athletes.

However, it may also be true that sociometric popularity has little to do with athletes’ behaviour during practice, and may instead be a product of a combination of other factors such as sport competence. Indeed, it has been recognized that not all correlates of sociometric status are behavioural in nature (Rubin et al., 2005). A large scale study of male and female children and adolescents revealed that sport competence, physical appearance, and academic competence all appeared to be significant predictors of peer acceptance (Vannatta et al., 2009). In the case of popular athletes in the present study, these athletes may have been well-liked by their peers not necessarily because of their social behaviour, but perhaps due to their sport competence or other individual factors. Given the previously established links between peer acceptance, sport competence, and other factors such as peer leadership and friendship quality (e.g., Moran & Weiss, 2006), future research should examine whether relationships between these factors and specific behavioural characteristics emerge that may help to explain these findings.

**Rejected and Neglected Athletes**

In the developmental psychology literature, the rejected and neglected sociometric status groups are considered conceptually distinct, characterized by different behavioural and developmental outcomes. Rejected individuals are actively disliked by their peers, and most often display elevated levels of aggressive behaviour (Newcomb et al., 1993). Developmental psychologists are particularly concerned with rejected youth due to the problematic conditions associated with this status, such as greater social withdrawal,
which is manifested by an increased prevalence of depression and anxiety (Coie et al., 1990). Neglected individuals, on the other hand, appear to display a slightly different set of behavioural traits. A review of past literature suggests that neglected individuals are less aggressive and display fewer positive social actions compared to their average peers (Newcomb et al., 1993). The one apparent commonality that exists between rejected and neglected groups in the literature is that they both display lower levels of social interactions with their peers (Newcomb et al., 1993). In the present study, the two groups appeared to be separate with respect to sport competence ratings, but were strikingly similar in their behavioural characteristics. Thus, their differences in sport competence will be discussed separately, at which point their behavioural traits will be considered together.

The rejected athletes received significantly lower peer-ratings of sport competence compared to average athletes. This finding is in line with previous research, and further supports the notion that sport competence or athletic ability is a major factor associated with youth’s social status in a group (e.g., Causgrove Dunn et al., 2007; LaFontana & Cillessen, 2002; Vannatta et al., 2009; Weiss & Duncan, 1992). The neglected group, on the other hand, displayed the highest self-perceptions of sport competence, and the difference between neglected and average athletes was approaching significance. There was also a sizeable disconnect between the participants’ self-ratings of sport competence and the ratings of their peers and coaches, particularly for the neglected athletes. This suggests that the neglected athletes appeared to display potentially over-inflated self-perceptions of sport competence. Over-confidence in one’s
abilities, coupled with poor social competence (Newcomb et al., 1993) may have in turn caused other athletes to ignore or neglect this sociometric status group.

Overall, the rejected and neglected groups appeared to be less sociable than the average group, a finding consistent with past research in school settings (e.g., Newcomb et al., 1993). These two groups also shared similar characteristics with respect to the specific behaviours that they displayed. Both groups spent less time displaying general, non-sport related interactions with peers compared to average. In schools, it has been shown that lower status individuals tend to belong to smaller cliques compared to higher status individuals who tend to belong to larger cliques (Benenson, Apostoleris, & Parnass, 1998). It is therefore possible that the rejected and neglected groups displayed lower relative levels of sociability and peer interaction because they were only comfortable interacting with a small subset of their peers. This potential reduction in the size of one’s social group may have also account for the limited range of behaviours exhibited by neglected athletes. Lower variability in peer interactions in adolescent males outside of sport has previously been associated with antisocial behaviour and negative developmental outcomes (Dishion et al., 2004). Future research should continue to examine the importance of behavioural variability within the sport context.

Behavioural similarities were also observed between rejected and neglected athletes in relation to their interactions with coaches. Both groups appeared to engage in fewer instances of prosocial and technical communication with coaches. Since the majority of these interactions tended to be initiated by the coach, it can be interpreted that these athletes may have been potentially ignored by their coaches. This is not surprising,
since teachers sometimes also reject students who have been labeled rejected by their peers (Lopes, Cruz, & Rutherford, 2002). While it is unknown whether these links also exists within a youth sport context, it clearly warrants future consideration. It would be beneficial to inform coaches of potential indices of peer rejection so that they have the opportunity to recognize this social phenomenon and modify the environment accordingly, hopefully curtailing any potential downstream problems.

Expectancy theory may also help to explain the finding that coaches appeared to provide less prosocial and technical feedback to athletes of lower sociometric status, who they also perceived as less competent than average athletes. Past research demonstrates that the expectancy that a coach has for a certain athlete will affect how that coach treats that particular athlete (Rejeski, Darracott, & Hutslar, 1979). Observational studies of intercollegiate and high school basketball players and coaches revealed that high expectancy (i.e., highly skilled) athletes received more technical instruction and praise than low expectancy (i.e., less skilled) athletes (Solomon, DiMarco et al., 1998; Solomon, Golden et al., 1998). Further support for this expectancy effect was provided by Solomon and Rhea (2008), who found that sport competence, or athletic ability, was one of the most important sources of information that coaches used to derive their perceptions of athletes.

This self-fulfilling prophecy can be problematic in youth sport contexts when one of the primary coaching goals to foster skill development in all athletes (Côté, Young, North, & Duffy, 2007). By affording athletes of higher levels of social status or sport competence increased technical feedback and encouragement, coaches may be
amplifying the disparity between athletes of low and high social status and/or athletic ability, inhibiting the skill development of a large portion of young athletes. This imbalance of prosocial and technical communication with coaches also appears to be contrary to the proposition that effective performance coaches should assess athletes and provide feedback and instruction to challenge them to improve (Côté et al., 2007). Based on this notion, it would be expected that coaches would provide more technical and prosocial feedback to lesser skilled athletes to motivate them to develop their sport skills. Similarly, effective coaches are expected to possess intrapersonal knowledge which includes constant introspection (Côté & Gilbert, 2009). In this case, coaches should become aware of their neglect of certain subsets of athletes and then tailor their subsequent behaviours accordingly to allow for optimal opportunities for athlete development.

**Controversial Athletes**

The controversial athletes received lower coach-ratings of sport competence compared to average athletes, whereas no sizeable differences emerged for either self or peer-ratings. In fact, coaches rated the controversial athletes as the least competent of the five sociometric status groups. It has been suggested that of the five sociometric status groups, controversial appears to be the least homogenous and stable (Newcomb et al., 1993). Controversial individuals sometimes display certain negative traits that should otherwise lead to peer rejection, if not paired with more positive traits that act as a buffer (Putallaz & Wasserman, 1990). In other words, controversial individuals tend to share similarities with both their popular and rejected peers. This was true for sport
competence; the controversial participants’ self-perceptions were similar to that of their popular peers, but the peer and coach perceptions were closer to their neglected and rejected peers.

Compared to average athletes, the controversial athletes appeared to spend more time engaged in non-sport related communication with coaches, and also appeared to spend more time discussing technical, sport-related topics with peers. The lack of general communication with coaches is a trend that is shared with the popular athletes; however, the controversial group appeared to bear no striking behavioural similarities to their rejected peers. Thus, based on athletes’ behaviour, the present sample partially supports the traditional conceptualization of controversial individuals who share similarities with both popular and rejected peers (Newcomb et al., 1993). However, this conceptualization is not universal; certain researchers also posit that controversial individuals are sometimes most similar to popular peers (Franzoi, Davis, & Vasquez-Suson, 1994).

The fact that controversial athletes appeared to engage in high levels of technical communication with their peers is a behavioural trait that appears to be unique to this sociometric status group. This finding may be a polarizing trait, where certain peers appreciated the elevated technical communication provided by controversial athletes, while others were opposed to it, leading to moderately high levels of both positive and negative sociometric nominations. This may be explained in light of the overall similarities between the popular and controversial groups. In female adolescent athletes, peer acceptance and self-perceived sport competence appeared to be predictive of peer
leadership (Moran & Weiss, 2006). In the present study, controversial athletes may have perceived themselves as leaders on their respective teams, thereby motivating them to provide higher levels of technical instruction and feedback to their teammates. To this effect, future qualitative research would be beneficial to further probe athletes regarding their behaviour in sport to attempt to create direct links between athletes’ internal perceptions and observed behaviour.

Chapter 6

Conclusions

Based on the findings of the present study, it appears that sociometric status is a useful metric with which to study peer relations in youth sport. This study has upheld the widely suggested notion of sport competence as an important determinant of social status, and has done so within a team sport context. Further, a novel approach was undertaken to assess athletes’ behaviours during practice through systematic observation. While statistically underpowered, there appeared to be substantial differences between sociometric status groups in the behaviours displayed during practice sessions when considering effect sizes. Athletes of lower sociometric status (i.e., rejected and neglected) appeared to be less sociable overall, and also interacted less with peers, received less technical and prosocial feedback from coaches, but engaged in more general communication with coaches. The implications of these results should be expressed and considered in light of the limitations of the study.
Limitations and Future Directions

Given that the present study was one of the first of its kind to measure sociometric status and athlete behaviour through observation, it is not without limitations. An often cited drawback of observational research is that it is a very time-intensive to collect and analyze the data (Ralph et al., 1997; Rubin et al., 2006). In line with this notion, one of the primary limitations of this study was its small sample size, which resulted in underpowered statistical analyses. However, numerous comparisons were approaching statistical significance, and many large effect sizes were observed. The trends observed are encouraging and warrant future examination in a study of a larger scale. While the use of systematic observation in this study necessitated a small sample size, the direct observation of behaviours can also be considered a key benefit. Even in developmental psychology where a multitude of studies have examined sociometric status in youth, relatively few have assessed behaviours through direct observation (Newcomb et al., 1993). Behavioural indicators are most often measured through traditional questionnaires or peer or teacher ratings (Rubin et al., 2006). Unless a researcher is specifically interested in an individual’s perceptions of behaviour, it seems perplexing to measure observable behaviour through such means when researchers can observe these behaviours directly. Indeed, the observation of social behaviour is regarded as the standard upon which other forms of behavioural assessment should be compared (Rubin et al., 2005).

The scope of this project was further limited by the lack of suitable existing coding systems with which to analyze athletes’ behaviours; the development of the ABCS was a significant time-consuming component of this study. As with all coding
system, the ABCS is not without its own limitations, and therefore future observational research on athlete behaviours should continue to utilize and refine this instrument, allowing for future studies to proceed more efficiently. Further, it is practical to employ similar coding systems across multiple studies to allow for continued comparisons and generalizations to be made across a more varied sample of athletes.

The present study was designed to be cross-sectional in nature in order to control for changes in competence and sociometric status over time. This study intended to provide a social snapshot of the three teams at one point in time. This was achieved through the collection of data during two practice sessions less than a month apart. However, while the cross-sectional design was appropriate for an initial exploratory study in this area, future research should longitudinally examine the consistency of sociometric status, sport competence, and behaviour over the course of a season. Specifically, it would be interesting to track sociometric status and athlete behaviour from a team’s first meeting at the beginning of the season and then continue as the season progressed. This type of design would allow for not only the examination of the stability of these variables over time, but would also allow researchers to observe the behavioural antecedents of sociometric status. By collecting data beginning from the team’s first meeting, it would be possible to study how an athlete’s initial behavioural predispositions are interpreted by their peers during group entry, and how the peer group in turn affects that athlete’s subsequent behaviour. Similar research has been conducted outside of sport, where interactions between groups of unfamiliar peers were observed over multiple days (Coie & Kupersmidt, 1983; Dodge, 1983). In those studies it was determined that aggression

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was the most salient predictor in determining whether an individual became popular or rejected within that peer group.

The specific and homogenous nature of the sample also limits the generalizability of the findings of this study. The participants were all female volleyball players from the same geographic region and were all members of the same competitive club. Conversely, this homogeneity can also be considered a strength of this study in that it helps to limit the number of confounding variables that may influence the results. Continued research on peers in sport should attempt to study different sports (e.g., interdependent and individual), ages, genders, and levels of competition. Together, as more varied samples are researched, the collective findings will better serve researchers to make confident claims regarding peer relations in youth sport.

While past research has employed a similar observational methodology in the study of coach-athlete interactions (Erickson et al., 2011), the present study used a slightly different design to attempt to gain a clarified understanding of athletes’ behaviour during practice. The use of a wide-angle camera and parabolic microphone provided a clearer picture of the athletes’ behaviour throughout practice, but limitations still persist. Camera equipment was placed in an unused corner of the gym or mezzanine area to attempt to minimize any distractions. However, the fixed location of the camera equipment often limited the detail of athletes’ behaviour that could be captured on video. For example, the parabolic microphone recorded athletes’ verbalizations much more clearly when athletes were facing the general direction of the microphone. Not surprisingly, the athletes were constantly moving during practice, and thus, their
orientation was often less than ideal for recording their behaviour. Similarly, athletes were sometimes out of view of the camera, or were chatting with their back to the camera, which made it difficult to code the content of their interactions. However, these situations arose only sparsely, and explicit decision rules were stated in the coding manual (Appendix A) so that coders dealt with these circumstances appropriately and consistently. These issues may have played a role in the lack of observation of certain behaviour categories in the coding system. For example, given the ages and gender studied, it was anticipated that relational aggression (coded as antisocial communication) would have been more prevalent in the observed practice sessions (Pepler & Craig, 1995). It is expected that in future observational research on peers in sport, researchers will continue to refine data collection and coding techniques, allowing for an even richer and more detailed account of athletes’ behaviour.

Finally, the present study is limited in that it observed athletes in only one of many sport contexts where social interactions take place. Even though athletes often spend most of their total time as a team practicing, it is undoubted that other contexts such as competitions and team social events also play crucial role in athletes’ derivation of their perceptions of peers. Subsequent studies should attempt to elucidate the differential nature and roles of varying sport contexts to peer relations.

This study has effectively approached the study of peer relations in youth sport from a novel perspective. A sociometric nomination methodology was adopted from developmental psychology and was used to compare multiple ratings of sport competence and indices of athletes’ behaviour during practice. This innovative perspective should
encourage researchers to move beyond solely assessing peer relations through self-perceptions via interviews or questionnaires. This study has provided some initial basis for understanding the connection between sociometric status and athletes’ behaviour in sport. Expanding upon this work, future research could aim to develop intervention programs to improve peer relations, or inform coach education programs to better structure sport environments and increase awareness of the importance of peer relations to youth’s overall positive development. It is hoped that through the continued use of varied methodologies, commonalities will eventually emerge that will allow for a greater depth of comprehension of the nature and role of social relations among peers in youth sport. Ultimately, observational and self-report based research should converge to provide a more detailed, informed, and complete understanding of the complex phenomenon that is peer relations in sport.
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Appendix A
Coding Manual
ATHLETE BEHAVIOUR CODING SYSTEM (ABCS)
CODING MANUAL

Overview

The Athlete Behaviour Coding System (ABCS) is an observational coding system designed to continuously code athlete behaviour exclusively in a youth sport context. The ABCS is the result of the adaptation of numerous existing instruments from multiple areas of research including coach-athlete interactions (Erickson et al., 2011), athlete communication and performance (e.g., LeCouteur & Feo, 2011), and developmental psychology (e.g., Rusby, Estes, & Dishion, 1991).

The ABCS has been developed to apply to all youth team sports, but portions of this coding manual contains features that may be specific to volleyball (e.g., practice context or examples of behaviour). This coding manual has been designed for observation of athlete behaviour during practices, not competitions.

Dimensions

1 – **SUBJECT** refers to which athlete is being coded at given point in time. Each member of a team will be a unique indentifying code.

2 - **CONTENT** refers to the type of behaviours that athletes exhibit. These categories refer to interactive and non-interactive behaviours, and can be verbal, non-verbal, or physical.

2a - **MODIFIER - TARGET** refers to the teammates being interacted with in each instance. For each content code, coders specify who (if anyone) the athlete is interacting with (i.e., team, subset of athletes, or self).

2b - **MODIFIER – DIRECTIONALITY** applies to all active communicative codes and describes whether an athlete actively initiated an interaction, and also differentiates between one-way and two-way (i.e., mutual) interactions.

2c - **MODIFIER – DIRECTIVE TYPE** applies only to directive communication (content code 13) and differentiates between general (non-sport related) and sport-related communication.

3 - **PRACTICE CONTEXT** refers to the specific practice setting in which interactions occur. This dimension is designed to differentiate between the major segments of practice (e.g., warm-up and scrimmage).
Coding Procedure

The ABCS has been designed to apply to any youth team sport practice setting, but for the present project will be limited to adolescent female competitive volleyball practices. The ABCS is used in conjunction with Observer XT software, which is a computer program that has been designed to code video data using the ABCS. Codes are entered in real-time while viewing the video using the keyboard and numerical pad. For each coded entry, coders specify the subject, content, and any applicable modifiers (e.g., athlete A [subject], prosocial [content], athlete B [target], initiator [directionality]).

Coding sessions will involve coding the continuous behaviour of all members of a team during a 20 minute video clip. It is recommended that coders focus on coding a particular athlete’s behaviour for the duration of the entire segment, and then repeat this process for each subsequent athlete. The amount of time required to code each 20 minute segment in its entirety is high variable, and depends on the size of the team, experience of the coder, and content of the particular segment.

Rules

3 SECOND RULE
This rule applies to the 3 second wait before coding ‘engaged’ or ‘uncodable’ following an active communicative code. The two situations in which it is used are as follows:

- Wait three (3) seconds before coding engaged (content) when changing from any actively communicative code. Code for this behaviour only if it continues past the three (3) second waiting period, at which point you would rewind the video three seconds and begin coding it at its true initiation point. However, if within three (3) seconds another actively communicative behaviour occurs, do not wait to code that behaviour.

- Wait three (3) seconds before coding ‘uncodable’ (content) when changing from any other code. Code for this behaviour only if it continues past the three (3) second waiting period, at which point you would rewind the video three seconds and begin coding it at its true initiation point. However, if within three (3) seconds a different behaviour visibly or audibly occurs, do not wait to code that behaviour.
DEFAULT CODES
For athlete content, target, directionality, and affect dimensions, specific behaviour codes are to be coded by default if criteria for any other relevant category within the dimension are not met. In other words, use the default codes in the absence of any other codable behaviour:

- Content – ‘general communication if interacting with coach and/or other athletes; ‘engaged’ if not interacting with coach or other athletes.
- Target – ‘team’
- Directionality – ‘mutual’
- Affect – ‘neutral’

- Note: no default categories exist for subject or context dimensions as these must be directly observed

DIMENSION – SUBJECT
Since there are multiple participants in all videos (i.e., individual athletes and coaches), the coder must specify which athlete’s behaviour is being coded at each point in time. Once assigned a subject ID, athletes must be coded using this same ID for all videos. This will be determined for all athletes on all teams prior to the beginning of coding, and will be referenced by name and physical appearance (e.g., hair colour, clothing, etc.) for each video.

These subject codes are also used when specifying the target modifier, which is used to qualify who an individual athlete directs their behaviour toward. When an athlete is interacting with the entire team, ‘team’ is coded, but when an athlete is interacting with a subset of teammates (e.g., a group of three) each involved subject’s code should be specified (e.g., athlete A with B and C).

a – Athlete A
b – Athlete B
c – Athlete C
d – Athlete D
e – Athlete E
f – Athlete F
g – Athlete G
h – Athlete H
i – Athlete I
j – Athlete J
k – Athlete K
l – Athlete L
t – Team
u – Uncodable
y – Assistant Coach
z - Coach
11 - Prosocial Communication
Explicit behaviours, including helpful or supportive actions reflecting affection, concern, empathy, cooperation, and leadership.

Notes
- Also includes non-verbal physical behaviours (e.g., high fives)
- E.g., compliments, encouragement, positive reinforcement, helping an injured teammate off the floor
- Group huddles require additional physical (e.g., high five, pat on back) or verbal cues to be coded as prosocial communication
- Includes apologies (e.g., “sorry!”, “my fault!”), regardless of the context (sport vs. general)
- **Applicable modifiers** – target, direction

Examples
- Team huddles up and high fives in between plays during a scrimmage
  - CODE: athlete a – prosocial – team – mutual
- The coach yells: “nice block athlete a!”
  - CODE: athlete a – prosocial – coach – receiver
- Athlete a walks up to b with her arm clearly outstretched for a high five
  - CODE: athlete a – prosocial – athlete b – initiator; athlete b – prosocial – athlete a – receiver

Non-Examples
- Team huddles up in between plays during a scrimmage, but there are no high fives or physical cues, and the specific nature of their conversation cannot be discerned
  - CODE: athlete a – tech/tact – athlete b, c, d, etc. - mutual
12 - Technical/Tactical Communication
Discussing task, technique or strategy with coach and/or teammates. Can occur both during and in between drills/play.

Notes
- Modeling is often best cue to distinguish tech/tact from general communication when can’t hear content of interaction
- Can be non-verbal if obvious (e.g., giving teammates signals for the upcoming play)
- **Default code for communication during drills/play or in between plays**
- If audible and obvious, code calling for ball or signals to teammates during play as technical/tactical communication with team (e.g., yelling numbers when hitting ball)
  - If unclear, ignore and code as engaged
  - High threshold – must be very clear/obvious to code short communications during play
- If coach is providing **individualized** technical/tactical instruction, code athlete as well. However, if coach’s instruction is directed to **entire team**, code athlete as **engaged**.
- Includes organizational behaviour directly related to the sport, e.g., setting up a drill
- **Applicable modifiers – target, direction**
- **Brief communication during drills (e.g., calling for the ball, etc.)**
  - **Toward team if**: it is in a controlled context where all athletes are observing and learning from the athletes actively involved in the drill (e.g., group of athletes practicing and rest of team watching and/or shagging balls)
  - **Toward individual athletes if**: it is in a competitive context (e.g., team scrimmage) where opposing teams are competing against each other

Examples
- Athlete a and b are talking to each other during a drill
  - CODE: athlete a – tech/tact – athlete b - mutual

Non-Examples
- Athlete a and b are talking to each other while sitting on the bench during a team scrimmage
  - CODE: athlete a – general – athlete b - mutual
13 – Directive Communication

Commands for a behaviour change that could occur within the observation, or when command is to not repeat a previously performed behaviour. There must be additional detail signifying directive behaviour aside from pointing or gesturing alone (e.g., verbal cues, behaviour change, etc.)

Notes
- e.g., “Cover me”, “get to your position”, etc.
- Applies only to directive communication between athletes or initiated by athletes towards coach
- \textit{Applicable modifiers} – target, direction, directive type

Examples
- Athlete a signals to b to move to another area on the court, and b complies and move to that spot
  - CODE: \textit{athlete a} – directive – \textit{athlete b} – initiator; \textit{athlete b} – directive – \textit{athlete a} – receiver

Non-examples
- Coach tells athlete a to assist athlete b blocking in a certain scenario
  - CODE: \textit{athlete b} – tech/tact – coach – receiver
- Athlete a and b are discussing the previous play, during which athlete a motions to an area of the court, but they continue their discussion, the details of which cannot be discerned
  - CODE: \textit{athlete a} – tech/tact – \textit{athlete b} – mutual (or initiator/receiver)

15 - General Communication

Communication with other athletes or coach unrelated to sport activities. Also used when content of communication between persons is unclear or unknown.

Notes
- E.g., talking about school, etc.
- Default actively communicative code if coder cannot hear content of interaction between athletes or coach.
- Includes organizational behaviours not directly related to practice (e.g., putting garbage away, etc.)
- \textit{Applicable modifiers} – target, direction

Examples
- Athlete a and b are chatting about school during a water break
  - CODE: \textit{athlete a} – general – \textit{athlete b} – mutual (or initiator/receiver)
- Athlete a and b are talking while sitting on the sidelines during a scrimmage,
details of conversation cannot be discerned
  o  CODE: athlete a – general – athlete b – mutual (or initiator/receiver)

Non-Examples

- Athlete a and b are talking in between plays during a scrimmage, details of conversation cannot be discerned
  o  CODE: athlete a – tech/tact – athlete b – mutual (or initiator/receiver)

16 - Engaged

Engaged in practice activities and not directly communicating with peers or coach.

Notes

- E.g., participating in drills, resting during assigned rest or break times, moving to new location on direction from coach, etc.
- Default code for anytime athlete not actively interacting with coach or other athletes unless actively disrupting practice, ignoring coach instructions, etc. (e.g., code athlete as ‘engaged’ when coach talking to group, even if athlete may appear to not be looking at coach, unless actively not listening/being disruptive).
- Assumed to be engaged when out of view of camera for short amount of time but still involved in play (e.g., in corner out of view of camera during drill)
- 3-second rule in effect before coding for ‘engaged’ from an actively communicative code

Applicable modifiers – target

- **Team** – default target for engaged. Applies in situations where team is participating in a drill/activity all together, or when all players are practicing independently.
  o  Applies in situations (e.g., controlled drills) where players are broken up into smaller sub-groups (e.g., players active in drill and players shagging balls) but ALL are paying attention to the same thing (e.g., the coach’s instruction, or the content of the drill)
- **Group** – code all athletes interacting in smaller sub-groups (e.g., drill when players are in groups of 4)
  o  Differentiated from ‘team’ because used when sub-groups are existing/functioning independently from one another (i.e., engaged in their own activity – not paying attention to coach or other groups)
- **Self** – used in situations where an individual athlete in engaged in solitary behaviour away from rest of them
  o  Must be obvious exclusionary/withdrawn behaviour (e.g., athlete having water break away from teammates, or athlete practicing alone
while rest of team is in groups)
  o Code as ‘team’ if ALL athletes are engaged in solitary practice (e.g., practicing skills independently)

Examples

- Entire team participating in a drill together, rotating through various positions
  o CODE: athlete a – engaged – team
- Athletes are participating in drill in independent groups of three (i.e., each group working on their own)
  o CODE: athlete a – engaged – athlete b, c, etc.
- The team is scrimmaging 6 on 6 against each other (or another team)
  o CODE: athlete a – engaged – athlete b, c, etc. (with other athletes on own side)
- Athlete is sitting off to the side away from team during a drill or scrimmage
  o CODE: athlete a – engaged – self
- Athletes are sitting down/drinking water during break period
  o CODE: athlete a – engaged – team
- Athlete is sitting far away from their teammates during break period
  o CODE: athlete a – engaged – self
- Athlete is playing with cell phone by him/herself during break period
  o CODE: athlete a – engaged - self

17 - Non-cooperative/Disruptive
Not engaged in practice activities and not directly communicating with peers or coach. Behavior that is non-compliant of coach or athlete’s directions and is disruptive to group activity. Shows disregard for rules and norms of the group.

Notes

- E.g., actively disrupting practice, ignoring coach instruction, etc.
- Requires athlete to be in opposition to current practice activity (e.g., code athlete resting during assigned rest period as ‘engaged’, code athlete sitting on deck after being told get in the pool by coach as ‘disruptive’).
- Must be very obvious.
- Applicable modifiers – target

Examples

- Athlete a is sitting down using cell phone while rest of team is on court preparing for the next drill
  o CODE: athlete a – noncoop
18 - Antisocial Communication
Blame, criticism, complaint, disapproval or negative emotion toward a person. May be physical (aggressive contact with others), verbal (vulgar language, threats), or non-verbal (body language) in nature.

Notes
- E.g., name calling, making threats toward others, pushing a teammate or opponent
- Applicable modifiers – target, direction

Examples
- Athlete a makes a rude comment about athlete b’s performance in the previous drill
  - CODE: athlete a – antisoc – athlete b – initiator

19 – Uncodable
Instances when an athlete is out of view for an extended period of time, and no assumption can be made about the athlete’s behaviour

Notes
- If athlete is out of view of camera, but their behaviour can be reliably inferred (e.g., at end of court during service drill), code as ‘engaged’, NOT ‘uncodable’
- E.g., an athlete leaves practice early (‘uncodable’ for remainder of practice)
- 3-second rule in effect before coding ‘uncodable’ following an active communicative code

Example
- Athlete a leaves the gym area for five minutes
  - CODE: athlete a – uncodable

Non-Example
- Athlete a is out of view of the camera periodically during a drill
  - CODE: athlete a – engaged – team (or with individual athletes)
MODIFIER – TARGET

- Individual athletes (a, b, c, etc.)
- Code multiple recipients when interacting with a group (a interacting with b, c, and d)
- **Team** – default code when coder can’t determine which teammates an athlete’s engaged with, or who an actively communicative code is directed toward
- **Groups** – code each individual member of a group (e.g., warm-ups in groups of 2), must be a distinct group activity that lasts a minimum of 30 seconds
- **Self** – when an athlete is practicing on his/her own while rest of team is in groups (must be obvious and for extended period of time, min. 30 seconds)

MODIFIER – DIRECTIONALITY

- Applies to all active communicative codes (i.e., prosocial, tech/tact, directive, general, and antisocial)
- **Initiator** refers to the individual that begins/initiates a given interaction (e.g., speaking)
  - *Initiates the behaviour/communication directed toward the target*
- **Receiver** refers to the individual(s) that are in receipt of the communication of the initiator (e.g., listening)
  - *Receives the behaviour communication from the target*
- **Mutual** refers to instances where all parties involved in a given interaction take turns as initiator and receiver (all parties both initiate and receive)
- In one-way interactions, there will always be an initiator and receiver(s)
  - E.g., a coach (the initiator) provides individualized technical feedback to an athlete (receiver) who does not respond to the coach.
- In two-way interactions, there will be an initiator and receiver(s) to begin, but as soon as the roles change, all involved individuals are coded as mutual for the remainder of the interaction
  - E.g., athlete A (initiator) tells a story about school to athlete B (receiver), at which point athlete B responds to athlete A’s story (both mutual)
- If you code an initiator or receiver, make sure to always check that you have also coded the appropriate reciprocal code (e.g., A → B receiver; B → A initiator)
  - This is a good informal check of your work after coding a video segment.
  - UNLESS it is an athlete receiving communication from coach (don’t code coach behaviour)
- It should be clear who the initiator/receiver of a given communication is when viewing the video in real time (i.e., without reviewing the clip in slow motion). If
it is unclear or you are unsure who initiated a communication, code all involved athletes as **mutual** (e.g., a brief high-five during a drill)

**MODIFIER – DIRECTIVE TYPE**

- Applies to 13 - directive communication
- **Sport** refers to directive communication related to the sport being practiced (e.g., “you’re supposed to be in the other corner”)
- **General** refers to directive communication unrelated to sport (e.g., “get out of here, we don’t want you listening”)

**DIMENSION – CONTEXT**

- warm-up or cool-down
- structured drills/exercises
- instruction (if team is stationary/listening to coach)
- scrimmage
- free play
- break – e.g., water breaks
Athlete Behaviour Coding

System - Summary

SUBJECT/TARGET
a, b, c... – Athlete A, B, C... (subject and target)
z – Coach (target only)
t – Team (target only)

ATHLETE CONTENT

11 – Prosocial Communication
• Verbal (e.g., “good job!”, “sorry, my fault”)
• Non-verbal (e.g., high fives, etc.)
• MODS – target, directionality

12 – Technical/Tactical Communication
• Sport-related communication
• E.g., calling for ball, moulding technique for teammate
• MODS – target, directionality

13 – Directive Communication
• E.g., “move over and get into position”
• MODS – target, directionality, direct type

15 – General Communication
• E.g., talking about school, etc.
• Default active communicative code if cannot hear or infer the content of interaction
• MODS – target, directionality

16 – Engaged
• Participating in expected practice activities
• Default code for anytime athlete not interacting with coach and/or peers
• MOD – target

17 – Non-cooperative/Disruptive
• In opposition to current practice activity, but not directly interacting with others
• E.g., ignoring instructions, etc.
• MOD – target

18 – Antisocial Communication
• Verbal (e.g., name calling, threats, etc.)
• Non-verbal (e.g., aggressive contact, body language, etc.)
• MODS – target, directionality

19 – Uncodable
• Athlete’s out of view for extended period of time, athlete’s behaviour cannot be inferred

DIRECTIONALITY

1i – Initiator
• Begins/initiates an interaction

1r – Receiver
• In receipt of initial interaction (e.g., listening)

1m – Mutual
• Two-way interaction where both parties act as initiator and receiver
• Default code for interactions when initiator/receiver are unclear

DIRECTIVE TYPE

2s – Sport-related
• E.g., “get to your position”, etc.

2g - General
• E.g., “go get my phone”, etc.

PRACTICE CONTEXT

c1 – Warm-up/cool-down
c2 – Structured drills
c3 – Coach instruction
c4 – Scrimmage
c5 – Free play
c6 – Breaks
ATHLETE BEHAVIOUR CODING SYSTEM – DECISION TREE

START HERE

Can you see/infer athlete’s location/behaviour?

No → 19 - UNCODABLE

Yes

Can you infer the content/details of the interaction?

No → 15 – GENERAL COMMUNICATION

Yes

Is the athlete actively interacting with coach and/or teammate(s)?

No

Is the interaction sport-related?

No → 16 - ENGAGED

Yes → 17 – NON-COOPERATIVE DISRUPTIVE

Yes

Is the athlete following directions, doing what’s expected of him/her?

No

Can see/infer athlete’s location/behaviour?

Yes

11 – PROSOCIAL COMMUNICATION

12 – TECH/TACT COMMUNICATION

13 – DIRECTIVE COMMUNICATION

18 – ANTISOCIAL COMMUNICATION
Appendix B
Letters of Information and Consent Forms
PARTICIPANT PARENTAL LETTER OF INFORMATION AND CONSENT FORM

Title of the study: Examining Youth Development in Sport

We would like to ask for your son or your daughter’s assistance with a study that is being carried out by a team of researchers from Queen’s University. The purpose of this study is to examine how youth develop personally through sport. The findings from this project will provide important information to coaches and educators in regard to developing positive personal development in a sport setting and beyond as contributing members of society. This study has been granted clearance according to the recommended principles of Canadian ethics guidelines, and Queen's policies.

If your son or your daughter volunteers to participate in this study, he/she may be asked to participate in two parts of the study. In Part I, 900 participants will be asked to complete a questionnaire. The questionnaire asks questions about your son or daughter’s sport environment and their sport experiences. The questionnaire should take about 45 minutes to complete. Some of the questions will ask your son or daughter about negative peer influences (e.g., bullying, drinking, drugs), family finances, and/or other forms of discrimination that they may or may not have experienced in sport. They have the right to not answer any questions that they are uncomfortable with and they are invited to contact Telehealth Ontario at 1-866-797-0000 if any of these questions trigger emotional upset.

Part II of the study will involve twelve teams being observed over the course of a three/four month period. Multiple sessions within the sport setting will be videotaped. Coaches and athletes will wear a microphone to record any talking that takes place within the sport environment. The videotaped practices will then be watched by the principal investigator to understand the different coach-athlete interactions and peer interactions (i.e., patterns and sequences of interactions) that occur within sport. Some athletes from these twelve teams may be asked to provide their opinions of their coach’s actions while watching a short video segment of a session. These opinions will be kept completely anonymous and will not be shown to the coach.

There will be no deception used in this study. Participation is completely voluntary and your child will be informed that he/she can withdraw at any time.

This is part of a research project for which Jean Côté is the primary researcher. The results from this study will be published and presented at conferences; however, the identity of your son or daughter will be kept confidential. All the information provided through the questionnaires and observations will be confidential and will be stored by in a locked office at Queen’s University for a minimum of seven years after the completion of the study. As a reminder, participation is completely voluntary and should you (or your son or daughter) wish, he/she may withdraw from
all or part of the study at any time, for any reason, without explanation or consequences by contacting the principal researcher, Dr. Jean Côté. Any information collected up to the time your son or daughter withdraws from the study will be destroyed.

With your permission and your son’s/daughter’s permission, the questionnaires and observations will be used to help improve young athlete development. If you and your son or daughter decides that he/she would like to be a part of this study, please complete the attached form. Also, please ask your son or daughter to read their letter and indicate his/her consent as well. Any questions about study participation may be directed to Dr. Jean Côté at 613-533-6000 x79049. Any ethical concerns about the study may be directed to the Chair of the General Research Ethics Board at chair.GREB@queensu.ca or 613-533-6081.

PARENTS/GUARDIANS PLEASE READ and SIGN YOUR CONSENT

I have read and understood the purpose of this study and my son’s/daughter’s involvement in this study. I am aware that my son/daughter will remain anonymous throughout the study and in any written results of the data collection through participation in this project.

I understand that my son/daughter’s participation in this research project is completely voluntary and that he/she has the right to not answer any question(s) that he/she feels comfortable with. I also recognize that my son/daughter has the right to withdraw from the study at any time without penalty and that any data collected to this point will be destroyed.

Finally, any questions I have about this research project and my son/daughter’s participation have been answered to my satisfaction. I understand that I am invited to contact the primary researcher and/or the General Ethics Review Board should I have any further questions or concerns about this research project and my son/daughter’s participation.

I, ____________________________ give permission to allow ____________________

to participate in the study conducted by the School of Kinesiology and Health Studies at Queen’s University.

Signature ____________________________ Date ____________

Please indicate if you wish to receive a summary of the study findings: [ ] Yes  [ ] No

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Primary Investigator  
Director and Professor  
School of Kinesiology and Health Studies  
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jc46@queensu.ca

Joan Stevenson, PhD  
Chair  
General Ethics Review Board  
Queen’s University  
Kingston, ON  
(613)533-6288  
stevensj@queensu.ca
PARTICIPANT CONSENT FORM-ATHLETE

You are invited to participate in a study entitled ‘Examining Youth Personal Development in Sport’. This study has been granted clearance according to the recommended principles of Canadian ethics guidelines, and Queen's policies. Please read this form carefully and feel free to ask any questions you may have.

Purpose and Procedures

The purpose of this research study is to examine the personal development of youth in sport. If you volunteer to participate in this study, you will be asked to complete questionnaires evaluating your personal experiences in sport. You may also be asked to videotaped during your sport sessions.

Potential Risks

Some of the questions will ask you about negative peer influences (e.g., bullying, drinking, drugs), family finances, and/or other forms of discrimination that you may or may not have experienced in sport. You have the right to not answer any questions that you are uncomfortable with and are invited to contact Telehealth Ontario at 1-866-797-0000 if any of these questions trigger emotional upset.

Potential Benefits

As a participant, you may be making important contributions to the research literature. We cannot and do not guarantee or promise that you will receive any direct benefits from the study.

Storage of Data

The original interview recordings and interview transcripts will be safeguarded and securely stored in a locked filing cabinet at Queen’s University for a minimum of seven years as per University requirements.

Confidentiality

The data from this study will be published and presented at conferences; however, your identity will be kept confidential.

Right to Withdraw

You may withdraw from the study for any reason, at any time, without penalty of any sort by contacting the principal investigator, Dr. Jean Côté (613-533-6000 x79049). There will be no team related effects associated with withdrawal. You do not have to answer any questions that you do not feel comfortable answering. Any information collected up to the time you withdraw from the study will be destroyed.
Questions
Any questions about study participation may be directed to Dr. Jean Côté at 613-533-6000 x79049. Any ethical concerns about the study may be directed to the Chair of the General Research Ethics Board at chair.GREB@queensu.ca or 613-533-6081.

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Consent to Participate
I have read and understood the description provided above. I have been provided with an opportunity to ask questions and my questions have been answered satisfactorily. I consent to participate in the study described above, understanding that I may withdraw this consent at any time. A copy of this consent form has been given to me for my records.

_________________________  _______________________
Signature of Participant    Date

_________________________  _______________________
Signature of Researcher     Date
COACH LETTER OF INFORMATION AND CONSENT FORM

Title of the study: Examining Youth Development in Sport

The purpose of this study is to examine how different coach behaviours affect youth’s development in sport. Specifically, the goal is to understand how the different ways coaches interact with athletes during practices leads to athletes’ experiences in sport. This study has been granted clearance according to the recommended principles of Canadian ethics guidelines, and Queen’s policies.

The study will have each athlete complete a questionnaire related to his/her experience in a specific sport (i.e., on a specific team with a specific coach). Over the course of three-four months, multiple practices in that sport setting will then be videotaped. As a coach, you will be wearing a microphone to record any talking. The videotaped practices will then be watched by the principal investigator to understand the different coach-athlete interactions (i.e., patterns and sequences of coach/athlete interactions). Individual clips from the videos may also be used in a later part of the project. There are no known or foreseeable risks involved by participating in this study.

This is part of a research study for which Jean Côté is the primary researcher. Information collected from coaches will remain completely confidential. For the entire study, all information collected will be kept in a locked filing cabinet by the primary researcher. Items will be available to the primary researcher and his research team. As a reminder your participation in this study is completely voluntary and you can decide to stop participating at any point without explanation or consequences. Should you decide to withdraw from participation, information collected to that point will be destroyed. Although there is no financial compensation it is anticipated that your information will help us to better understand the positive developmental experiences of youth sport participation.

The study is only interested in the information collected for the entire group and so all participants’ individual responses will never be known, keeping individuals identity secure. While the information collected may be presented at academic conferences and published in relevant academic journals, anonymity and confidentiality of all participants will be maintained.

Any questions about study participation may be directed to Dr. Jean Côté at 613-533-6000 x79049. Any ethical concerns about the study may be directed to the Chair of the General Research Ethics Board at chair.GREB@queensu.ca or 613-533-6081.

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PARTICIPANT CONSENT FORM - COACH

I have read the information letter and understand that this study requires the athletes I coach to complete a survey regarding their experiences in our specific sport setting (i.e., on this specific team, with me as a coach). I also understand that the second part of this study involves the videotaping of multiple practices in order to examine interactions between coaches and athletes.

I have been informed that my confidentiality will be protected throughout the study, and that the information I provide will be available only to the primary researcher and his research team. While the results of this study may be presented at academic conferences and/or in academic journals, I am aware that any results will be presented for the group only (i.e., no individual data will ever be reported) – thereby maintaining my anonymity. Similarly, the videotaped practices will only be viewed by the primary researcher and/or his research team and only for the purpose of data analysis – they will never be shown at conferences or in any other presentation.

I understand that my participation in this research project is completely voluntary and that I reserve the right not to answer any question(s) I do not feel comfortable with. I also recognize that I may stop participating at any time without explanation or consequence. I understand that any data collected up to that point will be destroyed.

Finally, any questions I have about this research project and my participation have been answered to my satisfaction. I understand that I am invited to contact the primary researcher and/or the General Ethics Review Board should any further questions or concerns about this research project or my participation.

I consent to participate in this research project.

________________________________________________________________________

Name of Participant                         Signature                      Date
Appendix C
Questionnaires
STUDY: Examining Youth Development in Sport

Current team: ____________________________________________________________

Name: _________________________________         Today’s date: _________________

Birthdate: _______________________________

Number of previous seasons played this sport (not including this year): ______

Number of previous seasons with current head coach (not including this year): ______
Athlete Sport Competence Questionnaire – COACH VERSION

Competence refers to one’s skill level or ability to perform a certain task. In this form you will be rating the sport competence of each of the athletes you are coaching.

Please answer each question based on how skilled or competent you perceive each athlete to be in each of the areas listed compared to all of the other athletes you know competing at this level of competition.

Circle the number that best corresponds to your perceptions. A 5 represents the most skilled athlete you know in this sport at this level, while a 1 represents the least skilled athlete you know in this sport at this level.

<table>
<thead>
<tr>
<th>Athlete Name</th>
<th>Technical skills (e.g., blocking, passing, throwing, hitting, etc.)</th>
<th>Tactical skills (e.g., decision-making, reading the play, strategies, etc.)</th>
<th>Physical skills (e.g., strength, speed, agility, endurance, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. (Insert athlete names)</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
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<tr>
<td>2.</td>
<td>1 2 3 4 5</td>
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<td>3.</td>
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<td>4.</td>
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<td>5.</td>
<td>1 2 3 4 5</td>
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<td>6.</td>
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<td>7.</td>
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<td>8.</td>
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<td>9.</td>
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<td>10.</td>
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<td>11.</td>
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<td>12.</td>
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<td>13.</td>
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<td>14.</td>
<td>1 2 3 4 5</td>
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<td>15.</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
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</tbody>
</table>
Athlete Sport Competence Inventory – ATHLETE VERSION

Sport competence refers to one’s ability to successfully perform a certain task in sport. In this form you will be rating the sport competence of both yourself and your teammates in volleyball.

Please answer each question based on how skilled or competent you perceive yourself or your teammates in each of the areas listed compared to all of the athletes that you know. Please answer truthfully, basing your rating solely on the specific area described in each question.

Circle the number that best corresponds to your perceptions. A 5 represents the most competent athlete you know at your age/skill level, while a 1 represents the least competent athlete you know at your age/skill level. Please check the appropriate box when you reach the section where you are rating yourself. Please rate yourself.

Your answers will be kept completely confidential.

In this section, you will be evaluating [Insert athlete name].

<table>
<thead>
<tr>
<th>Please rate this person’s sport competence in the following areas:</th>
<th>Not at all competent 1</th>
<th>Somewhat competent 2</th>
<th>Moderately competent 3</th>
<th>Very competent 4</th>
<th>Extremely competent 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical skills (e.g., shooting, passing, blocking, etc.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tactical skills (e.g., decision-making, reading the play, strategy, etc.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical Skills (e.g., strength, speed, agility, endurance, etc.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In this section, you will be evaluating [Insert athlete name].

<table>
<thead>
<tr>
<th>Please rate this person’s sport competence in the following areas:</th>
<th>Not at all competent 1</th>
<th>Somewhat competent 2</th>
<th>Moderately competent 3</th>
<th>Very competent 4</th>
<th>Extremely competent 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical skills (e.g., shooting, passing, blocking, etc.)</td>
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<td></td>
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<tr>
<td>Tactical skills (e.g., decision-making, reading the play, strategy, etc.)</td>
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<tr>
<td>Physical Skills (e.g., strength, speed, agility, endurance, etc.)</td>
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<td></td>
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</tbody>
</table>
Peer Connection Inventory

The following questionnaire will assess your relationships with your teammates in sport. Please answer each question based solely on the sport environment, excluding any contact outside of the team/group.

Please answer truthfully. Your answers will be kept completely confidential.

Please circle the 3 teammates that you enjoying participating in your sport with the most:

Insert randomly-ordered team roster

Please circle the 3 teammates that you enjoy participating in your sport with the least:

Insert randomly-ordered team roster
Appendix D
Tables
Table 9. *Comparison of Extreme Sociometric Status Groups with Average on Measures of Behavioural Variability*

<table>
<thead>
<tr>
<th></th>
<th>Average vs. Popular</th>
<th>Average vs. Rejected</th>
<th>Average vs. Neglected</th>
<th>Average vs. Controversial</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$t$ (df)</td>
<td>$p$</td>
<td>$d$</td>
<td>$t$ (df)</td>
</tr>
<tr>
<td>Cells Visited</td>
<td>.57 (13)</td>
<td>.58</td>
<td>.32</td>
<td>-.24 (7)</td>
</tr>
<tr>
<td>Transitions</td>
<td>-.29 (13)</td>
<td>.77</td>
<td>-.17</td>
<td>-.34 (7)</td>
</tr>
</tbody>
</table>

*Note.* Effect sizes > 0.50 are in boldface.