

DEVELOPMENT AND VALIDATION OF A MEASURE OF TRUST IN SPORT

by

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## *Abstract*

Many professional athletes have cited team chemistry as an essential factor in producing a winning team and research has shown there are several team variables that positively contribute to team performance (Beauchamp & Eys, 2014). One variable that has lacked considerable research within sport group dynamics literature is trust. The purpose of this research is to develop a sport-specific measure of trust. Procedures followed a typical scale development parameter: (1) an understanding was developed through a literature review of trust in sport and organizational science; (2) a list of items was developed and narrowed through an expert review process and think aloud protocol; and (3) an exploratory factor analysis was conducted to identify the factor structure of the questionnaire based on participants' responses. Finally, preliminary validation of the Trust in Sport Questionnaire was conducted.

***List of Abbreviations and Symbols Used***

**EFA** – Exploratory Factor Analysis

**TAP** – Think Aloud Protocol

**GEQ** – Group Environment Questionnaire

**IAG-S** – Individual attraction to Group – Social

**IAG-T** – Individual attraction to Group – Task

**GI-S** – Group Interaction – Social

**GI-T** – Group Interaction – Task

**CBT** – Cognitive-based -Task

**CBI** – Cognitive-based – Interpersonal

**ABT** – Affect-based – Task

**ABI** – Affect-based – Interpersonal

**ATQ** – Adapted Trust Questionnaire

**EFA** – Exploratory Factor Analysis

**TSQ** – Trust in Sport Questionnaire

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## ***Chapter 1: Introduction***

Different sport teams require a varying amount of interdependence among teammates. For example, swim and track relay teammates interact with each other much less during the course of competition than those individuals on hockey or basketball teams. Hockey and basketball are examples of highly interdependent sport teams (Cannon-Bowers & Bowers, 2006). These sports rely on teammates to interact frequently to execute a task. If breakdowns occur during competition, it can have a profound effect on team performance (Carron & Eys, 2012).

Many professional athletes and coaches have cited great team chemistry as an essential factor in producing a winning team (Beauchamp & Eys, 2014) and research investigating variables such as group cohesion (e.g., Carron, Bray, & Eys, 2002), collective efficacy (e.g., Short, Sullivan & Feltz, 2009), and leadership (e.g., Chelladurai, 1990) have all been shown to contribute to team performance (Beauchamp & Eys, 2014). One variable that has lacked considerable research in sport group dynamics literature is trust. Organizational research has shown that an increase in trust leads to better team processes and performance. This research has provided the impetus for trust research to move into the world of sport. Building upon an influx of research that started in the last decade of the twentieth century, trust has become one of the most discussed topics in the organizational sciences (Costa, Roe, & Taillieu, 2001) and has been studied in conjunction with cohesion (Mach, Dolan, & Tzafrir, 2010) and efficacy (Dithurbide & Flett, 2014) within sport.

A clear definition is one aspect of organizational trust research that is lacking. Multiple definitions have been presented in the organizational setting (Costa, Roe, & Taillieu, 2010; Rotter, 1967) mentioning the positive expectations of others, risks, and interpersonal relationships. However, without a consensus on a single definition, researchers are left to adopt

the definition that best serves their interests. Researchers who have begun to study trust within sport have cited the multiple organizational definitions (Dirks, 2000; Mach et al., 2010). Only one attempt has been made to offer a sport specific definition. Dithurbide and Flett (2014) describe teammate trust in terms of the expectation that one will perform their job effectively on the playing surface. This definition offers a sport specific variation of trust that is needed for this unique setting.

Multiple definitions of organizational trust have spawned multiple theoretical frameworks through research in business and politics. As research on trust has progressed so have conceptual theories. Early research focused on trust and suspicion (Deutsch, 1958) and was rooted in behavioral psychology. Researchers such as Deutsch (1958) used games to determine under what circumstances participants would be more trusting of one another. Trust was measured in these circumstances as cooperation in a modified version of the prisoner's dilemma game. From these results, he determined under what situational circumstances trust would be fostered. Lewis and Weigert (1985) moved away from this perspective and focused on the social interaction aspect of trust. Their theory was based on the concept that trust has distinctive cognitive, emotional and behavioural characteristics that merge to make the social experience.

From these different approaches research began to construct new theories focusing on the antecedents of trust and how it could be fostered in an organizational setting. McAllister (1995) proposed two distinct dimensions of trust, cognitive and affect-based. This conceptual framework outlined the antecedents and outcomes of both dimensions. Mayer, Davis, and Schoorman (1995) proposed a conceptual framework that also investigated the antecedents and outcomes of trust in an organizational setting. Dirks and Ferrin (2001) reviewed the role of trust in organizational settings and determined that there were two distinct models: the main effect

model and the moderating model. The main effect model implies trust has a direct effect on a variety of outcomes, whereas the moderating model implies that trust has an indirect effect on outcomes through moderating relationships.

A review of organizational trust (Dirks & Ferrin, 2001) revealed that even 40 years ago trust was a frequently cited determinant of group performance (Golembiewski & McConkie, 1975). Trust has been found to influence workplace performance outcomes (individual and group) as well as individual commitment to the organization (Costa, 2003; Dirks & Ferrin, 2001; Mooradian, Renzl, & Matzler, 2006). Costa (2003) studied organizational team trust and team effectiveness, determining that trust was important for the optimal functioning of teams in business organizations. In addition, Matzler and Renzl (2006) investigated the relationship between interpersonal trust, employee satisfaction, and employee loyalty. In conclusion, trust in peers was a strong predictor of employee satisfaction.

The organizational research on trust provides the foundation for research on trust in sport. Evidence provided by organizational research indicating that trust may have a direct effect on performance (Dirks & Ferrin, 2001) has intrigued researchers to investigate the same relationship in a sports setting. Dirks (2000) was the first to investigate trust in sport, investigating the relationship between trust in leadership (i.e., coach) and team performance. Trust was found to be a mediator of past performance and future team performance. Mach and colleagues (2010) continued research on trust in sport and the potential relationship to performance using cohesion as a mediator. Results indicated that trust was a stronger mediator of the relationship between cohesion and performance. This result differed from the hypothesized relationship with cohesion as a mediator for trust and performance. These results give a pretext for future research on trust.

Most recently, Dithurbide and Flett (2014) took a qualitative approach to investigating trust in sport, investigating the similarities and differences between teammate trust and teammate efficacy. Through interviews with adolescent athletes, definitions for each construct were established and perceptions as to what aspects foster the development of each construct were gleaned. Dithurbide and Flett (2014) have given future researchers a proposed definition on which to build upon, however, previous works on trust within sport have adapted measures designed for organizational settings and are not consistent with aspects of sport and more specifically teammate trust.

Dithurbide and Flett (2014) acknowledge that the ultimate goal of trust research in sport is to develop a model outlining the antecedents and outcomes and how they relate to other constructs within sport, such as cohesion (Mach et al., 2010). This ultimate goal can only be achieved by first defining these constructs and developing an effective means of measurement (Dithurbide & Flett, 2014). Researchers have attempted to side step this crucial aspect and move to building models of trust in sport and its relationship with other constructs (Dirks, 2001; Mach et al., 2010). To adequately measure trust within a sport context, a sport specific measure of trust must be developed and validated.

The purpose of this research is to develop a sport-specific measure of trust. Researchers in other performance domains (e.g., organizational psychology) have provided evidence of the importance of trust for both individual and team outcomes. These findings call for the development of a sport-specific model and the investigation of trust to determine if similar evidence can be found in a sport specific setting.

## ***Chapter 2: Literature Review***

There is little debate that trust facilitates effective relationships. These relationships can take many different forms, for example: romantic relationships, business relationships and also between teammates within a sport context. The ability to foster trust in each of these settings is a desirable skill, however each situation holds unique challenges that an individual may have to overcome in order to earn the trust of a desired party. This chapter will review literature on organizational trust and how this literature has given precedent for the trust research within sport. The aim of this review is to investigate the effects of interpersonal trust between teammates in the context of sport. The literature review will also explore the measurement development process.

### **2.1 Definitions of Trust**

Despite an increase in research popularity, an established consensus on the definition of trust has yet to be reached. This may reflect the roles and different levels in which trust can be assessed. Although definitions vary, some similarities exist. For example, the existence of vulnerability from the trustee, positive expectations of others, risk taking, and interpersonal relationships with others can be seen across a number of definitions. (Costa et al., 2010; Rotter, 1967; Rousseau et al., 1998).

Early research on trust conducted by Deutsch (1958) described trust as the notion of expectation or predictability as well as involving the notion of motivational relevance. If someone has an expectation that an event may occur and it is motivationally relevant, trust is often involved. Deutsch (1958) noted that trust occurs if the trustee perceives greater negative motivational consequence if trust is not reciprocated than positive motivational consequences if

trust is reciprocated. Deutsch's (1958) definition implies that the trustee is in a vulnerable position when trusting another individual.

Over years of research this definition and others have been modified and adapted in an attempt to better reflect the concept of trust. Two accepted, more current definitions are those from McAllister (1995) and Mayer et al. (1995). McAllister (1995) defines interpersonal trust as "the extent to which a person is confident in and willing to act on the basis of the words, actions, and decisions of another" (p. 25). Mayer et al. (1995) defines trust as "the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party" (p.712). These two definitions offer a different perspective of trust in an organizational context and in addition offer two distinct theoretical frameworks that have contributed a great deal to the literature.

All previously mentioned definitions imply one party's vulnerability to another's actions. On interdependent sport teams such as soccer, teammates become vulnerable to the actions of one particular teammate when they are in possession of the ball. Teammates not in possession of the ball expect that the teammate will make a smart play either passing the ball off or shooting the ball at the net depending on the context. The decision made by the athlete in possession of the ball will affect the extent to which his/her teammates will trust them on their next possession. Dithurbide and Flett (2014) offer the only sport specific definition of trust which outlines the expectation of teammates. The definition states that the "expectation that one's teammate will effectively perform a particular action that is necessary for one's own or team success." This definition expresses the task-specific aspect of trust but neglects to mention potential variables outside of competition that could affect trust.

It is important that a sport specific definition differentiate between teammate trust and other variables present in a sporting context, such as efficacy. Dithurbide and Flett (2014) studied how athletes differentiate between these two variables. Efficacy was described as the can do believe that a teammate will perform task and trust was described as the can do believe plus the knowledge of knowing that a teammate will perform a task. The commonalities between this sport specific definition and the definitions of McAllister (1995) and Mayer et al. (1995) are in the expectations that a teammate will perform effectively. However, vulnerability of the trustor/teammates to the actions of another is omitted from the Dithurbide and Flett (2014) definition.

## **2.2 Theoretical Frameworks**

Some early theories of trust came from the research of Morton Deutsch (1958). Deutsch believed trust involved the notion of expectation and motivational relevance. When Deutsch (1958) investigated trust and suspicion, he hypothesized that (1) as individual's confidence that trust will be fulfilled is increased, the probability of engaging in trusting behaviour will increase; and (2) as the ratio of anticipated positive to anticipated negative motivational consequences increases, the probability of trusting increases.

To test these hypotheses, Deutsch (1958) used a modified version of the prisoner's dilemma game to test the behaviour of participants under different motivational orientations and conditions. The purpose of the prisoner's dilemma game is to analyze the decisions or responses of participants within the game. The researchers manipulate the conditions under which the participants have to make those decisions and responses, very much like the motion picture *Hunger Games* at the simplest level. The game that was implemented in the Deutsch (1958) study was a non-zero-sum game, which means gains and loss could be incurred on the

participants of the experiment. A 2 x 2 matrix was presented to participants. Participant 1 could choose from columns A or B and participant 2 could choose from rows X or Y, this would allow each participant in the game 4 potential choices. A corresponding 2 x 2 matrix would then determine the points each participant would receive. For example, if participant 1 chooses row A and participant 2 chooses column X, their choices correspond to the AX box of the matrix. In this experiment there were varying point totals for each box in the 2 x 2 matrix. The choices of the participants in this example (AX) deems that they each receive nine points. Other boxes in the matrix (e.g. BX, AY and BY) corresponding to different point totals.

In addition participants in the game were given one of three motivational orientations: 1) Cooperation – where participants were led to feel that both participants were mutually concerned for each other's welfare; 2) Individualistic – each participant was led to feel only interested in doing what was best for themselves; 3) Competitive – each participant was led to feel interested in performing well and performing better than the opposing participant. Within these motivational orientations there were 4 conditions under which participants played the game. The first was that there was no communication between the two participants. Second, participants were allowed to communicate by passing notes. Third, participants made a choice and their choices were then announced to the other players and both players could then change their choice if they wished. Lastly, one participant would choose and that choice was then announced to the other participants who would then subsequently choose.

The results from Deutsch's (1958) experiment revealed a number of aspects that affect an individual's propensity to trust. The first is the influence of communication on trusting behaviour. Effective communication can lead to participants with individualistic orientations being more likely to trust one another. Effective communication in this context included one or



all four of the following aspects: 1) expectation 2) intention 3) retaliation, and 4) absolution. The benefits of effective communication are important on many levels and across contexts. In sport, this communication between teammates, and between athletes and coaches is imperative. These relationships can be seen through the communication of roles in sports team setting (Eys, Carron, Beauchamp, Bray; 2005). Effective communication of roles, team rules and philosophies will aid in the development and maintenance of trust between coaches and teammates. Other aspects that determined an individual's propensity to trust were: (1) a belief that individuals became more likely to trust if they believed the other person had nothing to gain from participating in untrusting behaviour, and (2) If a participant perceived they were able to exert some control over the other participant's outcome. Lastly, the introduction of a mutually disliked third party increased the tendency of participants to make trusting choices.

The conclusions that Deutsch's (1958) drew from his research were that mutual trust is more likely to develop when people are positively oriented to each other's welfare. In a team atmosphere such as a sport team, it is optimal for all teammates to be positively oriented to each other's welfare. However, he added that mutual trust could occur when participants are overtly unconcerned with each other's welfare, provided that the situational characteristics are such that participants would expect their trust to be fulfilled. Situational characteristics that promote trusting behaviour are: (1) the opportunity for each person to know what the other person will do before they commit irreversibly to trust; (2) the opportunity and ability to communicate fully a system of co-operation with specifications for handling violations and returning to a state of equilibrium with minimum disadvantages; (3) the power to influence the other person's outcome and hence to reduce any incentive they may have to engage in untrustworthy behaviour; and (4) the presence of a third party whose interests are in contrast with those of the other two players. In

a sporting context a coach or manager would prefer athletes to be positively oriented to each other and not resort to building trust through these secondary conditions.

Deutsch's (1958) approach to investigating trust is strongly based within the context of behavioural psychology, interpreting behavioural responses of the prisoner's dilemma game as trusting or non-trusting behaviours. Lewis and Weigert (1985) took a sociological approach to trust. Using a sociological conceptualization, their research attempted to take the work of Deutsch and other psychological and political scientists beyond their conceptual and theoretical limits, while also demonstrating the sociological nature of trust and its crucial importance. This sociological perspective offered a new view on trust and investigated emotional concepts that were neglected by previous researchers.

Lewis and Weigert (1985) conceived trust as a property of collective units such as dyads, groups, and teams and thus is applicable to the relationships among people. Trust allows social interactions to proceed on a simple and confident basis; the absence of trust leads to increasing complexity and actions (e.g. completing a team assignment). Trust will always involve the unavoidable element of risk and accepting risk. However, it is necessary for continual harmonious relationships (Lewis & Weigert, 1985). Lewis and Weigert (1985) proposed that trust has distinctive cognitive, emotional, and behavioural characteristics that merge to make the social experience.

We cognitively choose whom we trust and under what circumstances. Cognitive level trust is characterised by a cognitive "leap" beyond previous trustworthy experience with the trustee and rational reasoning (Lewis & Weigert, 1985). Deutsch (1958) found knowledge plays an important role in one's propensity to trust. Lewis and Weigert (1985) also determined

knowledge and previous experience to be pre-requisites for trust. However, when standing alone neither can cause an individual to trust another.

Emotional level trust is complimentary to cognitive (Lewis & Weigert, 1985). Trust creates an environment where intense emotional investments are made and why betrayals of trust can cause such outrage. The emotional level of trust contributes to the cognitive platform from which trust is established and maintained (Lewis & Weigert, 1985). Given the social nature of sport teams, the interpersonal aspects of emotion are prominent (Duncan, Latimer-Cheung & Brackett , 2014) making emotion a critical aspect to evaluate when investigating trust. Lastly, the behavioural level of trust is described as the undertaking of a risky course of action on the confident expectation that everyone involved will act competently. When others are seen acting in ways that imply trustworthiness, it is more likely that we reciprocate by trusting them more (Lewis & Weigert, 1985). In a sport environment, if a player performs a task desirably in a particular situation, it is more likely that they will be trusted in a similar situational context in the future.

Lewis and Weigert (1985) proposed separate types of trust based on levels of emotionality and rationality. Trusting behaviour is motivated by emotional trust or by rational reasoning or by some combination of both emotionality and rationality. Levels of emotionality and rationality can vary independent of one another based on previous experience with the trustee and the propensity to trust from the trustor. Lewis and Weigert's (1985) model states that ideological trust comprises of high levels of emotionality and rationality, where as the absence of emotionality and rationality leads to uncertainty. If emotionality is high and rationality is low Lewis and Weigert (1985) labeled this faith. On the contrary, if rationality is high and emotionality is low one could be said to be making calculated predictions. Lewis and Weigert

(1985) developed a matrix with which they label each degree of trust corresponding with the level of emotionality and rationality (i.e. high, low, virtually absent). This framework offers an alternative view on the aspects that influence trust, because of the inclusion of an emotional component. The inclusion of an emotional component gives this framework relevance in a sport context. Sport researchers have investigated the effect of Emotional Intelligence (EI) in sport and found it influences athlete performance (Zizzi, Deaner & Hirschhorn, 2003), increased use of psychological strategies (Lane, Thelwell, Lowther, & Devonport, 2009) and lowered pre-competition anxiety (Lu, Li, Hsu & Williams, 2010). Sport teams are ripe with emotion and therefore require athletes to be emotionally intelligent to be effective teammates. Given the importance of emotion in sport it should be recognized as an aspect of trust.

### **2.3 Mayer (1995) Framework**

It was mentioned previously that Lewis and Weigert (1985) believed that trust will always involve the unavoidable element of risk and adopting that risk in turn results in vulnerability. The aspect of vulnerability is critical to Mayer and colleagues' (1995) definition of trust, which implies that there is something important to the trustor that has the potential to be lost (Boss, 1978; Zand, 1972). The willingness to take risks is a cornerstone to Mayer et al.'s (1995) framework. The framework includes six propositions that range from the factors of perceived trustworthiness to the ultimate outcomes of trust.

The first proposition involves the characteristics of the trustor. The traits of the trustor will affect the trust that one party has for the other. Some parties have a general willingness to trust others while other parties are more conservative in whom they offer trust (Mayer et al., 1995). In Mayer et al.'s (1995) framework this trait is labeled propensity to trust or trustor's propensity and it is described as a stable within-party factor that affects the likelihood of a party

to trust others. People who have experienced different developmental or cultural backgrounds and different personality types will all be predisposed to vary in their propensity to trust. The first proposition states that the higher the trustor's propensity to trust, the higher the trust for a trustee prior to any available information. For example, an athlete who has experienced all positive coaching interactions in the past will have a higher propensity to trust a new coach knowing little about the current coach's previous experience.

The characteristics of the trustor are insufficient to account for the variance in trust that can be seen across relationships. The characteristics of the trustee must also be considered if we hope to explain a larger proportion of variance. The concept and characteristics of trustworthiness have garnered a fair amount of attention over the years in organizational psychology (Good, 1988; Hovland, Janis & Kelley, 1953). Mayer et al. (1995) reviewed antecedent factors of trust and found that three appeared often in the literature; ability, benevolence, integrity.

The first, ability, is a group of skills, competencies and specific characteristics that would enable a trustee to have influence within a specific domain. It is important to understand that trust is domain specific, meaning that a trustee may be trusted with tasks that are within a certain domain of expertise (e.g., hockey) but not another (e.g., doing your taxes).

The second antecedent of trust, benevolence, is the perception of a positive orientation of the trustee toward the trustor. Researchers have used other terms for benevolence, such as intentions or motives (Cook & Wall, 1980; Deutsch, 1958). In sport teams, all members are often striving toward the same goal (e.g., winning). However, in certain situations athletes may not have a positive orientation toward the team and make selfish decisions.

The third antecedent, integrity, is developed if the trustor perceives that the trustee adheres to a set of principles that are deemed acceptable. It is the perception of the trustor that is important, not whether the principles the trustee follows are moral, immoral, or otherwise. In most sports teams there is a culture that deems certain actions acceptable or not acceptable. If an athlete does not recognize that culture or does not adhere to it they run the risk of losing the trust of their teammates.

Mayer et al. (1995) further added to his model by making statements regarding the interrelationship of the three antecedent factors (ability, benevolence, integrity). The first states that the effect of integrity on trust is most salient prior to the development of benevolence between two parties. The second states that the effect of benevolence on trust will increase over time as a relationship develops between two parties.

If there is to be a behaviour manifestation of trust, then one party must act upon their willingness to be vulnerable and take a risk. The outcome of a trusting relationship (i.e., trust) will be risk taking (Mayer et al., 1995). Assessing risk in a certain situation is a critical element of weighing the likelihood of positive or negative outcomes. The trustor's belief about the likelihood of gains or losses is measured by perceived risk. Mayer et al. (1995) proposed that if the level of trust surpasses the perceived risk then the trustor will engage in the risk-taking behaviour. If the level of perceived risk is higher than the level of trust, the trustor will not engage in the risk-taking behaviour. In summary, risk-taking behaviour is a function of trust and the perceived risk in a particular situation.

The final proposition of the Mayer et al. (1995) model involves the reciprocal nature of the model. It states that the outcomes of trusting behaviours will lead to updating perceptions of ability, benevolence and integrity (antecedent factors of trust). This proposition has implications

in sport. During play, an athlete can develop perceptions of ability, benevolence and integrity as they are exposed to situations on and off the playing surface. Less than desirable performances in certain contexts (e.g., late in a game) could potentially have adverse effects on trust. Aspects of this framework may display some cross-context similarities, however, it should be noted that Mayer et al. (1995) identifies a limitation of this model as generalizability to other contexts (e.g. sport).

#### **2.4 McAllister (1995) Framework**

Another predominant model of trust that attempts to determine the antecedents of trust is McAllister's (1995) model. McAllister (1995) differentiates trust into a two-concept model featuring cognitive and affect-based foundations. Cognitive-based trust refers to the conditions in which you would trust another person and under what circumstances. This choice is based on what can be taken as 'good reason', constituting evidence of trustworthiness (Lewis & Wiegert, 1985). For trust to be present there must be some available knowledge of a person's capabilities. This knowledge will fall somewhere between total knowledge and total ignorance. If there is total knowledge of another's capabilities, then there is no need to trust that person because of the certainty of the situation. If there is total ignorance, then there is no basis on which to rationally trust the trustee.

Several personal characteristics are cited as being critical for trust to be fostered, they are competence, responsibility, reliability, and dependability (Butler, 1991; Cook & Wall, 1980; Rempel, Holmes & Zanna, 1985). Athletes often develop these characteristics through their performance on the playing surface. Coaches and teammates evaluate that performance and determine to what extent to trust a particular athlete. Affective-based trust refers to the emotional bonds between individuals. People make emotional investments in trusting relationships (Lewis

& Wiegert, 1985), expressing care, concern, belief in intrinsic virtue, and reciprocity. For example, if an athlete has determined that a coach or teammate has expressed concern for their well-being and are trusting, then they are more likely to reciprocate that trust.

McAllister (1995) hypothesized that relationships of interpersonal trust among managers in organizations are characterized by the two dimensions of cognitive and affect-based trust. The hypothesis extended to his theoretical framework and includes hypothesized relationships with antecedents of cognitive based trust and affect based trust. The antecedents of cognitive based trust are peer reliable role performance, cultural-ethical similarities, and professional credentials. Peer reliable role performance refers to the track record of a peer's (i.e., teammates) performance and how effectively they have carried out role-related duties in the past. Cultural-ethical similarities refer to the influence of individuals with fundamentally similar characteristics such as cultural or ethnic backgrounds. In sport, there is a possibility that this may extend to similar developmental backgrounds, such as minor league teams or training groups. Professional credentials refer to the individual's preparedness to take on the role with which they have been entrusted. For example, if an athlete has no previous special teams experience and they are put on the power play (in hockey), their credentials in this case do not favour a positive outcome.

The antecedents of affect-based trust are citizenship behaviour and interaction frequency. Citizenship behaviour refers to the intent to provide help to other organizational members. In a sporting context this would transfer into what is commonly called "a good teammate", being supportive, having concern for others, and being a positive influence. Interaction frequency refers to the amount of social and formal interaction individuals have experienced. Being a member of a sports team requires that athletes spend a vast amount of time at practice and playing games, this would be referred to as a formal context. Interactions outside of practice and



games would be in a social context. Social interactions can vary and are dependent on the team and athlete.

The framework also outlines hypothesized relationships with consequences (i.e., outcomes) of both cognitive (control based monitoring and defensive behaviour) and affect-based trust (need-based monitoring and citizenship behaviour). Control based monitoring refers to monitoring to control an untrustworthy individual. Defensive behaviour refers to requesting assistance from co-workers or superiors before its needed and unnecessary using of resources to ensure satisfactory performance. The affect-based consequences, need-based monitoring, is in reference to research that shows individuals in communal relationships are more likely to keep track of associates' (teammates') needs to better understand the nature of the relationship. Citizenship behaviour refers to individuals who have expressed high affect-based trust in an associate and therefore also direct a high amount of citizenship behaviour toward that individual. The theoretical framework builds from the antecedents of cognitive and affect-based trust to the consequences and subsequently to manager and peer performance as the dependant variables.

To measure the effect of the antecedents on two dimensions of trust and the consequences on managerial and peer performance within organizations, McAllister (1995) constructed a study which utilized three separate dyad pools in each organization. Performance information (4-item measure) was provided by superiors and all other information was provided by dyad members. A new measure of cognitive and affect-based trust was developed for this research. Dyad members also completed a behavioural response measure and questions to measure exogenous variables (e.g. interaction frequency, citizenship behaviour, reliable role performance).

It was found that McAllister's (1995) theoretical model provided only a limited explanation for the structural relationship among variables. The hypothesized antecedent and

consequence pathways connecting to cognitive-based trust were non-significant. However, the hypothesized antecedent and consequence pathways connecting to affect-based trust were significant. This indicates that McAllister's (1995) theoretical framework may be best viewed as addressing the antecedents and consequences of affect-based trust and but failing to explain the antecedents and consequences of cognitive-based trust. There was also strong support for the distinction between cognitive-based and affect-based trust, indicating that interpersonal trust has two distinct forms. This finding is consistent with the framework from Lewis and Weigert (1985) in that it acknowledges the distinction of an emotional and cognitive components in assessing trust. This is critical knowledge to carry over into a sport environment.

### **2.5 Dirks and Ferrin (2001) Review**

In a review of the role of organizational trust, Dirks and Ferrin (2001) found that the dominant perspective of trust in an organizational setting is fairly straightforward: trust results in distinct main effects such as higher levels of cooperation, more positive attitudes, and superior performance from the trustee. Another model that was shown to have some traction within the literature is the moderating effect of trust. This model proposes that trust provides the condition under which certain outcomes (i.e. cooperation and performance) are likely to occur.

The Dirks and Ferrin (2001) review investigates the extent to which the literature supports each model, the main effect or moderating effect, while further developing the moderating model by presenting two propositions to help interpret existing research and guide future research on trust. These two frameworks provide the basis of the review and, along with the propositions made, offer insight as to the future of trust theory and research. The main effect model has been the predominant model cited within the literature, however, it may not be the best representation of trust in an organizational setting. Evidence from the Dirks and Ferrin

(2001) review suggests that the moderating model may give researchers the best insight as to the influence of organizational trust.

The review in large part consisted of literature that investigated the main effect model of trust: 43 studies used this model, 29 of which examined behavioural and performance outcomes and 23 examined attitudes or perceptual outcomes. Dirks and Ferrin (2001) acknowledge that the bulk of studies that investigate the main effect of trust on workplace behaviours and performance outcomes feature the idea that individual beliefs about another party affect how they behave towards that party. This is representative by the model put forth by Mayer et al. (1995). This model accounts for individuals' beliefs about another's abilities lead to a willingness to take risks, if we assume that risk-taking behaviour will lead to beneficial outcomes (i.e., increase in total sales volume or increased winning percentage). A high level of trust between employees or athletes would indicate that one would be more likely to take a risk with that particular associate or teammate. The review determined that the main effect model had the strongest support predicting organizational citizenship behaviour (Konovsky & Pugh, 1994; McAllister, 1995; Pillai, Schriesheim & Williams, 1999; Podsakoff, MacKenzie, Moorman, & Fetter, 1990; Robinson, 1996). Rich (1997) investigated trust in managers and individual sales performance. This research was supportive of the main effect model of trust, showing a positive relationship between trust in managers and individual sales performance. In total 12 studies found significant effects of trust on various facets of workplace satisfaction. Other aspects that were studied using the main effect model (i.e., group performance, effort, conflict, negotiation behaviour, information sharing) showed weaker and less consistent effects.

The second model proposed (Dirks & Ferrin 2001) to assess how trust may operate in an organizational setting was the moderation effect model. This model states that trust facilitates the

effects of other determinants on work attitudes, perceptions, behaviours, and performance. Within this moderation model, Dirks and Ferrin (2001) offer two propositions that provide a theoretical foundation to help integrate and interpret existing research and help guide future research. The first suggests that “trust facilitates the effects of motivational concepts on workplace behaviours and outcomes by influencing one’s expectation about another future behaviour” (p. 451). To better understand this proposition, consider the relationship between trust and an outcome that is associated with risk-taking behaviour (Mayer et al., 1995). Risk-taking behaviours are often the cause of individual motives to attain goals or incentives. Trust, instead of directly causing risk-taking behaviour, may influence the motivation for engaging in risk-taking behaviours. This effect on motivation would in turn affect the strength of the relationship between trust and risk-taking behaviour.

The second of Dirks and Ferrin’s (2001) two propositions suggests that trust moderates the relationship between a trustee’s action and the trustor’s response by influencing one’s interpretation of an action. The same action could be interpreted and reacted to differently depending on the level of trust that exists between the two parties. Trust therefore offers a perspective from which to interpret the trustee’s actions (Dirks & Ferrin 2001). The review of literature conducted by Dirks and Ferrin (2001) found tentative support for both of their propositions. They suggest that the propositions may have potential to provide an integrative understanding of trust and how it operates in a variety of settings.

## **2.6 Trust in Sport**

Dirks (2000) investigated trust within sport organizations using NCAA basketball teams. He explored how trust in leadership affected team performance. This study employs theory (i.e. Mayer et al., 1995) and adapted measures (i.e. McAllister, 1995) from organizational research on

trust to conceptualize trust as an expectation that a team can rely on a leader's actions and intentions. Integrity and trustworthiness are important traits for leaders (Bass & Stogdill, 1990). When a team distrusts its leader they become less likely to carry out specified roles that are appointed by the leader (Dirks, 2000).

Research within the organizational context has yielded mixed results when looking at the effect of team trust and performance. There is research that has suggested that trust between team members results in greater group performance (Dirks, 1999) and research that has revealed mixed results when investigating the relationship between team trust and performance (Dirks & Ferrin, 2001). Dirks (2000) studied the effects of trust between teammates and the trust between the team and its leader (i.e., the coach). He hypothesized that team trust in leadership has a positive effect on team performance and trust in leadership mediates the relationship between past team performance and future team performance.

Dirks (2000) assessed several different variables including coach experience and career record, player trust (between teammates and between team and coach), tenure (how long they have played under their respective coach) and lastly talent (second team all-star, first team all-star, or MVP). Past team performance was measured by past inter-conference records and pre-conference performance, which was a team's performance before the conference schedule. McAllister's (1995) measure of trust was adapted to measure trust between teammates and trust between the team and the coach (Dirks, 2000).

Using a regression procedure and controlling for potential determinates of performance, Dirks (2000) found support for part one of his hypothesis. Trust in the coach resulted in a significantly positive effect on winning percentage. When investigating the role of trust as a mediator, three equations where used. First, the mediator (i.e. trust) is regressed on the

independent variable, second, the dependent variable is regressed on the independent variable, and third, the dependent variable is regressed on both the independent variable and the mediator. The first two equations determined that past performance did not have a significant effect on trust but did have a significant effect on winning percentage. When trust was added as a mediator of past performance and future performance, the coefficient for past performance decreased in magnitude and became statistically insignificant with respect to future performance. Results from these three equations provides support for trust mediating the relationship between past and future performance (Dirks, 2000).

These findings suggest that effects of trust on team performance are not only important theoretically but also substantial in practical terms. For example, in professional sport it is the general manager's job to employ an effective coach. If a coach's recent performance has been ineffective but they still maintain team trust it maybe a positive sign the coach will be effective in the future versus hiring a new coach that the team may not trust. However, Dirks (2000) also suggests that one of the reasons that the inertia in performance can be sustained is because performance affects the team's trust in its leader, which in turn affects team performance. The same coach from the previous example can only sustain a limited amount of poor performances before trust from the team will begin to erode, leading to more poor performances. Although the effect of trust in leadership was substantial and significant, trust in teammates was not significant after controlling for other variables. This casts further doubt on the theory of a direct relationship between team trust and performance.

Another theory previously discussed was that of an indirect relationship between trust and performance. Mach and colleagues (2010) investigated the mediating role team cohesion had on team trust and team performance. This differs slightly from the indirect model put forth by

multiple researchers from Dirks and Ferrin's (2001) review. Instead of trust being the moderator, this research investigates mediating variables in the relationship between trust and performance. Cohesion was found to be a mediator in the trust and performance relationship. Research conducted by Dirks (1999) found that trust influenced group processes and performance indirectly. Although sport offers a different context from an organizational context, many similarities can be drawn. In both an organizational and sport context, trust is an integral part of team tasks requiring a high level of interdependence between members (Fiore, Salas, & Cannon-Bowers, 2001). The purpose of the study conducted by Mach and colleagues (2010) was to examine how trust effects team performance, while also examining the role of cohesion in the relationship.

More specifically, Mach and colleagues (2010) attempted to examine how trust in other teammates, the coach, and the top management translated into more effective behaviour and subsequently better performance through the process of cohesion. Cohesion is defined as 'a dynamic process that is reflected in the tendency of a group to stick together and remain united in the pursuit of its instrumental objectives and/or for the satisfaction of member affective needs (Carron, Brawley, & Widmeyer, 1998, p. 213). The association between group cohesion and performance is viewed as having a moderate to large positive relationship to team performance within a sport setting (Carron et al., 2002). The association between trust and cohesion however, has not been explored within sport. When investigating team cohesion in an organization context Salas and Fiore (2004) asserted that an effective team is expected to perform to an extent that is greater than the sum of the individuals' performance. Some sports offer a highly interdependent environment with a singular goal, amplifying aspects such as cohesion and trust.

The creation of cohesion among a team is strengthened when one member interprets another's words, attitudes, or actions as being reliable, honest, and containing genuine concern, thereby indicating a relationship of trust (Mach et al., 2010). This is in line with Mayer et al.'s (1995) idea that understanding trust and its causes can facilitate cohesion between team members. Part 1 of Mach et al.'s (2010) hypothesis was that trust in the coach, teammates, and management would be positively related to team cohesion. Part 2 of the hypothesis was that team cohesion would be related to team performance. Lastly, part 3 was that team cohesion mediates the relationship between multifaceted trust and team performance.

To test these hypotheses Mach et al. (2010) recruited Spanish professional athletes from multiple sports (basketball, handball, roller hockey, and indoor soccer). The same adapted measure (McAliister, 1995) that was used in Dirks (2000) was used to measure teammate trust and trust in leadership. To measure trust in management a four-item sub-scale developed by Tzafrir and Dolan (2004) was used. To measure team cohesion a modified version of the Group Environment Questionnaire (Carron, Widmeyer, & Brawley, 1985) was used.

Prior to examining the relationship between trust and performance, some preliminary analyses were conducted to ensure the internal reliability and consistency of the psychometric measures used in the study. Two separate confirmatory factor analyses (CFA) were conducted to determine the factor structure of the trust measure. The results validated a three-factor structure (trust in teammates, trust in coach, and trust in management) for the trust measure. The second CFA was conducted to determine empirically whether team cohesion and trust in teammates were two different constructs. Results indicated that trust in teammates and team cohesion were in fact separate variables.



A correlation analysis revealed that trust in teammates and trust in coach were positively related to team cohesion. This partially confirmed the part 1 of the hypothesis that all three factors (i.e. teammate trust, trust in leadership, trust in management) of trust would be positively related to cohesion. Trust in management was found not to be correlated to team cohesion. Part 2 was also confirmed with team cohesion being positively correlated with team performance (Mach et al., 2010). Part 3 of the hypothesis stated that team cohesion would play a mediating role in the relationship between trust and performance. Structural equation modelling was used to determine the mediation model that best fit the data. It was found that trust in teammates was the variable that played the primary mediation role and not team cohesion as originally hypothesized. However, team cohesion still played a mediating role in the relationship between trust in coach and trust in teammates (Mach et al., 2010).

Mach et al. (2010) believed that the results suggested that trust and the three foci (teammates, coach, and management) are important in the functioning of groups and teams and contribute *indirectly* to their performance. The revised model of trust and cohesion and their relationship to performance offers a platform for which future research can be based.

More recently Dithurbide and Flett (2014) investigated trust using qualitative methods in adolescent athletes and investigated the relationship with a different variable, teammate efficacy. This research investigated two constructs within sport that have seen relatively little attention. Teammate efficacy is an individual level construct as compared to collective efficacy, which is a group level construct. Teammate efficacy involves the belief that teammates hold regarding the capabilities of one another (Dithurbide & Flett, 2014). Trust is defined by Dirthurbide and Flett (2014) as “the expectation that one’s teammate will effectively perform a particular action that is necessary for one’s own and the team’s benefit” (p. 29). The researchers attempted to uncover

how athletes define teammate trust and teammate efficacy, what they mean and how they differ, what were the antecedents of teammate trust and teammate efficacy and lastly, what were the behavioural and performance effects (Dithurbide & Flett, 2014).

Qualitative interviews were completed with twelve competitive volleyball players who answered questions that were organized into three sections: team context, understanding teammate trust and efficacy, change and development. Teammate trust was defined by participants in emotional terms, as a gut feeling, that they did not have to back-up a teammate because they were effective at their job. Trust was also described as the knowledge that teammates would initiate back-up behaviour if it was needed (Dithurbide & Flett, 2014). Participants acknowledged the similarities between teammate trust and teammate efficacy but also acknowledged a fundamental difference, which was that teammate trust involved an aspect of *knowing* that a teammate can complete a task at anytime. It was suggested that teammate efficacy combined with the sense of *knowing* would result in teammate trust (Dithurbide & Flett, 2014).

A number of organizational studies on trust have focused on examining the antecedents of trust (Mayer et al., 1995; McAllister, 1995). Dithurbide and Flett (2014) determined the antecedents of teammate trust were the perceived effort put forth by a teammate as well as optimal performance in critical situations. If we are to compare these antecedents to those discovered within an organizational context we see that effort is not an antecedent of trust within an organization context although ability (Mayer et al., 1995), peer reliable role performance and citizenship behaviour (McAllister, 1995) may all include an aspect of effort. Performance in critical situations could include aspects of peer reliable role performance (McAllister, 1995) and integrity. Integrity is described as the trustor's perception that the trustee adhered to a set of

principles that were deemed acceptable (Mayer et al., 1995). Athletes interviewed believed that teammate trust generally improved over the course of the season (Dithurbide & Flett, 2014), which is consistent with the interaction frequency antecedent described by McAllister (1995).

The performance outcomes of teammate trust that were discovered by Dithurbide and Flett (2014) where: backing-up behaviours, playmaking decisions, motivation, pressure and focus. A number of these variables could be attributed to risk-taking behaviours (Mayer et al., 1995) or citizenship behaviour (McAllister, 1995). Participants commented that low trust in teammates lead to a general decline in performance where teams could not adjust to a dynamic environment (Dithurbide & Flett, 2014).

Trust in a sport context and trust in an organizational context have been deemed to be important aspects with respect to performance, whether in an indirect or direct capacity (Dirks & Ferrin, 2001; Dithurbide & Flett, 2014; Mach et al., 2010). There are differences between the two settings. Sport often requires split second decision-making and a higher degree of interdependence at a team level than most organizational settings. Dirks and Ferrin (2001) proposed that the concept of “situational strength” (Mischel, 1977), could be a determinant of the influence of trust on the situation. The situational strength of most sporting situations would be strong or very strong. The guidance, culture and incentives of most sports teams often lead members to behave in a particular fashion and teammates are driven to behave in that same way (Johnson, Martin, Palmer, Watson & Ramsey, 2013). According to this theory, the effect of trust within a sport team setting is deemed to be minuscule. However, research on trust in a sport context has provided evidence to the contrary, suggesting the trust between teammates and trust between a team and leadership are crucial to performance.

To measure trust in sport quantitatively, Dirks (2000) and Mach et al. (2010) used the same adapted measure of trust from McAllister (1995). Throughout this paper the similarities across theoretical frameworks have been illustrated and it is evident that there are aspects of organization trust that transfer to a sport context. However, there are aspects that are not consistent with sport and it is entirely possible that McAllister's (1995) measure neglects critical aspects of trust in sport because it was designed for an organizational context. For example, the question "I pass on new information that might be useful to this person" is not nearly as relevant in a sport context as it is in a corporate context. Often team members receive the same information from managers or coaches, limiting the use of information as currency. McAllister's (1995) CFA found a number of questions regarding peer affiliative citizenship behavior and peer assistance-oriented citizenship behavior that are loaded strongly in the original organizational context that may be irrelevant in a sport context. The same actions that are viewed as citizenship behavior may not be viewed as behaviors that constitute a good teammate in a sport environment.

There are aspects specific to sport that are not addressed by the McAllister (1995) measure. For example, it does not touch on the development of trust through situational performances. This is presumed to be a crucial aspect of developing trust in sport (Dithurbide & Flett, 2014). The measure inquires about the interaction frequency of employees in a work versus a social environment but it does not touch on whether an employee/athlete is trusted in either setting. In sport there is a distinct possibility that an athlete could be trusted in the competitive or performance context but not in a social context. The McAllister (1995) measure has never been validated in a sport context and due to many potential discrepancies and omissions, a sport specific measure of trust is needed.

It is important to note that the central limitation hindering trust research in sport pertains to the lack of a valid measure. Although there has been consistency in measuring trust within sport with Dirks (2000) and subsequently Mach, Dolan, and Tzafrir (2010) using the same measure, it has not been validated in sport. For example, domains such as organizational psychology and military research have experienced a surge in team decision-making and performance research (Cannon-Bowers & Bowers, 2006). Research within these fields has provided evidence suggesting the importance of team decision-making research within sport. Trust in an organizational setting has been shown to be an active variable in the team-decision making process that enhances organization performance (Spreitzer & Mishra, 1999).

It can be tempting to generalize results from an organizational and military context to that of sport; however, this should be done with some caution (Cannon-Bowers & Bowers, 2006). There are fundamental differences between sport and organizational teams. These include practical differences such as the environment in which teams enter daily and compete, and the motivations for membership (Barker, Rossi & Puhse, 2010). For example, sport teams compete in arenas and stadiums in front of a live audience, whereas most organizations do compete but may not ever see their opponents.

Team structure is another potential difference between organizations and sport. For example, in sport there is a pre-existing structure with which coaches and team leaders must follow. A hockey coach is required to play 5 skaters and a goalie, and a soccer manager must field 11 players (10 in the field and a keeper). Under the rules of these sports, these structures do not change. Typically in business, managers can organize a group or team to whichever structure they deem will be the most effective, or perhaps not organize a team at all (Barker, Rossi & Puhse, 2010).

Many studies have been conducted investigating the antecedents of trust in an organizational setting (Mayer, Davis & Schoorman, 1995). In their review of the antecedents of trust, Mayer, Davis and Schoorman (1995) cited multiple antecedents, such as; reputation, reliability as an information source (Griffin, 1967), loyalty, discreetness and receptivity (Butler, 1991). These characteristics influence trust within an organizational setting but may not have the same influence within a sports team.

Cannon-Bowers and Bowers (2006) suggest categorizing teams in terms of interdependence and the opportunity to coordinate. This research will investigate *team interdependent* sports (e.g. hockey, soccer, basketball) and trust between teammates at the individual level. Using previous evidence from both organizational and sport domains, this research will develop a sport-specific measure of trust. In addition to development of a sport specific measure of trust, preliminary validation will be achieved through examination of the Trust in Sport Questionnaire and the correlations to an established measure of group cohesion, The Group Environment Questionnaire (Carron et al., 1985) and to an adapted measure of trust in sport (Dirks, 2000).

## **2.7 Measurement Development**

Research at any level and in any field is fairly dynamic. New theories are developed and tested, and new constructs are formed. Psychology, and more specifically sports psychology, is a dynamic field that often turns to psychometrics to quantify newly developed constructs or existing constructs in the context of sport. To develop a psychometric test or scale there are parameters that a researcher must follow (Clark & Watson, 1995). Step 1 requires an in-depth knowledge of the construct that is being quantified. To develop a quantitative scale, this first step of gathering knowledge is often achieved using qualitative methods, such as focus groups and

open-ended questionnaires. The purpose of this step is to determine a meaning of the construct as perceived by the specific demographic that you will be testing when the measure is complete.

A comprehensive literature review on the topic is a necessity. The literature review is used to articulate the basic construct as clearly as possible. The review should include any previous attempts to conceptualize and assess both the same construct and closely related constructs. Subsequently, the review should be broadened to encompass what may appear to be less immediately related constructs to articulate the conceptual boundaries (Clark & Watson, 1995).

The information gained through step 1 is used to supplement step 2, item generation. Item generation is the process of generating an initial pool of items that will be narrowed and adjusted to eventually become the final scale or measure. In item generation, the primary concern is content validity, which may be viewed as the minimum psychometric requirement for measurement adequacy (Hinkin, 1995). Expert consultation is a vital aspect in developing content validity. Expert review can happen throughout the development of initial items, upon completion of an initial item pool (Boardley & Kavussanu, 2007; Haynes, Richard & Kubany, 1995; Lee, Whitehead & Ntoumanis, 2007) or at both time points. Experts from within the area of content-relevance are consulted to ensure the content validity of items as well as any definitions that have been developed. Finally, in creating the initial item pool, the test developer also must decide on the response format to be used; two of the most common are dichotomous responding and Likert scale rating (Clark & Watson, 1995).

Following the expert review phase, a Think Aloud Protocol (TAP) offers another opportunity to layer content validity into the measure. Ericsson and Simon's (1993) research on verbalization of cognitions revealed that verbalizations are a subset of the cognitions.

Information that is recently acquired and currently being concentrated on (i.e., reading a question on a questionnaire) can be accessed as a verbalization. The TAP allows one to evaluate whether an individual respondent or relevant group (i.e. athletes) understands and processes the instrument's items as was intended by the instrument's developer (Dietrich & Ehrlenspiel, 2010). Think aloud protocols can be carried out concurrently or retrospectively. In a concurrent format the participants are asked to verbalize their cognitive process of completing the questionnaire. Ericsson, Simon & Estes (1980) had previously investigated concurrent and retrospective verbal reports and found that the concurrent format provides direct verbalization of cognitive tasks. The retrospective report requires retrieval from a past learning experience and thus is prone to inaccuracies. Concurrent think aloud protocols have been used to decipher the thought processes of distance runners (Samson et al., 2017) and cyclists (Whitehead et al., 2018). Whitehead et al. (2016) used a concurrent think aloud protocol to develop a framework to facilitate coach learning among British rugby coaches. These protocols can be effective in many different sport contexts.

Following the expert evaluation and think aloud protocol the next step in the measurement development process is to administer these items to a relevant population. The initial iteration of the measurement is administered to examine how the construct is measuring what it is has been designed to measure. A large sample population is needed at this step, large samples must be obtained to achieve the sampling adequacy required to run a factor analysis. Following collection of the data it was refined and analyzed.

The most common analytic technique used for data reduction and refining constructs is a factor analysis (Ford, McCallum, & Tait, 1986). In a review of scale development practices Hinkin (1995) found that principal components analysis (factoring method of factor analysis) with orthogonal rotation was the most frequently reported factoring method (33%). An



Exploratory Factor Analysis (EFA) looks to identify the factor structure of an instrument based on participant's responses to an administered questionnaire. An EFA is essential to determining the underlying constructs of a measure's variables. In factor analysis, it is generally assumed that (a) common variance is due to the effects of underlying factors and (b) the number of factors of substantive interest is less than the number of indicators (Kline, 2013)

To complete an EFA, you must have an initial data set with a set of items. Initial extraction is the first step; each factor will explain the maximum amount of variance that is not explained by the previous factor. The next step is to determine the number of factors that are going to be retained. As previously stated a common practice is to consider all factors with eigenvalues greater than 1 (Kaiser, 1960). Another method is the use of scree plots, which the plotting of each eigenvalue against the factor with which it is associated. The scree plot will typically have a few factors with high eigenvalues and many factors with relatively low eigenvalues. This creates a steep descending curve that flattens out which creates a "point of inflexion" or an "elbow". This is the point where the line connecting the factors resembles an elbow or a sharp change in direction and is suggested to be the cut-off point for retaining factors (Cattell, 1966).

After a decision on the retention of factors has been made, a rotation (transformation) can be done to have factors better represent the data. Variables have high loadings on the most important factors and smaller loadings on all other factors. To better discriminate between factors, a factor rotation can be used (Fields, 2013). There are several different rotations that can be used, the most basic are orthogonal rotation, where factors are independent or oblique where factors are allowed to covary. The goal of the rotation is to enhance the interpretability of the retained factors (Kline, 2013).

After factor extraction and rotation, reliability is checked. Reliability refers to the test-retest consistency of the scale being developed. There are two basic concerns with respect to reliability, consistency of items within a measure and stability of the measure over time. The most commonly accepted measure is internal consistency reliability using Cronbach's Alpha (Hinkin, 1995). Although the generally accepted values are .8 for cognitive tests and .7 for ability tests (Kline 2013). Results from the EFA will leave scale developers with a reduced item pool and newly determined structure to re-test.

Construct validity is achieved if the developed scale is measuring the constructs that it claims to be measuring. Throughout the scale development process, a case for validity must be built. The true test of validity is time as more studies validate the measurement procedure. A strong case for construct validity is concurrent validity (Fields, 2013). Concurrent validity can be accomplished through using subsequent psychometric analyses for the refinement of the developed scale. High magnitudes of shared variance between scores of a newly developed measure and well-established measure can result from items converging on constructs outside of those targeted. Construct validity difficulties can arise when the criterion instrument is (a) based on a different definition of the construct (i.e., trust), (b) contains items outside the construct domain, or (c) disproportionately taps some facets of the construct (Haynes et al., 1995). However, if the goal is to measure a novel construct it is beneficial to have low magnitudes of shared variance between measures as this indicates that the newly developed measure is tapping into a different construct (e.g. Lee et al., 2007). These low magnitudes of shared variance would indicate discriminant validity.

This present study aimed to measure the novel construct of trust in sport. An in-depth knowledge of trust in other performance-based domains were used to develop a framework. This

framework was subsequently used as a foundation for item development and subsequent analysis of those items. It is hypothesized that the developed framework and subscales will be supported by the exploratory factor analysis. It is also hypothesized that the total scores of the Trust in Sport Questionnaire (TSQ) will be moderately correlated ( $r = .3 - .5$ ) with the Group Environment Questionnaire (GEQ) and the Adapted Trust Questionnaire (ATQ). It is expected that the ATQ will have a higher correlation score than the GEQ. When investigating the subscales of the GEQ, it is hypothesized that the highest correlations will be with the Group Interaction -Task (GI-T) subscale because this subscale evaluates the interactions related to the task.

### ***Chapter 3: Item Generation, Expert Review, and Think Aloud Protocol – Methods and Results***

Trust is a variable that has been studied extensively in organizational science and valid psychometric measures exist in this context. However, research conducted on trust within sport does not use a valid sport specific measure. To develop a measure there are parameters that a researcher must follow. This chapter will describe the methods and subsequently the results for each subsection of this chapter; the item generation, expert review of the initial pool of items, and the Think Aloud Protocol of the Trust in Sport Questionnaire. This chapter will outline the steps taken, to allow the reader a better understanding of the first steps in the development and validation process of the Trust in Sport Questionnaire.

#### **3.1 Developing an Understanding**

The development of the Trust in Sport Questionnaire required an in-depth knowledge of trust in a variety of contexts. To develop a quantitative measure, the first step was gathering knowledge. Knowledge was gathered at this step through a combination of a literature review and the triangulation of this knowledge with other sources (e.g., Dithurbide & Flett, 2014; Mach et al., 2010). Triangulation occurred by careful analysis of the information gathered through the literature review and reviewing studies investigating trust in sport (e.g., Dithurbide & Flett, 2014; Mach et al., 2010) that included interviews conducted with individual athletes and research differentiating trust from other group dynamic constructs.

The literature review compared and contrasted research from both organizational and sport contexts, because of the extensive research conducted on trust in organizational psychology, several theoretical frameworks have been presented. Along with the knowledge gathered from previously developed psychometric sport measures (e.g., Group Environment Questionnaire; Carron, Widmeyer, & Brawley, 1985; and Collective Efficacy in Sport

Questionnaire, Short, Sullivan, & Feltz, 2009) and the limited research conducted on trust within sport, the frameworks from organizational psychology were modified to fulfil the needs of a sport specific framework. This framework was used as a base for which an initial pool of items could be generated.

The field of organizational psychology has provided several models of trust within organizations (Mayer et al., 1995; McAllister, 1995). The modern sports team draws many similarities to the modern corporation. To completely ignore the research and frameworks that have been developed within the field of organizational psychology when developing a framework for sport would be imprudent. While the researcher acknowledges the similarities between sport and organizational constructs, such as the importance of independence and the opportunity to communicate (Cannon-Bowers & Bowers, 2006) this research would not be necessary if there were not differences between sport and organizational constructs. In this research, we are attempting to measure trust in sport as a construct, not the antecedents or outcomes.

Sport has a distinct emotional component that can influence the outcome of a match or game (Vallerand & Blanchard, 2000). There has been considerable research conducted on emotional intelligence in sport (Duncan, Latimer-Cheung & Brackett, 2014), to illustrate the role emotion plays in group dynamics specifically related to sport. Accurately perceiving a person's emotions facilitates the prediction and understanding of that person's subsequent actions (Elfenbein & Ambady, 2002). Dirks and Ferrin (2001) proposed that trust facilitates workplace behaviours and outcomes by influencing one's expectation about another's future behaviour. McAllister's (1995) framework differentiates the emotional aspects of trust (affect-based) and

the strict cost benefit analyses of one's behaviours (cognitive-based) as the base of his trust framework.

The ability to accurately predict behaviours of a teammate is a performance advantage in sport. The organizational research of trust is compelling enough to support the addition of an emotion aspect to a sport framework. The differentiation of the emotional aspects from the cognitive aspects of trust lead to the belief that McAllister's (1995) framework outlining cognitive and affective based trust could be adapted to a sport context.

The McAllister (1995) framework outlines the cognitive and affect based foundations of trust, which were described in the literature review of the manuscript. The cognitive foundation evaluated knowledge of a person's capabilities, while the affective foundation evaluated emotional bonds and investments in relationships. When adapting this framework to a sport setting, other psychometric sport measures were reviewed; for example, the Group Environment Questionnaire (GEQ; Carron, Widmeyer, & Brawley, 1985) and Collective Efficacy Questionnaire for Sports (CEQS; Short, Sullivan, & Feltz, 2009). The GEQ contains a social aspect of the measurement, this aspect acknowledges the activities conducted outside of the organized structure of the team environment. Research conducted using the GEQ has shown the social (IAG-S and GI-S) aspects of team cohesion do link to performance (Dobersek, Gershgoren, Becker, & Tenenbaum, 2014). In sport, there is a large time commitment, and in interdependent sport, teammates often spend significant amounts of time together (e.g. ,practice, strength training, team meetings, video sessions, and games). These commitments can also move outside of team delegated activities and into social activities that are not team requirements.

In McAllister's (1995) framework he cites interaction frequency and citizenship behaviour (i.e., behaviour intended to provide help and assistance that is outside an individual's

work role, not directly rewarded and conducive to the effective organizational functioning) as the antecedents to affect-based trust. It is believed that there are many factors that contribute to both of these factors (i.e., interaction frequency, citizenship behaviour) that does not happen on the playing surface. Therefore, in the preliminary framework, an interpersonal dimension to the cognitive and affective pillars was added to the cognitive and affect-based pillars of trust (Fig. 1).

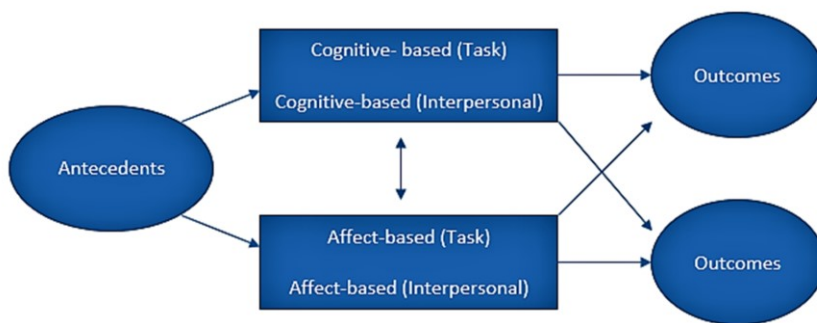
In addition to the preliminary framework, an analysis was completed of the Dithurbide and Flett (2014) paper. This paper provided insight into how athletes articulated teammate trust and how it was differentiated from other psychometric variables. The analysis of this specific research and the comprehensive literature review of both organizational and sport contexts lead to the conclusion that it would be redundant to conduct further focus groups. The depth of the previous research and the literature review revealed adequate data saturation had been achieved to develop an initial pool of items.

### **3.2 Item generation**

**Methods.** After developing an in-depth understanding of the construct under investigation, the item generation phase began. Content validity is built into a measure by the development of items (Clark & Watson, 1995). Item development was achieved in this case through a deductive method, sometimes called "logical partitioning," or "classification from above." This method requires an in-depth understanding of the phenomenon that is being investigated and the development of a theoretical framework of the construct under examination. The framework was then used as a guide for the development of items (Hinkin, 1995). This method was used because the development of a framework of trust in sport is essential to this

research. An in-depth understanding was established to subsequently develop this framework and further our understanding of trust to better aid in the measurement development process.

The initial pool of items was (a) broader and more comprehensive than one's own theoretical view of the target construct and (b) included content that ultimately will be shown to be tangential or even unrelated to the core construct (Clark & Watson, 1995). This was done to ensure there is an adequate sample of items within each of the major content areas or subscales of the broader conceptualized construct. Formal subscales were created before item development began. Cognitive-Based Task (CBT) is associated with the cognitive aspects of McAllister's (1995) framework and sport-specific tasks. Cognitive-Based Interpersonal (CBI) is associated with the cognitive aspects of McAllister's (1995) framework and non sport-specific activities. Affect-Based Task (ABT) is associated with the affective aspects of McAllister's (1995) framework and sport-specific tasks. Affect-Based Interpersonal (ABI) is associated with the affective aspects of McAllister's (1995) framework and non sport-specific activities.



*Figure 1:* Trust in sport framework. This figure illustrates the proposed framework for trust in sport

Items were developed using the trust in sport framework subscales and existing organizational and sport literature (e.g., McAllister, 1995; Mayer et al., 1995, Dirks 2000) to



ensure that a comprehensive theoretical view was being achieved. The researcher's own sporting experience as an athlete and coach played a role in the development of items by also including items believed to be important to the construct.

Finally, a response format was chosen. Two of the most common response formats are dichotomous responding and Likert scale rating with three or more options (Clark & Watson, 1995). Trends in previous and related measures such as the GEQ (Carron, Widmeyer, & Brawley, 1985) and McAllister's (1995) measure of trust have used 7-point and 9-point scales respectively. However, more recent related psychometric measures such as The Child Sport Cohesion Questionnaire (Martin, Carron, Eys et al., 2013) and the Prosocial and Antisocial Behavior in Sport Scale (Kavussanu & Boardley, 2009) use 5-point scales. A large number of choices (e.g. 7 to 9) can allow participants to display the specificity of their responses, yet when the range is too large it can affect validity by introducing an element of random responding (Clark & Watson, 1995). Due to the substantial number of items it was believed that a Likert scale featuring a large number of choices would significantly increase response times during questionnaire administration. Therefore, the 5-point scale was deemed appropriate given the number of items and the population. The 5-point scale also introduces a mid-point. The midrange was thought to be helpful for two reasons: 1) The mid-point represents a neither agree or disagree option meaning the item is not representing any relevance to trust; and 2) the mid-point ratings could represent confusion regarding a particular item. In either situation a large number of mid-point ratings would cause researchers to reassess the items relevance in the questionnaire.

The level of measurement of trust that is used is an individual perspective of teammates. This is consistent with other measures used in sport, such as cohesion (Group Environment Questionnaire) and collective efficacy (Collective Efficacy Questionnaire for Sport). Mortiz and

Watson (1998) discussed issues with the levels of analysis and specifically self and collective efficacy. Collective efficacy can be measured multiple ways, including; by an aggregate of individual measures of self-efficacy, an aggregate of individual measures of collective efficacy or by group consensus (Mortiz & Watson, 1998). Team trust as a group construct could be measured as an aggregate of individual measures of teammate trust. However, team members' judgements of team trust be shown to be shared by the group. Group outcomes have the ability to largely represent the sum of individual contributions working independently. It is expected that teammate trust measured as an individual level variable will behave much the same as efficacy. This issue is further addressed in Chapter 5 (Future Directions).

**Results.** Using the framework that was developed a priori (Figure 1) to guide item generation, a total of 76 items were developed and divided into 4 subscales (Appendix A). Some examples of questions and corresponding subscales are: “My teammates execute the requirements of their position (i.e., score/prevent goals) to a high degree” (Cognitive-Based Task); “My teammates effectively manage stress in their life” (Cognitive-Based Interpersonal); “My teammates create a positive atmosphere at the arena or field” (Affect-Based Task); “My teammates interact with me frequently outside of sport” (Affect-Based Interpersonal).

### **3.3 Expert Review**

**Methods.** Expert consultation is another vital aspect on developing content validity. Expert review happened upon the completion of the initial item pool (Haynes et al., 1995; Lee et al., 2007; Boardley & Kavussanu, 2007). Experts from within the area of content-relevance were consulted to ensure the content validity of items as well as the theoretical framework that was developed with definitions of the subscales. Experts were chosen by reviewing the curriculum vitae of authors who appeared frequently throughout the literature review process. Experts within

the field of organizational science and sports psychology were recruited in an attempt to gain a well-rounded critique of the items presented. Experts were contacted by email using addresses gathered from public websites and were asked if they would participate in the expert review process. All documentation, including a letter of information, informed consent, and the Trust in Sport Questionnaire, was included attached to the email at initial contact with the expert. The qualifications of the experts chosen to assess item content-relevance, along with justification, are listed below (Dunn, Bouffard, & Rogers. 1999):

Expert 1: Expertise in sport group dynamics: cohesion, efficacy

Expert 2: Expertise in sport psychology, group dynamics, measurement development

Expert 3: Expertise in organizational psychology: trust

Expert 4: Expertise in group dynamics organizational & sport: trust

Lynn (1986) recommends five experts is adequate. However, the initial expert reviews yielded similar responses and other measurement development studies have used three external experts (e.g., Eys, Loughead, Bray, & Carron, 2009). Following the fourth expert review no more experts were recruited. Experts who did consent to participating and completed the review were provided with a clearly described item-evaluation tool for which to evaluate the measure (Dunn et al., 1999). The item-evaluation tool contained two questions per item, each on a 3-point scale (1 = agree to 3 = disagree). The questions asked experts if; “This item is written in a way that is easy to understand” and “This item is an important indicator of interpersonal trust”. This process was adapted from Dunn et al. (1999). The scale was made as simple as possible to accommodate the large number of items in the measure while still providing the developers with quantified item ratings and the opportunity to evaluate and summarize relevance-judgments (Dunn et al., 1999).

**Results.** Four experts reviewed the 76-item measure they were provided. Items were removed from the instrument if three of four experts scored the item a 3 (disagree), indicating that the item was not relevant to interpersonal trust. However, if any expert scored an item a 1 (agree), indicating the item was particularly relevant to interpersonal trust the item was kept. If one or two of the experts scored an item a 3 (disagree), indicating they did not feel it was an important indicator of interpersonal trust, the item was flagged for future consideration. Of the initial 76 items (CBT = 24; CBS = 16; ABT = 19; ABS = 17) 15 items were removed following the expert review (Table 1). An additional 13 items were edited to improve future comprehension. For example, the item “Be in a leadership position on the team” was edited to “My teammates are leaders on the team”. The other edits can be seen in Appendix B.

| Table 1.<br><i>Removed Items following Expert Review</i>   |         |
|--|---------|
| <b>Cognitive-Based (Task)</b>  |         |
| Have a high degree of previous success in their sport  | Removed |
| Have previously played for the same team   | Removed |
| Have no experience in the current sports league  | Removed |
| Have little experience at the current level of competition   | Removed |
| Be trusted by the coaching staff   | Removed |
| Be trusted by players from other teams   | Removed |
| Play the same position as me on the team   | Removed |
| <b>Cognitive-based (Social)</b>  |         |
| Experience success outside of sport (i.e. academics)   | Removed |
| Have the same cultural background  | Removed |
| Have the same values as me   | Removed |
| Be in a committed relationship   | Removed |
| Play a musical instrument  | Removed |
| <b>Affect – Based (Task)</b>   |         |
| Never be too excited   | Removed |
| <b>Affect – Based (Social)</b>   |         |
| Have a lot of friends outside of the team  | Removed |
| Always seem to have it together  | Removed |
| <i>Notes. The stem for all questions in the table is “rate how strongly you trust your teammates to:” This stem was subsequently changed in further versions of the questionnaire. ”</i> |         |

### 3.4 Think Aloud Protocol

**Methods.** A Think Aloud Protocol (TAP) is a type of cognitive interviewing that assesses the test content of the Trust in Sport Questionnaire. Essentially, the TAP involves asking focus group participants to simply think out loud as he/she is answering the questionnaire (Dietrich & Ehrlenspiel, 2010). The TAP provides another opportunity to layer content validity into the developing measure. The concurrent TAP (Fonteyn, Kuiper, & Grobe, 1993) was used in this research. This type of TAP involves asking the participants to verbalize thoughts while answering the questions on the questionnaire. A number of recent research studies within sport psychology have utilized TAPs (Samson, Simpson, Kamphoff, & Langlier, 2017; Whitehead et al., 2016, 2018). TAPs are a means to develop an in-depth understanding of unique phenomenon from the people that experience them first hand.

Two TAPs were conducted containing 5 participants (10 total; 7 male, 3 female) each from interuniversity sport and/or competitive club teams (e.g., Hockey, Soccer, Curling, Football, Lacrosse, Volleyball). The athletes who were recruited participated in interdependent sports (i.e. teammates who interact with one another during game play). The primary investigator contacted team executives or head coaches to request permission to discuss the study with team members. Contact information for team executives or coaches was gathered through publicly available forms (i.e., team websites). The primary investigator emailed executives/coaches a Letter of Information. All participants who expressed interest in the study were contacted by email and thanked for their interest. The TAP contained only a single member from each team that was contacted to participate. This was done to be sure no biases emerged during the protocol. Other members from the same team who expressed interest were asked if they would like to be placed on a waiting list. In the event the first participant could not participate, the first

participant from the waiting list was contacted. The TAPs took place at Dalhousie University and were approximately 45-60 minutes long. An equal number of males and females were targeted within the think aloud protocol in an attempt to ensure gender equality during this step of the process. However, the first five participants to respond and confirm participation in the TAP were chosen, this method led to the greater representation of males ( $n=7$ ) in the TAP. Participants read and signed informed consent forms, the primary investigator then read through each of the items on the questionnaire. Participants were asked to voice any questions/concerns or thoughts they had as the item was being read. This entire process took place in a group setting. If there were questions regarding the wording or content of an item, it was taken under consideration to be edited.

**Results.** The participants were instructed to complete the questionnaire containing 61 items that were retained following the expert review phase. Participants verbalized all thoughts throughout the TAP process. This process aided in finding problematic items within the questionnaire before proceeding to administer the questionnaire on a larger population of athletes. If an item was previously flagged from the expert review and then identified by the athletes in the TAP as a problematic item, it was removed. For example, the item “My teammates are proud around their teammates” was scored as a poor indicator of teammate trust during the expert review (3 of 4 experts disagreed that it was an indicator of teammate trust, scoring a 3 out of 3 on the disagreement scale). However, it was retained for the TAP, because a single expert scored the item a 1 of 3 on the disagreement scale. This score indicated the expert agreed that it was an indicator of teammate trust. The athletes in the TAP expressed concern over this item, stating they did not believe pride was an indicator of trust. The item was therefore removed.

If an item was not previously flagged in the expert review it could not be removed following the TAP. Of the 61 items that were present in the questionnaire, three were removed during this process (see Table 2). The 10 edits that were made to the questionnaire can be seen in Appendix D. For example, the item “My teammates study team systems” was edited to “My teammates study team systems/strategies”. This was done to encompass a wider variety of team sports that may not contain systems (e.g., curling).

| Table 2.<br><i>Items Removed following Think Aloud Protocol</i>            |         |
|--|---------|
| <b>Cognitive – Based (Task)</b>  |         |
| Do their job   | Removed |
| <b>Cognitive – Based (Interpersonal)</b>                                   |         |
| Are proud around their teammates   | Removed |
| <b>Affect – Based (Interpersonal)</b>                                      |         |
| Trust others   | Removed |
| Exceed the minimal requirements of being a good teammate                   | Removed |
| <i>Notes. The stem for all questions in the table is “My teammates...”</i> |         |



## *Chapter 4: Survey Administration, Factor Analysis, and Validation – Methods and Results*

### **4.1 Survey Administration**

**Methods.** Following a phased review from the Research Ethics Board, questions were raised regarding the stem used in the questionnaire. The stem which can be seen in Appendix C, “how strongly do you trust a team mate who...”, was believed to favor positive responses from participants and subsequently lead to little variance in responses. Through this review and through consultation with one of the expert reviewers, the stem was changed to: “My teammates...” so that it would not skew responses (Appendix E). The next step was to administer the remaining items to examine how well they are measuring the constructs they were designed to measure.

#### ***Participants***

A total of 399 participants started the online questionnaire. However, only completed questionnaires with no missing data were used. Consequently, only 193 of the 399 questionnaires that were started were deemed usable for analysis due to missing or incomplete data. This was a completion rate of 48%, which was less than ideal. Descriptive statistics are reported only for the final sample. Participants ( $N = 193$ , 95 males, 98 females) were athletes competing at the university or similar level (i.e., competitive club) with the goal of winning. The average age of participants was 20.8 ( $SD = 4.4$ ) years. Targeted sports included hockey ( $n = 74$ ), basketball ( $n = 24$ ), soccer ( $n = 19$ ), rugby ( $n = 21$ ), volleyball ( $n = 23$ ). Other sports ( $n = 33$ ) included rowing, curling, football, lacrosse, field hockey, and baseball. Equal gender representation was sought by approaching an equal number of male and female teams.

## *Measures*

Participants completed an online survey comprised of demographic questions including age, sex, primary sport, and current team. The following portion of the questionnaire comprised of the questions that had been retained through the expert review and the TAP (items = 57). Sample questions from each of the subscales include: (CBT= 16 items) “My teammates are efficient at executing the demands of their role”; (CBI = 10 items) “My teammates cope well with demands”; (ABT = 18 items) “My teammates show they are willing to cooperate”; (ABI = 13 items) “My teammates show empathy”. The final phase of the questionnaire also had participants complete the 18-item Group Environment Questionnaire (GEQ; Carron, Widmeyer, & Brawley, 1985) and the 9-item Adapted Trust Questionnaire (ATQ; Dirks, 2000).

The GEQ is a sport-specific measure designed to assess team cohesion (Carron, Widmeyer, & Brawley, 1985). The GEQ measures group cohesion using 4 subscales: Individual Attractions to the Group-Task (IAG-T), Individual Attractions to the Group-Social (IAG-S), Group Integration-Task (GI-T) and Group Integration-Social (GI-S). The GEQ uses a Likert-scale where respondents indicate on a scale 1-9 their level of agreement with the item where 1 indicates low agreement (low cohesion) and 9 indicates high agreement (high cohesion). This framework is comparable to the framework developed in the current study and it is believed that cohesion and trust may be related constructs in sport since meaningful group interaction is needed to achieve high levels of both cohesion and trust.

The ATQ is a questionnaire that was originally developed to measure trust within a corporate setting (McAllister, 1995) and was adapted to sport by Dirks (2000). This adapted measure uses an organizational framework (McAllister, 1995) and simply adapted the questions the McAllister (1995) measure to reflect teammates versus superiors and co-workers. The

adapted trust questionnaire (Dirks, 2000) uses a Likert-scale where respondents indicate on a scale 1-7 their level of agreement with the item where 1 strongly disagree with the statement and 7 indicates strongly agreement with the statement.

This measure was used in the current study because it is a commonly used measure of trust within the organizational setting. The newly developed trust measure for sport should be related to this measure but should not be highly correlated (i.e., multicollinearity). High correlations between these measures would suggest the newly developed sport measure is not tapping into novel aspects when compared to what the adapted measure is already assessing. This would affect the validity of the new trust in sport measure.

### ***Procedure***

Participant recruitment included emails sent to varsity and competitive club coaches at local universities and colleges. This email asked permission to recruit players from their respective teams to participate in the study and a link to the online questionnaire. If the coach agreed to have their athletes participate, they were asked to forward the link onto their athletes. Social media (Twitter and Facebook) was also used to recruit athletes from other institutions and competitive club teams. A link to the online questionnaire was included in recruitment messages posted on team Facebook and Twitter pages. Potential participants were asked to follow the link, and once the questionnaire was completed, were invited to enter a draw for a \$50 gift card.

### ***Data Analysis***

In the measurement development process, the first set of data collected from an independent sample is analyzed using an Exploratory Factor Analysis (EFA). An EFA looks to identify the factor structure of an instrument based on participants' responses to the administered set of items. The EFA is critical to determining the underlying constructs of a measure's

variables (Kline, 2013). An EFA was conducted through SPSS using a principal axis extraction without a rotation to determine the relationship between factors.

In analyzing the results from the first EFA item reduction through statistical means was the main objective. The R-matrix was inspected for correlations that were  $< .3$  and  $> .9$ . The anti-image matrix was also inspected for large correlations (Field, 2013). Absolute values under  $.01$  were suppressed during the initial analysis and below  $.03$  in subsequent analysis (Field, 2013).

A second EFA was conducted following the statistical item reduction. The approach to item reduction at this stage was both statistical and conceptual. Statistically, items were required to have a factor loading of at least  $.35$  on one factor and to load no more than  $.25$  on another factor to be representative of a certain factor (Short, Sullivan & Feltz, 2009). Only factors with eigenvalues over 1 were retained (Kaiser, 1960). Items were also subjected to a conceptual reduction where if they did not fit within the conceptualization of the factors that were statistically revealed through the EFA, they would also be removed.

Following the statistical and conceptual reduction a third EFA was conducted to reveal the underlying factor structure of the remaining items.

### ***Validity***

Construct validity was achieved through the EFA and assessing the concurrent validity of the TSQ and other established measures from within sport. Construct validity is assessed because a prediction has been made regarding the operationalization of trust and how it will perform based on a developed theoretical framework. Concurrent validity is the degree to which the operationalized construct is correlated with variables it might be expected to be correlated (Vaughn & Daniel, 2012). Subsequent psychometric analyses were used to assess concurrent validity. The GEQ and its subscales (Individual Attraction to the Group – Task, Individual

Attraction to the Group – Social, Group Integration – Task, Group Integration – Social; Carron, Widmeyer, & Brawley, 1985) as well as the Adapted Trust Questionnaire (Dirks, 2000; Mach & Lvina, 2017) were used to measure concurrent validity. It is hypothesized that the newly developed measure will be correlated with both the GEQ and the Adapted Trust Questionnaire (ATQ). A moderate correlation ( $r = .3 - .5$ ) is hypothesized with the Group Environment Questionnaire (GEQ) and the Adapted Trust Questionnaire (TSQ). It is expected that the ATQ will have a higher correlation score than the GEQ, because the ATQ and the newly developed TSQ will be measuring the same construct but across different environmental contexts.

When measuring a novel construct, low magnitudes of shared variance between measures indicates that the newly developed measure is tapping into a different construct, this is referred to as discriminant validity. High magnitudes of shared variance between measures that were hypothesized to converge indicate convergent validity (Lee et al., 2007). Correlation coefficients of the GEQ (Carron, Widmeyer, & Brawley, 1985) subscales (IAG-T, IAG-S, GI-T, GI-S), the Adapted Trust Questionnaire (Dirks, 2000) and the factors of the Trust in Sport Questionnaire were compared. Correlation coefficients between the GEQ (Carron, Widmeyer, & Brawley, 1985) subscales and the TSQ should be lower than those between TSQ and the adapted trust measure (Dirks, 2000). The ideal correlation range for is .3 to .5 (Kline, 2005). High correlations ( $<.8$ ) can indicate that the construct of interest has not added any novel understanding to the phenomena it is being compared to (Vaughn & Daniel, 2012)

**Results.** A preliminary factor analysis was conducted to determine the relationship between factors. It was determined through the EFA that the factors were related and all subsequent EFAs were conducted with an oblique rotation. In addition to determining the relationship between factors this preliminary EFA was conducted to begin to eliminate items

based on statistical criteria. If an item had consistent (e.g. 5-10) correlation scores below  $r = .3$  (singularity) or above  $r = .9$  (multicollinearity) (Field, 2013) within the R-matrix they were removed from the analysis. This resulted in the removal of twenty ( $n = 20$ ) items. Following the removal of items by inspecting the R-matrix, the anti-image matrix was inspected for large correlations. Items with correlations  $>-.4$  and  $< .2$  were removed (Field, 2013). This resulted in the removal of five ( $n = 5$ ) additional items. The statistical analysis of items within the TSQ measure resulted in the removal of a total of 25 ( $n=25$ ) items due to preliminary statistical cut-off criteria.

| Table 3.<br><i>Items removed during preliminary factor analysis</i>                    |         |
|--|---------|
| <b>Cognitive – Based (Task)</b>  |         |
| are highly skilled players in their playing positions                                  | Removed |
| are efficient at executing the demands of their role                                   | Removed |
| execute the requirements of their position (i.e. score/prevent goals) to a high degree | Removed |
| dedicated to the team  | Removed |
| physically prepare for each practice/game  | Removed |
| study team systems/strategies  | Removed |
| <b>Cognitive – Based (Interpersonal)</b>   |         |
| effectively manage stress in their life  | Removed |
| can be relied upon to help me complete a task outside of sport                         | Removed |
| are good role models outside of sport  | Removed |
| are accountable for their actions outside of sport                                     | Removed |
| are punctual (i.e. on time) outside of sport   | Removed |
| <b>Affect – Based (Task)</b>   |         |
| interact with you frequently at the arena or field                                     | Removed |
| are understanding of any issues you may have within the team                           | Removed |
| work to resolve team issues  | Removed |
| celebrate team success   | Removed |
| celebrate other individual’s success   | Removed |
| are supportive during other individual’s failures                                      | Removed |
| <b>Affect – Based (Interpersonal)</b>  |         |
| share similar goals outside of sport   | Removed |
| interact with me frequently outside of sport   | Removed |
| offer help when needed   | Removed |
| can keep a secret  | Removed |
| are loyal to teammates regardless of situation   | Removed |
| are approachable people  | Removed |
| are non-judgemental  | Removed |
| are open about their feelings  | Removed |
| <i>Notes. The stem for all questions in the table is “My teammates...”</i>             |         |

Following the initial statistical item reduction, a principal axis factor analysis with an oblique rotation (direct oblimin) was conducted on the remaining items ( $n=32$ ). The result of the factor analysis was a 4-factor model, based on retaining eigenvalues over 1 (Kaiser, 1960), accounting for a cumulative 55.4% of variance. This model went through the process of further statistical and conceptual reduction. Statistically, items must carry a loading at least .35 on one factor and load no more than .25 on another factor to be representative of that factor (Short, Sullivan & Feltz, 2009). Five items ( $n = 5$ ) were removed due to not meeting these criteria. There were items that were strongly cross-loaded that were retained for conceptual reasons (e.g. CBT 7, 9)

This model only contained factors with eigenvalues over 1 (Kaiser, 1960). Inspecting this model conceptually, the factor structure revealed through the EFA contained four ( $n = 4$ ) factors that isolated items pertaining to each of the pre-existing subscales (i.e. CBT, CBI, ABT, ABS) on different factors. Factor 1 contained all affect-based items (ABT and ABS) with one exception. Factor 3 contained all cognitive-based interpersonal (CBI) items with one exception. Factors 2 and 4 featured items all from the cognitive-based task (CBT) subscale (refer to Appendix F for factor structure and loadings).

Conceptually, factor 2 and 4 were assessing different subscales of trust according to the factor structure that was revealed through the EFA, however both factors included exclusively CBT items. Assessing the items loaded on each factor, the items on factor 2 closely resembled the items on factor 3 which appeared to be assessing the cognitive-based interpersonal aspect of teammate trust. For example, the item: My teammates are dedicated to their sport was loaded strongly (.698) on factor 2 and the item: My teammates are committed in all aspects of their life was loaded strongly (.666) on factor 3. The two items ( $n = 2$ ) on factor 2 that reflected



commitment were removed to avoid redundancy, leaving only three items on factor 2 with one being strongly cross-loaded with factor 4 (CBT 7).

Assessing the items on Factor 4, they appeared to reflect the performance aspect of teammate trust which is a critical aspect of the cognitive-based task aspects of teammate trust that was established in the early phases of the research. At this point in the conceptual reduction each factor contained three items. The two most strongly loaded items were on factor 4. For simplicity, it was desirable to only have one factor reflect the cognitive-based task aspect of teammate trust. Between factor 2 and factor 4 the items that best reflected the cognitive-base task aspect were retained. This resulted an additional two ( $n = 2$ ) being removed. Two more items were removed due to conceptual reasons resulting in a total of six ( $n = 6$ ) items removed. The analysis of the second EFA resulted in a combined (statistical and conceptual) reduction of a total of eleven ( $n = 11$ ) items (see Table 4).

| Table 4.<br><i>Items removed during conceptual restructuring</i>           |         |
|--|---------|
| <b>Cognitive – Based (Task)</b>  |         |
| Follow team rules  | Removed |
| Dedicated to their sport   | Removed |
| Are very focused on their own improvement                                  | Removed |
| Mentally prepare for each practice/game                                    | Removed |
| Show commitment to the team  | Removed |
| Do not quit regardless of the score  | Removed |
| <b>Affect – Based (Task)</b>   |         |
| Are equally driven towards goals outside of sport                          | Removed |
| Are consistent in their actions in a game or practice                      | Removed |
| Demand the best from other teammates                                       | Removed |
| <b>Affect – Based (Interpersonal)</b>                                      |         |
| Are consistent with actions away from sport                                | Removed |
| Show empathy   | Removed |
| <i>Notes. The stem for all questions in the table is “My teammates...”</i> |         |

Following the statistical and conceptual analysis of preliminary EFA outputs, a principal axis factor analysis was conducted on 21 items with an oblique (direct oblimin) rotation. The Kaiser-Meyer-Olkin measure verified the sampling adequacy with a KMO statistic equating to .94 (Hutcheson & Sofroniou, 1999). All KMO values for individual items were greater than .85 which is above the acceptable limit of .5 (Field, 2013). Three factors, Cognitive-based Task (CBT), Cognitive-based Interpersonal (CBI) and Affect-based (AB), with eigenvalues greater than 1 were retained explaining a combined variance of 55.1%. Table 5 shows the factor loadings after rotation and the scree plot is also displayed (see Figure 2).

| Table 5. <i>EFA Pattern Matrix</i>   |          |          |          |
|--|----------|----------|----------|
|  | Factor 1 | Factor 2 | Factor 3 |
| ABT16  | .826     |          |          |
| ABT6   | .769     |          |          |
| ABS12  | .746     |          |          |
| ABT7   | .672     |          |          |
| ABT12  | .667     |          |          |
| ABT4   | .649     |          |          |
| ABT9   | .643     |          |          |
| ABS11  | .636     |          |          |
| ABT10  | .624     |          |          |
| ABT13  | .618     |          |          |
| ABT3   | .593     |          |          |
| ABT3   | .433     |          |          |
| CBT8   |          | .823     |          |
| CBT10  |          | .697     |          |
| CBT7   |          | .620     |          |
| CBT11  |          | .409     |          |
| CBS8   |          |          | .742     |
| CBS7   |          |          | .704     |
| CBS1   |          |          | .609     |
| CBS5   |          |          | .527     |
| CBS3   |          |          | .403     |
| <i>Notes: Cut off values set at .25 to reflect lowest statistical cut for cross-loadings (text p.55)</i> |          |          |          |

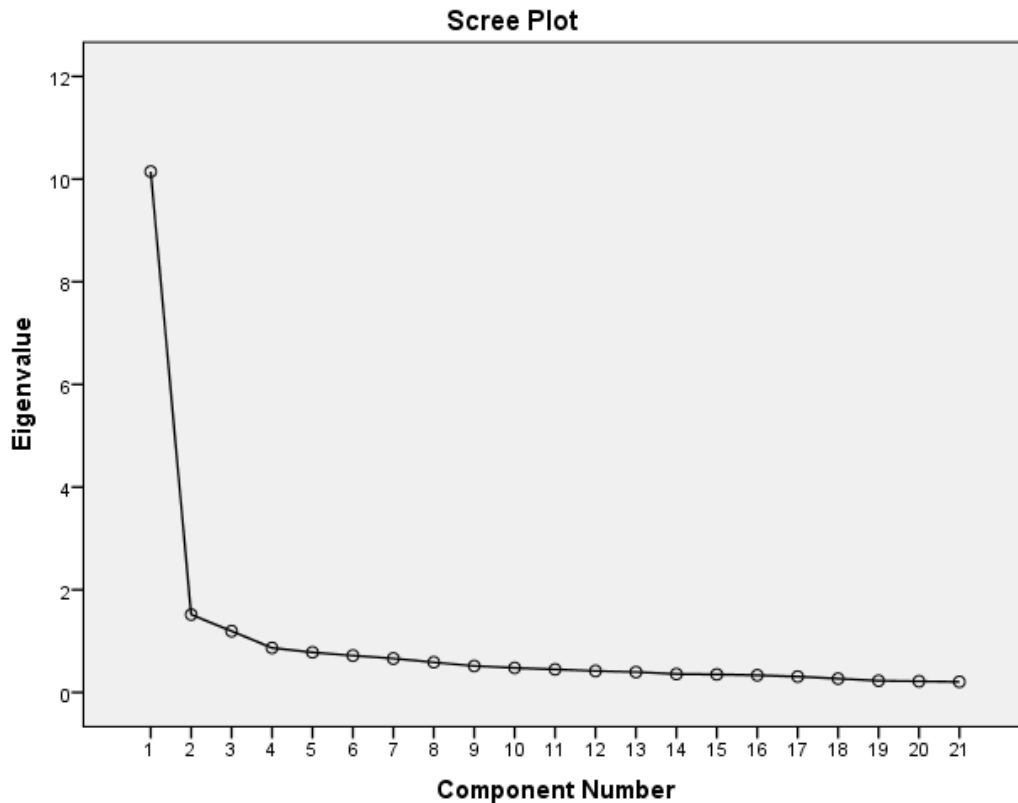


Figure 2. Scree plot of Final EFA.

| Subscales  | Descriptive Statistics |             |                  |              |
|------------|------------------------|-------------|------------------|--------------|
|            | <i>M</i>               | <i>SD</i>   | <i>Range</i>     | <i>Alpha</i> |
| <b>CBT</b> | <b>3.80</b>            | <b>0.74</b> | <b>1.50-5.00</b> | <b>.84</b>   |
| <b>CBI</b> | <b>3.87</b>            | <b>0.70</b> | <b>1.60-5.00</b> | <b>.86</b>   |
| <b>AB</b>  | <b>4.09</b>            | <b>0.63</b> | <b>2.25-5.00</b> | <b>.92</b>   |
| <b>TSQ</b> | <b>3.98</b>            | <b>0.59</b> | <b>2.95-5.00</b> | <b>.94</b>   |

Notes: *M*= mean, *SD*=standard deviation

### Validity

The reliability of the Trust in Sport Questionnaire and each subscale was measured using Cronbach's (1951) alpha. The reliability estimates range from .82 to .93 (Table 6). Correlations coefficients of the GEQ subscales (ATGT, ATGS, GIT, GIS), the adapted trust questionnaire

(ATQ) and the developed subscales of the Trust in Sport Questionnaire (CBT, CBS, ABT, ABS) were compared (Table 7). These correlation coefficients provide data on the concurrent validity, in this case convergent validity was hypothesized. Comparing the TSQ scores to the GEQ and ATQ we can see that the correlations are  $r = .61$  and  $r = .69$  respectively. These values are slightly above the ideal correlations for convergent validity however are still acceptable. The values of the GEQ subscale coefficients range from  $r = .19$  to  $r = .63$ . A higher level of correlation was seen between the total TSQ score and with the adapted trust scale at  $r = .69$ , seeing subscale values range from  $r = .53$  to  $r = .68$ . This indicates slightly higher correlation coefficient than a desirable level when analyzing convergent validity (Carlson & Herdman, 2012).

Table 7.

*Correlation coefficients of Measures Assessed During Survey Administration Phase*

|             | IAG-S | IAG-T | GI-S  | GI-T  | CBT   | CBI   | AB    | ATQ   | GEQT  | TSQT  |
|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| IAG-S       | 1     | .30** | .37** | .35** | .22** | .32** | .42** | .40** | .77** | .39** |
| IAG-T       |       | 1     | .17*  | .44** | .41** | .37** | .39** | .33** | .69** | .43** |
| GI-S        |       |       | 1     | .44** | .23** | .19** | .35** | .36** | .65** | .31** |
| GI-T        |       |       |       | 1     | .56** | .46** | .63** | .67** | .71** | .34** |
| CBT         |       |       |       |       | 1     | .65** | .66** | .53** | .47** | .81** |
| CBI         |       |       |       |       |       | 1     | .72** | .57** | .47** | .86** |
| AB          |       |       |       |       |       |       | 1     | .68** | .61** | .95** |
| <i>ATQ</i>  |       |       |       |       |       |       |       | 1     | .63** | .69** |
| <i>GEQT</i> |       |       |       |       |       |       |       |       | 1     | .61** |
| <i>TSQT</i> |       |       |       |       |       |       |       |       |       | 1     |

*Notes.* Abbreviation key: Individual attraction to group-social (IAG-S), Individual attraction to group-task (IAG-T), Group integration-social (GI-S), Group integration-task (GI-T), Cognitive-based task (CBT), Cognitive-based interpersonal (CBI), Affect-based task (ABT), Affect-based interpersonal (ABI), Adapted trust questionnaire (ATQ), Group environment questionnaire total (GEQT), Trust in sport questionnaire total (TSQT)  
 Significance levels: \*p < .05, \*\* p < =.01, \*\*\*p < .001

## *Chapter 5: Discussion*

This research outlines the development and preliminary validation of the Trust in Sport Questionnaire (TSQ). The TSQ is based on the multidimensional framework of trust that was developed by merging an in-depth review of trust from an organizational science lens and an in-depth knowledge of sport through previous research on trust and other similar variables. Through the factor analysis, a 3-factor model was chosen with the factors very closely resembling the conceptual framework that was present prior to the analysis. These results present an adapted framework and corresponding subscales within the TSQ (Cognitive-Based Task, Cognitive-Based Interpersonal, Affect-Based). The subscales are measured by mean scores considering the number of items within each subscale differs.

The final version of the TSQ contains a total of 19 items: 4 items in the Cognitive-Based Task (CBT) subscale, 5 items in the Cognitive-Based Interpersonal (CBI) subscale, 12 items from a combined Affect-Based Trust (AB) subscale. The AB subscale included 9 items from the original task (ABT) subscale and 4 from the original interpersonal subscale (ABI). The EFA provided results that were able to further guide the conceptualization of sports specific trust. A main objective during the factor analysis was the reduction of items within the measure. As stated previously, the approach to item reduction was statistical and conceptual.

Throughout the literature review, concept development, item generation, expert review, and think aloud protocol, a strong case for the original conceptual framework presented is built. The framework has a strong conceptual base and preliminary analysis partially supported the conceptual framework that was developed. The analysis showed support for the separation of cognitive and affective aspects of trust. The analysis also showed support for the separation of

the task and interpersonal in the cognitive-based aspect, however, support for the separation of task and interpersonal in the affect-based factor of trust was not supported by the data.

Conceptually this would suggest that social or interpersonal aspects that may be seen to reflect trust outside of sport, may not support trust in a sporting environment. For example, the item “My teammates can keep a secret” (ABS 6, Appendix E) was not retained. The items “My teammates keep promises to teammates” (ABS 1), and “My teammates are honest” (ABS 11) were retained. Potentially, if athletes cannot see how a particular trait can be transferable to their competitive and training environment, it may not be relevant to them. How athletes conceptualize trust could be viewed as placing importance on traits that would reflect a good teammate, not necessarily traits that reflect a respectable individual. This is demonstrated in the strong relationship between task cohesion and team performance (Carron, Bray & Eys, 2002). Highly interdependent teams (i.e. Basketball and Soccer) could amplify the relationships between team trust, cohesion and performance. Team such as basketball and soccer rely heavily on teammates to achieve tasks and do not have the positional segregation of a football or reciprocal interdependence of baseball team (Cannon-Bowers & Bowers, 2006). This type of interdependence may have an effect on teammate trust and/or cohesion.

Cannon-Bowers and Bowers (2006) discuss varying degrees of interdependence and opportunities to communicate as differentiating factors when investigating teams in sport and organizational science. It is possible that sports teams with varying degrees of interdependence could see fluctuations in trust scores or the impact of trust. Organizational research has shown that relationships with greater total interdependence exhibit higher trust, stronger commitment, and lower conflict than relationships with lower interdependence (Kumar, Scheer & Steenkamp, 1995). It can be tempting to generalize frameworks and conceptual models from team research



conducted in organizational science to the context of sports teams. This process has merit but should be deployed with some caution (Cannon-Bowers & Bowers, 2006).

Once the items within the TSQ were finalized, the initial evidence for validity of the measure was analysed. When interpreting the results of the validation analyses, it was found that all the correlations were significant at  $< .05$ . There was an expected correlation between the GEQ and the TSQ because of the similarities of the constructs. However, the coefficients are low enough to allow for the differentiation between the two constructs. A higher level of correlation was seen between the total TSQ score and with the adapted trust scale. This values between the TSQ, subscales and ATQ indicated slightly higher correlation scores than desirable levels when analyzing convergent validity (Carlson & Herdman, 2012). However, in this context these scores are acceptable. This is because the GEQ represents a different construct (cohesion as opposed to trust), but within the same context (sport). The adapted trust questionnaire (Dirks, 2000) represents the same construct (trust) within a different context (validated in an organizational context as opposed to sport). The correlations suggest that these items are related, which because they are measuring the same construct in different settings they should be, in contrast the correlation values are not large enough to indicate that they have measured the same thing.

The main difference between the TSQ and other trust measures is the sport specific nature of the measure. The McAllister (1995) measure was developed using antecedents from organizational science. One such example of an antecedent from McAllister's (1995) research is interaction frequency, this is reflected as an item in the McAllister (1995) measure. The interaction frequency antecedent was included in the early stages of item development of the TSQ. Discussion in the TAP led to questioning the relevance of interaction frequency in a sport context. Athletes in the one of the TAP's discussed at the length the potential effect of

interaction frequency on trust. A football player discussed the interactions that happened most frequently are with teammates that are a part of the same unit (i.e. offense, defense or special teams) and happened less frequently with teammates outside of the unit. Teams can often be separated into factions for task-driven reasons, Simply, the defensive tasks are to prevent points and the offensive tasks are to score points. These then provide the impetus for task-driven interactions (Shea & Guzzo, 1987). Interaction frequency could affect teammate trust but because all athletes within the team are not held to the same standard due to positional restrictions it may introduce some bias to the questionnaire in particular cases.

An additional layer to argument against interaction frequency as an antecedent of trust in sport is team size. Large teams such as football or rugby teams provide athletes the option to interact less with one teammate and more with another due to sheer size, where as smaller teams may not have the opportunity to remove themselves from interactions with a particular teammate. A curling athlete discussed the fact that her team only had 4 athletes (skip, third, second and lead) and though the quality of their interactions are strong, they have little choice has to which teammates they interact with. They must all communicate and interact effectively to be successful.

Athletes within the TAP reached the conclusion that the amount of time spent with a particular teammate was thought to have little effect on trust in the relationship.. The premise of the item in an organizational context is the more interaction you have with someone, the more insight you will gain on their ability, benevolence, and integrity (Mayer et al., 1995).

Interdependent athletes view interaction with teammates as something that happens automatically, as a task-driven process, not as something that can be quantified as a prerequisite for trust. This item is a good example of the differences between the worlds of organizational

psychology and sport psychology. Results of the EFA reinforced the TAP conclusions as the items that reflected interaction frequency were removed due to the statistical analysis and the final version of the TSQ did not have any items reflecting interaction frequency.

The trust measure for sport adapted by Dirks (2000) has an item reflecting past performance. Past performance is mentioned as an antecedent of trust by previous organizational science research (Mayer et al., 1995; McAllister, 1995). Past performance was another variable that was reflected in the initial item development phase of the TSQ but is not reflected in the final version. The item on Dirks' (2000) ATQ reads "given a player's past performance, I see no reason to doubt his (her) competence". This item could be speaking to a reputation of performance or performances in which the respondent was directly aware of or apart of. In an organizational setting, performance reputation may have trust earning potential. In a sport setting this does not seem to be the case. In the TSQ, the items that were retained in relation to performance specifically stipulated that a performance occurred under pressure or that a teammates performance was reliable. These stipulations are important to athletes in order to gain teammate trust. Performances must be repeatable and are dependent on the situation (i.e. under pressure).

One potential reason past performance was not viewed as a critical proponent of trust could be that the majority of our sample consisted of university athletes. University sport in Canada is elite level sport and the vast majority of these athletes would have been recruited to play at this level. This in itself would be grounds not to question a teammate's past performance as the perception would be that their abilities are adequate to be competing at this level of sport. Although the final version of the TSQ did not feature items questioning interaction frequency or past performance, the final version of the TSQ did reflect variables such as reliable performance,

professionalism, and communication, all of which are similar to the adapted trust measure (Dirks, 2000).

The quality of interactions these athletes have outside of competition (e.g., practice, video sessions, team functions) are difficult to isolate from the decision-making process that occurs within competition, therefore the addition of the interpersonal subscale was added. The GEQ (Carron et al., 1985) made this distinction and found the social (ATG-S and GI-S) aspects of team cohesion can have an effect on performance (Dobersek et al., 2014). Trust is a construct that requires between two parties. If the interaction between two parties acts to reduce the other's fear of exploitation the level of trust with the relationship increases (Kelley & Thibaut, 1978). Some behaviours that would increase the level of trust between teammates occur frequently off the field of play. Variables that are reflected in the final version of the TSQ such as being a good role model, showing empathy and being honest are often interactions that happen off the field of play. Interactions that happen out of competition or practice can hold similar importance to those that happen in competition or practice.

When comparing the variables measured by the GEQ (i.e., group cohesion) and the TSQ (i.e., team trust) the similar theoretical frameworks (i.e. division of two distinct subscales with task and interpersonal social aspects) add an additional important layer to both measures. However, this research has made clear that they are separate variables within sport. Group cohesion is broken down into group integration and individual attraction to the group. Group integration is the category that represents the closeness, similarities and bonding within the group. Individual attractions to group represents the interaction of variables working on an individual to remain a part of the group (Carron et al., 1985). The correlations between the subscales of the GEQ, subscales of the TSQ and the total TSQ scores revealed that the highest

correlation scores were between the group integration–task (GI-T) subscale and the TSQ subscales (CBT=.56, CBI=.46, AB=.63, ATQ=.67). The GI-S subscale contains some of the lowest correlation values across the subscales and total TSQ scores (CBT=.23, CBI=.19, AB=.35, ATQ=.36). This would suggest that teammate trust and its subscales do not related more to the aspects of cohesion representing closeness, similarities and bonding than too the interactions of variables working on individuals to remain part of the group. However, the statistics suggest that specifically task related aspects of group integration are taping into teammate trust more than other subscales. This maybe a result of trust being an important aspect of the bonding process between teammates.

Both the cognitive-based and affective based aspect of trust can be seen as variables that are working on an individual to remain part of the group as well. If a teammate holds doubts regarding the reliability or dependability (cognitive-based trust) of others, that is a variable that could affect the individuals desire to remain a part of the group. When Mach et al. (2010) investigated the two variables, cohesion was found to mediate the relationship between team trust and team performance. The reciprocal nature of trust (Lewis & Weigert 1985) was thought to cause an increase in group cohesion on the premise that if a teammate does not trust another they will be less likely to engage in reciprocal behaviours (Mach et al., 2010). Team trust may well be an important antecedent to group cohesion.

Collective and teammate efficacy are other group dynamics constructs potentially related to trust. Collective efficacy refers to a group’s shared belief, which emerges from an aggregation of individual group members’ perception of the group’s capabilities to succeed at a given task (Bandura, 1986). Dithurbide and Flett (2014) describe teammate efficacy beliefs as “can do” beliefs versus trust as a “will do” expectation. In Dithurbide and Flett’s (2014) study, athletes

described teammate efficacy as highly dependant upon their teammates abilities and skill where as team trust was a “gut feeling” and comfort with teammates. That “gut feeling” that differentiates efficacy from trust could also be described as the willingness to except vulnerability to the actions of teammates. Vulnerability was an attribute that was consistently cited in the definitions of trust in organizational science (Mayer et al., 1995; McAllister, 1995) but was omitted from the Dithurbide and Flett (2014) sport-specific definition. This attribute of vulnerability should be included in a sport-specific definition of trust as it allows for the differentiation of trust from other closely related variables (i.e. efficacy).

Given the limited research conducted in sport comparing these constructs, it is difficult to comment on how they may be related and what effect they have on performance (mediated or direct). In a communal relationship (i.e., team) members appear less likely to keep track of personal input (Watson & Clark, 1984). However, constantly attempting to monitor or “back-up” teammates may yield poor results (Dithurbide & Flett, 2014). If the efficacy belief is not reinforced by positive outcomes, the need to monitor teammates may rise. This need based monitoring of teammates that could potentially have a negative effect on the “will do” expectation that is team trust.

## **5.1 Limitations**

It is always an important step in the research process to identify the limitations. First, this research only investigated the relationships of teammates. The athlete/coach relationship was purposely omitted. While the importance of this relationship in a sporting context is often important, it was thought to contain too many different variables to attempt to combined into a single measure of trust. As discussed previously in this paper, it is believed to be a rich area of future research.

Second, the level of analysis that was undertaken in this research could be considered a limitation because of the number of different levels that analysis could have taken place. This research did not investigate team level trust. The individual level of analysis was chosen because of its consistency with other measure of group level variables in sport (i.e., cohesion and efficacy). When investigating collective efficacy, it was suggested that individual perceptions of collective efficacy are an important concept (Moritz and Watson, 1998).

Mortiz and Watson (1998) also suggested that to assert one level of analysis over another may be misguided, however it is important to distinguish at what level the analysis is taking place. At the current level of analysis, it is unclear whether aggregated scores could be used to assess trust at the group level. However, this may be a promising area of future research.

Third, the study was limited to measuring only the relationships between players on interdependent sport teams. Athletes from sports such as track and field and swimming where teammates interaction is much less frequent during competition were not actively recruited. This was a delimitation that was purposely imposed. Sports that are largely individual but include paired or relayed events were not actively recruited, meaning coaches from those teams were not approached and asked if their athletes would participate in the study. This was due to the belief that trust would be a more influential variable in sports teams where interaction between multiple teammates was frequent during competition. Athletes who participate on interdependent teams are more reliant on each other for success (Carron & Eys, 2012). Individual athletes or relay team athletes may have a different outlook on trust between teammates and coaches than do highly interdependent sport team athletes.

With this limitation it must be mentioned that although sequential interdependent teams (e.g. relay athletes) were not actively recruited, data were obtained from track and field athletes

(n=2), swimming athletes (n=2) and a tennis player (n=1). If a more adequate completion rate would have been obtained through the online questionnaire the data from these athletes could have potentially been excluded. The length of the questionnaire was thought to have played a major role in the low completion rate. Most incomplete questionnaires contained complete data sets from the first page of the online questionnaire and all subsequent questions were incomplete. This could indicate that the athletes had started and abandoned the questionnaire upon realizing the length of the questionnaire. The low completion resulted in a less than desirable data set with which to perform the EFA, therefore all complete data was analyzed. The non-interdependent athlete data was used because of the athletes within these sports are still reliant upon their teammates for success, and do not compete purely as individuals.

Finally, it must be stated that the methodology used to reduce items during the EFA has the potential to affect the future study of teammate trust and trust in sport as a variable. The statistical and conceptual reduction process is consistent with other research conducted in sport (Short, Sullivan and Feltz, 2009), however it carries limitations. There was strong support shown in the EFA for the separation of the cognitive and affect-based foundations and further separation of task and interpersonal aspects of the cognitive-based foundation. In addition, the building and supporting of the conceptual case throughout the literature review, concept development, item generation, expert review, and think aloud protocol, lead to the desire to retain as much of the preliminary framework as the statistics delivered through the EFA would allow. Through this process there were items that although deemed statistically relevant through the EFA were removed from the final measure.

Through the removal of these items it is possible that a latent factor of teammate trust was discarded. A purely statistical approach could have been used for the reduction of items, this



would have possibly resulted in a model that contained a different number of factors with a varying number of items.

## **5.2 Future Directions**

Moving forward with this line of research requires confirmation of the factor structure that was provided by the EFA. This requires a separate sample of athletes to run a confirmatory factor analysis. This analysis will further validate the factor structure presented in this research and is necessary if the measure is to be utilized in future research. In addition to confirming the factor structure incremental validity should be assessed to determine whether the new TSQ is increasing the predictive ability beyond that provided by an existing method of assessment, in this case the adapted questionnaire (Dirks, 2000). Once further validating of the TSQ has been completed, the potential to investigate trust at the team/group level can be explored. Previously investigated constructs that have been discussed throughout this research investigate group/team level dynamics and there is potential to investigate trust at the group level.

This research asked individual athletes to answer questions on their individual expectations of their teammates, measuring an individual-level construct with implications on team dynamics. More research is needed to examine whether trust, measured by the TSQ, can be analyzed as a group-level construct. Further validation studies could assess the factor structure presented in this research as a potential team-level construct. The investigation of team-level trust and its interaction with other team-level variables is an important step to determining its relationship to team performance and other team outcomes.

This research used other established variables for the purpose of assessing concurrent validity. Future research containing the TSQ is critical for the validity and reliability of the measure. The established measures used in this research, the GEQ (Carron, Widmeyer, &

Brawley, 1985) and an adapted trust measure (Dirks, 2000; Mach et al., 2010) were chosen purposefully as measures that should have a relationship to trust but should also be distinguishable. Research assessing the concurrent validity of the Collective Efficacy Questionnaire for Sport (CEQS) and the TSQ would be beneficial to further ensure the TSQ is measuring a novel construct.

In addition to investigating the relationships to other existing constructs and ensuring the validity of the TSQ, another important area of future research will be investigating trust between coaches and athletes. The relationship between supervisors and subordinates has been studied in organization psychology (Engelbrecht & Cloete, 2000) and in the military (Deluga, 1995). There has also been research in sport investigating trust in leaders (Dirks, 2000; Mach et al., 2010; Mach et al., 2016). These studies did not use a valid measure of trust designed for use in a sport context, however they do shed some light on the importance of trust in leadership. Dirks (2000) found that trust in leadership had a significantly linked to winning percentage (i.e. performance). Mach et al. (2010) included trust in leadership as part of an overall team trust variable and found the relationship with performance was mediated by group cohesion.

These studies illustrate the importance of athlete/coach trust and its relationship to performance. The athlete/coach relationship is a rich area of research with the power to affect performance and other team variables. It is believed by this researcher that player/coach trust is a separate construct from teammate trust and was therefore omitted from this study. For example, although interaction frequency was omitted as a relevant item for teammate trust, it may well be a critical element to athlete/coach trust. It was determined that the addition of athlete/coach trust would have made the scope of this research too wide.

The items within the TSQ have provided future researchers with clues as to what the antecedents of trust are within sport. Traits that are reflected in the items of the TSQ are; reliability, commitment, accountability, empathy, honesty and effective communication. These traits could be divided among the antecedents of trust listed by Mayer et al. (1995) (i.e., Ability, Benevolence, Integrity). The antecedents of trust in organizational science look to be similar to those that present in sport, however, conclusions on a teammate's abilities, benevolence, and integrity are drawn in different ways within sport than we would in a corporate setting.

Teammates would most likely measure ability by how they perform day to day in practice and more importantly in a competitive situation. Elite athletes spend two to three hours a day practicing together and additional time in competition. This would provide an in-depth knowledge of the ability of a teammate. In an organizational setting, knowledge of a co-worker's ability is insufficient to develop trust (Mayer et al., 1995). The items in the TSQ reflect a similar environment in sport. Integrity and benevolence are additional variables that constitute trust in organizational science. In sport a teammate may be viewed as having integrity if they are committed to the team and its goals as well as being accountable for his/her own actions within the team. These are traits that are believed to be developed in sport both on and off the playing surface. Benevolence in a sport setting could be represented in traits such as empathy and effective communication. While we can map traits that appear in items of the TSQ into pre-existing organization trust models, future research is needed to reinforce these antecedents in sport.

The establishment of a measure of trust in sport provides the impetus for model development to continue, building upon what has been found in this study. There is more research that needs to be done to fabricate a more complete model of trust in sport including the

antecedents and outcomes of the construct. Once a more complete model has been developed model testing can begin. An established model will then be used to inform practical implications, such as trust building and rebuilding activities.

### **5.3 Practical Implications**

The practical implications of this research will constitute the use of this questionnaire as a means to evaluate trust in sport teams. Once trust is evaluated, a team can then determine to foster the existing levels of trust or start to build a foundation to better develop trust. Trust building/diagnosing techniques could be beneficial for teams to discover gaps in trust and proceed to fill/repair them or in certain cases remove them. If this measure is adapted to encompass trust in coach, there are potentially more practical implications diagnosing trust in that relationship. In sport, much like in other domains, organizations are always searching for innovative ways to increase overall performance. This measure has the potential to add to the existing body of group dynamics assessments.

### **5.4 Conclusion**

This research aimed to take the preliminary steps required to develop a measure of trust in sport that would allow future researchers to effectively define and assess trust within sport and how it relates to different variables (e.g. cohesion, collective efficacy). Through reviewing literature on organizational trust a theoretical understanding of the construct was achieved. Using this knowledge, a theoretical framework of trust in sport was presented. This framework was used to guide the development of an initial pool of items that encapsulated all the potential paths in which trust between teammates could be built and interpreted. These items were then refined in number and content by experts with the field of trust research, elite level athletes and statistical analysis until it a preliminary questionnaire could be presented. The preliminary TSQ

was then tested for reliability and validity to determine that it was measuring the construct that the researchers had set out to measure with accuracy. It is the hope of the researchers that this research is the foundation to a strong niche of research within the field of sport psychology. Future research is needed to confirm the finding of this research and subsequently to further validate this measure and push trust research within the sport to the level trust research has achieved in other domains.

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## Appendix A

### TSQ Version 1 administered to Expert Panel Trust in Sport Questionnaire

#### Cognitive – Based (Task)

*Grounded in individual's beliefs about teammate reliability and dependability during sport*

**In the context of your sport, rate how strongly you trust your teammates to:**

|   | Absence of Trust |                       |   | Complete Trust  |   |
|---|------------------|-----------------------|---|-----------------|---|
| 1. Be highly skilled players in their playing positions.                                      | 1                | 2                     | 3 | 4               | 5 |
| <i>This item is written in a way that is easy to understand</i><br><i>Comments?</i>           | <i>Agree</i>     | <i>Somewhat agree</i> |   | <i>Disagree</i> |   |
| <i>This item is an important indicator of interpersonal trust</i><br><i>Comments?</i>         | <i>Agree</i>     | <i>Somewhat agree</i> |   | <i>Disagree</i> |   |
| 2. Be efficient at executing the demands of their role  | 1                | 2                     | 3 | 4               | 5 |
| <i>This item is written in a way that is easy to understand</i><br><i>Comments?</i>           | <i>Agree</i>     | <i>Somewhat agree</i> |   | <i>Disagree</i> |   |
| <i>This item is an important indicator of interpersonal trust</i><br><i>Comments?</i>         | <i>Agree</i>     | <i>Somewhat agree</i> |   | <i>Disagree</i> |   |
| 3. Execute the requirements of their position<br>(i.e. score/prevent goals) to a high degree. | 1                | 2                     | 3 | 4               | 5 |
| <i>This item is written in a way that is easy to understand</i><br><i>Comments?</i>           | <i>Agree</i>     | <i>Somewhat agree</i> |   | <i>Disagree</i> |   |
| <i>This item is an important indicator of interpersonal trust</i><br><i>Comments?</i>         | <i>Agree</i>     | <i>Somewhat agree</i> |   | <i>Disagree</i> |   |
| 4. Have a high degree of previous success<br>in their sport                                   | 1                | 2                     | 3 | 4               | 5 |
| <i>This item is written in a way that is easy to understand</i><br><i>Comments?</i>           | <i>Agree</i>     | <i>Somewhat agree</i> |   | <i>Disagree</i> |   |
| <i>This item is an important indicator of interpersonal trust</i><br><i>Comments?</i>         | <i>Agree</i>     | <i>Somewhat agree</i> |   | <i>Disagree</i> |   |

|   |              |   |                       |   |                 |
|---|--------------|---|-----------------------|---|-----------------|
| 5. Have previously played for the same team                                     | 1            | 2 | 3                     | 4 | 5               |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| 6. Have no experience in the current sports league                              | 1            | 2 | 3                     | 4 | 5               |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| 7. Have little experience at the current level of competition                   | 1            | 2 | 3                     | 4 | 5               |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| 8. Do their job   | 1            | 2 | 3                     | 4 | 5               |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| 9. Be very dedicated to the team  | 1            | 2 | 3                     | 4 | 5               |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |

|   |              |   |                       |   |                 |
|---|--------------|---|-----------------------|---|-----------------|
| 10. Be very dedicated to their sport  | 1            | 2 | 3                     | 4 | 5               |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| 11. Be very dedicated to their own improvement                                  | 1            | 2 | 3                     | 4 | 5               |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| 12. Be relied upon to carry their own weight on the team                        | 1            | 2 | 3                     | 4 | 5               |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| 13. Play their best under pressure  | 1            | 2 | 3                     | 4 | 5               |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| 14. Not quit regardless of the score  | 1            | 2 | 3                     | 4 | 5               |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |



|   |              |   |                       |   |                 |
|---|--------------|---|-----------------------|---|-----------------|
| 15. Be trusted by the coaching staff  | 1            | 2 | 3                     | 4 | 5               |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| 16. Be trusted by players from other teams                                      | 1            | 2 | 3                     | 4 | 5               |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| 17. Be highly confident athletes  | 1            | 2 | 3                     | 4 | 5               |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| 18. Be in a leadership position on the team                                     | 1            | 2 | 3                     | 4 | 5               |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| 19. Follow team rules   | 1            | 2 | 3                     | 4 | 5               |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |

|   |              |   |                       |   |                 |
|---|--------------|---|-----------------------|---|-----------------|
| 20. Play the same position as me on the team                                    | 1            | 2 | 3                     | 4 | 5               |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| 21. Physically prepare for each practice/game                                   | 1            | 2 | 3                     | 4 | 5               |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| 22. Mentally prepare for each practice/game                                     | 1            | 2 | 3                     | 4 | 5               |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| 23. Study team systems  | 1            | 2 | 3                     | 4 | 5               |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| 24. Show commitment to the team   | 1            | 2 | 3                     | 4 | 5               |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |

**General comments on sub-scale**

### Cognitive –Based (Interperonsal)

*Grounded in individual’s beliefs about teammate reliability and dependability away from sport*

**In the context of your team, but outside of playing your sport, rate how strongly you trust your teammates to:**

|   | Absence of Trust |   |                       | Complete Trust |                 |
|---|------------------|---|-----------------------|----------------|-----------------|
| 1. Be highly motivated individuals  | 1                | 2 | 3                     | 4              | 5               |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i>     |   | <i>Somewhat agree</i> |                | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i>     |   | <i>Somewhat agree</i> |                | <i>Disagree</i> |
| 2. Experience success outside of sport (i.e. academics)                         | 1                | 2 | 3                     | 4              | 5               |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i>     |   | <i>Somewhat agree</i> |                | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i>     |   | <i>Somewhat agree</i> |                | <i>Disagree</i> |
| 3. Appear to have low levels of stress in their life                            | 1                | 2 | 3                     | 4              | 5               |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i>     |   | <i>Somewhat agree</i> |                | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i>     |   | <i>Somewhat agree</i> |                | <i>Disagree</i> |
| 4. Have good coping skills  | 1                | 2 | 3                     | 4              | 5               |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i>     |   | <i>Somewhat agree</i> |                | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i>     |   | <i>Somewhat agree</i> |                | <i>Disagree</i> |

|   |              |   |                       |   |                 |
|---|--------------|---|-----------------------|---|-----------------|
| 5. Be relied upon to help me complete a task outside of sport                         | 1            | 2 | 3                     | 4 | 5               |
| <i>This item is written in a way that is easy to understand</i><br><i>Comments?</i>   | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust</i><br><i>Comments?</i> | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| 6. Set a strong personal example for teammates  | 1            | 2 | 3                     | 4 | 5               |
| <i>This item is written in a way that is easy to understand</i><br><i>Comments?</i>   | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust</i><br><i>Comments?</i> | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| 7. Be good role models  | 1            | 2 | 3                     | 4 | 5               |
| <i>This item is written in a way that is easy to understand</i><br><i>Comments?</i>   | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust</i><br><i>Comments?</i> | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| 8. Behave in a professional way   | 1            | 2 | 3                     | 4 | 5               |
| <i>This item is written in a way that is easy to understand</i><br><i>Comments?</i>   | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust</i><br><i>Comments?</i> | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| 9. Be proud around their teammates  | 1            | 2 | 3                     | 4 | 5               |
| <i>This item is written in a way that is easy to understand</i><br><i>Comments?</i>   | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust</i><br><i>Comments?</i> | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |

|   |              |                       |   |                 |   |
|---|--------------|-----------------------|---|-----------------|---|
| 10. Have the same cultural background   | 1            | 2                     | 3 | 4               | 5 |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i> | <i>Somewhat agree</i> |   | <i>Disagree</i> |   |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i> | <i>Somewhat agree</i> |   | <i>Disagree</i> |   |
| 11. Have the same values as me  | 1            | 2                     | 3 | 4               | 5 |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i> | <i>Somewhat agree</i> |   | <i>Disagree</i> |   |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i> | <i>Somewhat agree</i> |   | <i>Disagree</i> |   |
| 12. Show commitment in all aspects of their life                                | 1            | 2                     | 3 | 4               | 5 |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i> | <i>Somewhat agree</i> |   | <i>Disagree</i> |   |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i> | <i>Somewhat agree</i> |   | <i>Disagree</i> |   |
| 13. Be in a committed relationship  | 1            | 2                     | 3 | 4               | 5 |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i> | <i>Somewhat agree</i> |   | <i>Disagree</i> |   |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i> | <i>Somewhat agree</i> |   | <i>Disagree</i> |   |
| 14. Be accountable for their actions  | 1            | 2                     | 3 | 4               | 5 |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i> | <i>Somewhat agree</i> |   | <i>Disagree</i> |   |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i> | <i>Somewhat agree</i> |   | <i>Disagree</i> |   |

|   |              |   |                       |   |                 |
|---|--------------|---|-----------------------|---|-----------------|
| 15. Be punctual (i.e. on time)  | 1            | 2 | 3                     | 4 | 5               |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| 16. Play a musical instrument   | 1            | 2 | 3                     | 4 | 5               |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |

**General comments on sub-scale:**

**Affect – Based (Task)**

*Grounded in reciprocated interpersonal care and concern between teammates during sport*

**In the context of your sport, rate how strongly you trust your teammates to:**

| Absence of Trust  | Complete Trust |   |                       |   |                 |
|---|----------------|---|-----------------------|---|-----------------|
| 1. Interact with you frequently at the arena or field                           | 1              | 2 | 3                     | 4 | 5               |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i>   |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i>   |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| 2. Share your goals within sport  | 1              | 2 | 3                     | 4 | 5               |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i>   |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i>   |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |

|   |              |                       |   |                 |   |
|---|--------------|-----------------------|---|-----------------|---|
| 3. Create a positive atmosphere   | 1            | 2                     | 3 | 4               | 5 |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i> | <i>Somewhat agree</i> |   | <i>Disagree</i> |   |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i> | <i>Somewhat agree</i> |   | <i>Disagree</i> |   |
| 4. Pick a teammate up when they are down  | 1            | 2                     | 3 | 4               | 5 |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i> | <i>Somewhat agree</i> |   | <i>Disagree</i> |   |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i> | <i>Somewhat agree</i> |   | <i>Disagree</i> |   |
| 5. Be understanding of any issues you may have within the team                  | 1            | 2                     | 3 | 4               | 5 |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i> | <i>Somewhat agree</i> |   | <i>Disagree</i> |   |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i> | <i>Somewhat agree</i> |   | <i>Disagree</i> |   |
| 6. Communicate effectively with other teammates and leaders                     | 1            | 2                     | 3 | 4               | 5 |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i> | <i>Somewhat agree</i> |   | <i>Disagree</i> |   |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i> | <i>Somewhat agree</i> |   | <i>Disagree</i> |   |
| 7. Help with sport/team related problems  | 1            | 2                     | 3 | 4               | 5 |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i> | <i>Somewhat agree</i> |   | <i>Disagree</i> |   |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i> | <i>Somewhat agree</i> |   | <i>Disagree</i> |   |

|   |              |   |                       |   |                 |
|---|--------------|---|-----------------------|---|-----------------|
| 8. Work to resolve team issues  | 1            | 2 | 3                     | 4 | 5               |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| 9. Be viewed as very good sportsperson  | 1            | 2 | 3                     | 4 | 5               |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| 10. Show a sincere caring for the team and its success                          | 1            | 2 | 3                     | 4 | 5               |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| 11. Be consistent in actions and emotions within a game or practice             | 1            | 2 | 3                     | 4 | 5               |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| 12. Never be too excited  | 1            | 2 | 3                     | 4 | 5               |
| <i>This item is written in a way that is easy to understand<br/>Comments?</i>   | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust<br/>Comments?</i> | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |



|   |              |   |                       |   |                 |
|---|--------------|---|-----------------------|---|-----------------|
| 13. Never be negative toward the team   | 1            | 2 | 3                     | 4 | 5               |
| <i>This item is written in a way that is easy to understand</i><br><i>Comments?</i>   | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust</i><br><i>Comments?</i> | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| 14. Show they are willing to cooperate  | 1            | 2 | 3                     | 4 | 5               |
| <i>This item is written in a way that is easy to understand</i><br><i>Comments?</i>   | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust</i><br><i>Comments?</i> | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| 15. Celebrate team success  | 1            | 2 | 3                     | 4 | 5               |
| <i>This item is written in a way that is easy to understand</i><br><i>Comments?</i>   | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust</i><br><i>Comments?</i> | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| 16. Celebrate individual success  | 1            | 2 | 3                     | 4 | 5               |
| <i>This item is written in a way that is easy to understand</i><br><i>Comments?</i>   | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust</i><br><i>Comments?</i> | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| 17. Be supportive during team failures  | 1            | 2 | 3                     | 4 | 5               |
| <i>This item is written in a way that is easy to understand</i><br><i>Comments?</i>   | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| <i>This item is an important indicator of interpersonal trust</i><br><i>Comments?</i> | <i>Agree</i> |   | <i>Somewhat agree</i> |   | <i>Disagree</i> |
| 18. Be supportive during individual failures  | 1            | 2 | 3                     | 4 | 5               |



|   |              |                       |                 |   |   |
|---|--------------|-----------------------|-----------------|---|---|
| <i>This item is written in a way that is easy to understand</i><br><i>Comments?</i>   | <i>Agree</i> | <i>Somewhat agree</i> | <i>Disagree</i> |   |   |
| <i>This item is an important indicator of interpersonal trust</i><br><i>Comments?</i> | <i>Agree</i> | <i>Somewhat agree</i> | <i>Disagree</i> |   |   |
| 4. Interact with frequently me outside of sport                                       | 1            | 2                     | 3               | 4 | 5 |
| <i>This item is written in a way that is easy to understand</i><br><i>Comments?</i>   | <i>Agree</i> | <i>Somewhat agree</i> | <i>Disagree</i> |   |   |
| <i>This item is an important indicator of interpersonal trust</i><br><i>Comments?</i> | <i>Agree</i> | <i>Somewhat agree</i> | <i>Disagree</i> |   |   |
| 5. Go beyond the minimal requirements of being a good teammate                        | 1            | 2                     | 3               | 4 | 5 |
| <i>This item is written in a way that is easy to understand</i><br><i>Comments?</i>   | <i>Agree</i> | <i>Somewhat agree</i> | <i>Disagree</i> |   |   |
| <i>This item is an important indicator of interpersonal trust</i><br><i>Comments?</i> | <i>Agree</i> | <i>Somewhat agree</i> | <i>Disagree</i> |   |   |
| 6. Offer their help if they thought it was needed                                     | 1            | 2                     | 3               | 4 | 5 |
| <i>This item is written in a way that is easy to understand</i><br><i>Comments?</i>   | <i>Agree</i> | <i>Somewhat agree</i> | <i>Disagree</i> |   |   |
| <i>This item is an important indicator of interpersonal trust</i><br><i>Comments?</i> | <i>Agree</i> | <i>Somewhat agree</i> | <i>Disagree</i> |   |   |
| 7. Be consistent with actions and emotions away from sport                            | 1            | 2                     | 3               | 4 | 5 |
| <i>This item is written in a way that is easy to understand</i><br><i>Comments?</i>   | <i>Agree</i> | <i>Somewhat agree</i> | <i>Disagree</i> |   |   |
| <i>This item is an important indicator of interpersonal trust</i><br><i>Comments?</i> | <i>Agree</i> | <i>Somewhat agree</i> | <i>Disagree</i> |   |   |
| 8. Have a lot of friends outside of the team  | 1            | 2                     | 3               | 4 | 5 |

|  |       |                |          |   |   |
|--|-------|----------------|----------|---|---|
| <i>This item is written in a way that is easy to understand</i><br>Comments?   | Agree | Somewhat agree | Disagree |   |   |
| <i>This item is an important indicator of interpersonal trust</i><br>Comments? | Agree | Somewhat agree | Disagree |   |   |
| 9. Be capable of keeping a secret  | 1     | 2              | 3        | 4 | 5 |
| <i>This item is written in a way that is easy to understand</i><br>Comments?   | Agree | Somewhat agree | Disagree |   |   |
| <i>This item is an important indicator of interpersonal trust</i><br>Comments? | Agree | Somewhat agree | Disagree |   |   |
| 10. Be loyal to teammates and others regardless of situation                   | 1     | 2              | 3        | 4 | 5 |
| <i>This item is written in a way that is easy to understand</i><br>Comments?   | Agree | Somewhat agree | Disagree |   |   |
| <i>This item is an important indicator of interpersonal trust</i><br>Comments? | Agree | Somewhat agree | Disagree |   |   |
| 11. Be very approachable people  | 1     | 2              | 3        | 4 | 5 |
| <i>This item is written in a way that is easy to understand</i><br>Comments?   | Agree | Somewhat agree | Disagree |   |   |
| <i>This item is an important indicator of interpersonal trust</i><br>Comments? | Agree | Somewhat agree | Disagree |   |   |
| 12. Always seem to have it together  | 1     | 2              | 3        | 4 | 5 |
| <i>This item is written in a way that is easy to understand</i><br>Comments?   | Agree | Somewhat agree | Disagree |   |   |
| <i>This item is an important indicator of interpersonal trust</i><br>Comments? | Agree | Somewhat agree | Disagree |   |   |
| 13. Not judge me or my actions   | 1     | 2              | 3        | 4 | 5 |
| <i>This item is written in a way that is easy to understand</i><br>Comments?   | Agree | Somewhat agree | Disagree |   |   |



## APPENDIX B

### Revisions made to the TSQ following the expert review

Stem Expert Panel Task (Cognitive and Affective): **In the context of your sport, rate how strongly you trust your teammates **to:****

Stem Revision: **In the context of your sport, rate how strongly you trust teammates **who:****

Stem Expert Panel Interpersonal (Cognitive and Affective): **In the context of your team, but outside of playing your sport, rate how strongly you trust your teammates **to:****

Stem Revision: **In the context of your team, but outside of playing your sport, rate how strongly you trust teammates **who:****

Wording was changed in questions to reflect this change in the stem

The following questions were removed or edited following the expert review:

#### Cognitive-Based (Task)

4. Have a high degree of previous success in their sport

**Removed**

5. Have previously played for the same team

**Removed**

6. Have no experience in the current sports league

**Removed**

7. Have little experience at the current level of competition

**Removed**

15. Be trusted by the coaching staff

**Removed**

16. Be trusted by players from other teams

**Removed**

18. Be in a leadership position on the team wording change

**Edited to: Are leaders on the team**

20. Play the same position as me on the team

**Removed**

### ***Cognitive-based (Interpersonal)***

---

2. Experience success outside of sport (i.e. academics)

**Removed**

---

3. Appear to have low levels of stress in their life

**Edited to: Effectively manage stress in their life**

---

4. Have good coping skills

**Edited to: Cope well with demands**

---

7. Be good role models

**Edited to: Are good role models outside of sport**

---

10. Have the same cultural background

**Removed**

---

11. Have the same values as me

**Removed**

---

13. Be in a committed relationship

**Removed**

---

14. Be accountable for their actions  
**outside of sport**

**Edited to: Are accountable for their actions**

---

16. Play a musical instrument

**Removed**

---

### **Affect – Based (Task)**

---

3. Create a positive atmosphere

**Edited to: Create a positive atmosphere at the arena or field**

---

4. Pick a teammate up when they are down

**Edited to: Consoles teammates when they are upset or frustrated**

---

9. Be viewed as very good sportsperson

**Edited to: Demonstrate sportspersonship**

---

12. Never be too excited

**Removed**

---

13. Never be negative toward the team

**Edited to: Are rarely negative toward the team**

---

### **Affect – Based (Interpersonal)**

5. Go beyond the minimal requirements of being a good teammate

**Edited to: Exceed the minimal requirements of being a good teammate**

---

6. Offer their help if they thought it was needed

**Edited to: Offer help when needed**

---

8. Have a lot of friends outside of the team

**Removed**

---

12. Always seem to have it together

**Removed**

---

13. Not judge me or my actions

**Edited to: Are non-judgemental**

---

17. Be upfront and open about their feeling

**Edited to: are open about their feelings**

---

*Items were removed if all four experts agreed that the item was not an important indicator of interpersonal trust. Requests for editing items in an attempt to ensure they were more easily understandable were taken into consideration. If it was believed the PI and supervisor that it would not change variable of interest the suggested edit was made.*



## Appendix C

### TSQ administered during Think Aloud Protocol

#### Trust in Sport Questionnaire

##### Cognitive – Based (Task)

*Grounded in individual's beliefs about teammate reliability and dependability during sport*

In the context of your sport, rate how strongly you trust teammates who:

Absence of Trust

Complete Trust

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| 1. Are highly skilled players in their playing positions.                                     | 1 | 2 | 3 | 4 | 5 |
| 2. Are efficient at executing the demands of their role                                       | 1 | 2 | 3 | 4 | 5 |
| 3. Execute the requirements of their position<br>(i.e. score/prevent goals) to a high degree. | 1 | 2 | 3 | 4 | 5 |
| 4. Do their job   | 1 | 2 | 3 | 4 | 5 |
| 5. Are very dedicated to the team   | 1 | 2 | 3 | 4 | 5 |
| 6. Are very dedicated to their sport  | 1 | 2 | 3 | 4 | 5 |
| 7. Are very dedicated to their own improvement  | 1 | 2 | 3 | 4 | 5 |
| 8. Can be relied upon to carry their own weight on the team                                   | 1 | 2 | 3 | 4 | 5 |
| 9. Play well under pressure   | 1 | 2 | 3 | 4 | 5 |

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| 10. Do not quit regardless of the score       | 1 | 2 | 3 | 4 | 5 |
| 11. Are highly confident athletes             | 1 | 2 | 3 | 4 | 5 |
| 12. Are leaders on the team                   | 1 | 2 | 3 | 4 | 5 |
| 13. Follow team rules                         | 1 | 2 | 3 | 4 | 5 |
| 14. Physically prepare for each practice/game | 1 | 2 | 3 | 4 | 5 |
| 15. Mentally prepare for each practice/game   | 1 | 2 | 3 | 4 | 5 |
| 16. Study team systems                        | 1 | 2 | 3 | 4 | 5 |
| 17. Show commitment to the team               | 1 | 2 | 3 | 4 | 5 |

**Cognitive –Based (Interpersonal)**

*Grounded in individual’s beliefs about teammate reliability and dependability away from sport*

**In the context of your team, but outside of playing your sport, rate how strongly you trust teammates who:**

**Absence of Trust**

**Complete Trust**

|                                     |   |   |   |   |   |
|-------------------------------------|---|---|---|---|---|
| 1. Are highly motivated individuals | 1 | 2 | 3 | 4 | 5 |
|-------------------------------------|---|---|---|---|---|

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| 2. Effectively Manage stress in their life                        | 1 | 2 | 3 | 4 | 5 |
| 3. Cope well with demands   | 1 | 2 | 3 | 4 | 5 |
| 4. Can be relied upon to help me complete a task outside of sport | 1 | 2 | 3 | 4 | 5 |
| 5. Sets a strong personal example for teammates outside of sport  | 1 | 2 | 3 | 4 | 5 |
| 6. Are good role models outside of sport                          | 1 | 2 | 3 | 4 | 5 |
| 7. Behave in a professional way                                   | 1 | 2 | 3 | 4 | 5 |
| 8. Are proud around their teammates                               | 1 | 2 | 3 | 4 | 5 |
| 9. Are committed in all aspects of their life                     | 1 | 2 | 3 | 4 | 5 |
| 10. Are accountable for their actions outside of sport            | 1 | 2 | 3 | 4 | 5 |
| 11. Are punctual (i.e. on time) outside of sport                  | 1 | 2 | 3 | 4 | 5 |

**Affect – Based (Task)**

*Grounded in reciprocated interpersonal care and concern between teammates during sport*

**In the context of your sport, rate how strongly you trust teammates who:**

| <b>Absence of Trust</b>   | <b>Complete Trust</b> |   |   |   |   |
|---|-----------------------|---|---|---|---|
| 1. Interact with you frequently at the arena or field           | 1                     | 2 | 3 | 4 | 5 |
| 2. Share your goals within sport                                | 1                     | 2 | 3 | 4 | 5 |
| 3. Create a positive atmosphere at the arena or field           | 1                     | 2 | 3 | 4 | 5 |
| 4. Consoles teammates when they are upset or frustrated         | 1                     | 2 | 3 | 4 | 5 |
| 5. Are understanding of any issues you may have within the team | 1                     | 2 | 3 | 4 | 5 |
| 6. Communicate effectively with other teammates and leaders     | 1                     | 2 | 3 | 4 | 5 |
| 7. Help with sport/team related problems                        | 1                     | 2 | 3 | 4 | 5 |
| 8. Work to resolve team issues                                  | 1                     | 2 | 3 | 4 | 5 |
| 9. Demonstrate sportspersonship                                 | 1                     | 2 | 3 | 4 | 5 |

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| 10. Show a sincere caring for the team success            | 1 | 2 | 3 | 4 | 5 |
| 11. Are consistent in their actions in a game or practice | 1 | 2 | 3 | 4 | 5 |
| 12. Are rarely negative toward the team                   | 1 | 2 | 3 | 4 | 5 |
| 13. Show they are willing to cooperate                    | 1 | 2 | 3 | 4 | 5 |
| 14. Celebrate team success                                | 1 | 2 | 3 | 4 | 5 |
| 15. Celebrate individual success                          | 1 | 2 | 3 | 4 | 5 |
| 16. Are supportive during team failures                   | 1 | 2 | 3 | 4 | 5 |
| 17. Are supportive during individual failures             | 1 | 2 | 3 | 4 | 5 |
| 18. Demand the best from other teammates                  | 1 | 2 | 3 | 4 | 5 |

**Affect – Based (Interspersonal)**

*Grounded in reciprocated interpersonal care and concern between teammates away from sport*

**In the context of your team, but outside of playing your sport, rate how strongly you trust teammates who:**

**Absence of Trust**

**Complete Trust**

|                               |   |   |   |   |   |
|-------------------------------|---|---|---|---|---|
| 1. Keep promises to teammates | 1 | 2 | 3 | 4 | 5 |
|-------------------------------|---|---|---|---|---|

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| 2. Share similar goals outside of sport                     | 1 | 2 | 3 | 4 | 5 |
| 3. Trust others   | 1 | 2 | 3 | 4 | 5 |
| 4. Interact with me frequently outside of sport             | 1 | 2 | 3 | 4 | 5 |
| 5. Exceed the minimal requirements of being a good teammate | 1 | 2 | 3 | 4 | 5 |
| 6. Offer help when needed                                   | 1 | 2 | 3 | 4 | 5 |
| 7. Are consistent with actions away from sport              | 1 | 2 | 3 | 4 | 5 |
| 8. Can keep a secret  | 1 | 2 | 3 | 4 | 5 |
| 9. Are loyal to teammates regardless of situation           | 1 | 2 | 3 | 4 | 5 |
| 10. Are approachable people                                 | 1 | 2 | 3 | 4 | 5 |
| 11. Are non-judgemental                                     | 1 | 2 | 3 | 4 | 5 |
| 12. Show empathy  | 1 | 2 | 3 | 4 | 5 |

|                |   |   |   |   |   |
|----------------|---|---|---|---|---|
| 13. Are honest | 1 | 2 | 3 | 4 | 5 |
|----------------|---|---|---|---|---|

---

|                                 |   |   |   |   |   |
|---------------------------------|---|---|---|---|---|
| 14. Take other people seriously | 1 | 2 | 3 | 4 | 5 |
|---------------------------------|---|---|---|---|---|

---

|                                   |   |   |   |   |   |
|-----------------------------------|---|---|---|---|---|
| 15. Are open about their feelings | 1 | 2 | 3 | 4 | 5 |
|-----------------------------------|---|---|---|---|---|

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## Appendix D

Revisions made to the TSQ following the Think Aloud Protocol:

### *Cognitive – Based (Task)*

*Explanation of Section:*

*Grounded in individual's beliefs about teammate reliability and dependability during sport*

*Scale: 1= Absence of Trust / 5= Complete Trust*

*Stem: In the context of your sport, rate how strongly you trust teammates who:*

*The following questions were removed or edited form the TSQ:*

### **Cognitive – Based (Task)**

4. Do their job

Removed

---

7. Are very dedicated to their own improvement

Edited to: Are very focused on their own improvement

---

8. Can be relied upon to carry their own weight on the team

Edited to: Are reliable in the context of sport

---

16. Study team systems

Edited to: Study team systems/strategies

---

### **Cognitive –Based (Interpersonal)**

8. Are proud around their teammates

Removed

---

### **Affect – Based (Task)**

7. Help with sport/team related problems

Edited to: Help with team related problems

---



15. Celebrate individual success

Edited to: Celebrate other individuals success

---

17. Are supportive during individual failures

Edited to: Are Supportive during other individuals failures

---

### **Affect – Based (Interpersonal)**

2. Share similar goals outside of sport

Edited to: Are equally driven towards goals outside of sport

---

3. Trust others

Removed

---

5. Exceed the minimal requirements of being a good teammate

Removed

---

Items were edited if there was confusion among the athletes in the think aloud protocol. Edited were discussed by the P.I. and the supervisor prior to being made to the measure.

Items were only removed if they had been previously flagged as potentially problematic by the experts, meaning that if two of the four believed that the item was not a relevant indicator of interpersonal trust (which was indicated by the scoring of items from expert review). IF an item had been previously flagged and was then discussed during the Think Aloud Protocol and deems to be confusing of problematic it was then removed.

## Appendix E

### Trust in Sport Questionnaire (TSQ)

This questionnaire is designed to assess your perceptions of your team. There are no wrong or right answers, so please give your immediate reaction. Some of the questions may seem repetitive, but please answer ALL questions. Your personal responses will be kept in strictest confidence.

#### *Cognitive – Based (Task)*

*Grounded in individual's beliefs about teammate reliability and dependability during sport*

**The following statements are designed to assess your feelings about YOUR PERSONAL INVOLVEMENT with your team. Please CIRCLE a number from 1 to 5 to indicate your level of agreement with each of these statements.**

|   | Disagree |   |   | Agree |   |
|---|----------|---|---|-------|---|
| 1. My teammates are highly skilled players in their playing positions.                                  | 1        | 2 | 3 | 4     | 5 |
| 2. My teammates are efficient at executing the demands of their role                                    | 1        | 2 | 3 | 4     | 5 |
| 3. My teammates execute the requirements of their position (i.e. score/prevent goals) to a high degree. | 1        | 2 | 3 | 4     | 5 |
| 4. My teammates are dedicated to the team   | 1        | 2 | 3 | 4     | 5 |
| 5. My teammates are dedicated to their sport  | 1        | 2 | 3 | 4     | 5 |
| 6. My teammates are very focused on their own improvement   | 1        | 2 | 3 | 4     | 5 |
| 7. My teammates are reliable in the context of sport  | 1        | 2 | 3 | 4     | 5 |
| 8. My teammates play well under pressure  | 1        | 2 | 3 | 4     | 5 |

|  |   |   |   |   |   |
|--|---|---|---|---|---|
| 9. My teammates do not quit regardless of the score        | 1 | 2 | 3 | 4 | 5 |
| 10. My teammates are highly confident athletes             | 1 | 2 | 3 | 4 | 5 |
| 11. My teammates are leaders on the team                   | 1 | 2 | 3 | 4 | 5 |
| 12. My teammates follow team rules                         | 1 | 2 | 3 | 4 | 5 |
| 13. My teammates physically prepare for each practice/game | 1 | 2 | 3 | 4 | 5 |
| 14. My teammates mentally prepare for each practice/game   | 1 | 2 | 3 | 4 | 5 |
| 15. My teammates study team systems/strategies             | 1 | 2 | 3 | 4 | 5 |
| 16. My teammates show commitment to the team               | 1 | 2 | 3 | 4 | 5 |

***Cognitive –Based (Social)***  
***Grounded in individual’s beliefs about teammate reliability and dependability***  
***outside of sport***

|   |                 |   |   |   |              |
|---|-----------------|---|---|---|--------------|
|   | <b>Disagree</b> |   |   |   | <b>Agree</b> |
| 1. My teammates are highly motivated individuals        | 1               | 2 | 3 | 4 | 5            |
| 2. My teammates effectively Manage stress in their life | 1               | 2 | 3 | 4 | 5            |
| 3. My teammates cope well with demands                  | 1               | 2 | 3 | 4 | 5            |

4. My teammates can be relied upon to help me complete a task outside of sport 1 2 3 4 5

---

5. My teammates sets a strong personal example for teammates outside of sport 1 2 3 4 5

---

6. My teammates are good role models outside of sport 1 2 3 4 5

---

7. My teammates behave in a professional way 1 2 3 4 5

---

8. My teammates are committed in all aspects of their life 1 2 3 4 5

---

9. My teammates are accountable for their actions outside of sport 1 2 3 4 5

---

10. My teammates are punctual (i.e. on time) outside of sport 1 2 3 4 5

---

***Affect – Based (Task)***

***Grounded in individual's beliefs about teammate reliability and dependability during sport***

**Disagree**

**Agree**

1. My teammates interact with you frequently at the arena or field 1 2 3 4 5

---

2. My teammates are equally driven towards goals outside of sport 1 2 3 4 5

---

3. My teammates create a positive atmosphere at the arena or field 1 2 3 4 5

---

|  |   |   |   |   |   |
|--|---|---|---|---|---|
| 4. My teammates consoles teammates when they are upset or frustrated         | 1 | 2 | 3 | 4 | 5 |
| 5. My teammates are understanding of any issues you may have within the team | 1 | 2 | 3 | 4 | 5 |
| 6. My teammates Communicate effectively with other teammates and leaders     | 1 | 2 | 3 | 4 | 5 |
| 7. My teammates Help with team related problems                              | 1 | 2 | 3 | 4 | 5 |
| 8. My teammates Work to resolve team issues                                  | 1 | 2 | 3 | 4 | 5 |
| 9. My teammates Demonstrate sportspersonship                                 | 1 | 2 | 3 | 4 | 5 |
| 10. My teammates Show a sincere caring for the team success                  | 1 | 2 | 3 | 4 | 5 |
| 11. My teammates Are consistent in their actions in a game or practice       | 1 | 2 | 3 | 4 | 5 |
| 12. My teammates Are rarely negative toward the team                         | 1 | 2 | 3 | 4 | 5 |
| 13. My teammates Show they are willing to cooperate                          | 1 | 2 | 3 | 4 | 5 |
| 14. My teammates Celebrate team success                                      | 1 | 2 | 3 | 4 | 5 |

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| 15. My teammates Celebrate other individual's success | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|

---

|  |   |   |   |   |   |
|--|---|---|---|---|---|
| 16. My teammates Are supportive during team failures | 1 | 2 | 3 | 4 | 5 |
|--|---|---|---|---|---|

---

|  |   |   |   |   |   |
|--|---|---|---|---|---|
| 17. My teammates Are supportive during other individual's failures | 1 | 2 | 3 | 4 | 5 |
|--|---|---|---|---|---|

---

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| 18. My teammates Demand the best from other teammates | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|

---

***Affect – Based (Social)***  
***Grounded in individual's beliefs about teammate reliability and dependability***  
***outside of sport***

|  | Disagree |   |   | Agree |   |
|--|----------|---|---|-------|---|
| 1. My teammates Keep promises to teammates | 1        | 2 | 3 | 4     | 5 |

---

|  |   |   |   |   |   |
|--|---|---|---|---|---|
| 2. My teammates Share similar goals outside of sport | 1 | 2 | 3 | 4 | 5 |
|--|---|---|---|---|---|

---

|  |   |   |   |   |   |
|--|---|---|---|---|---|
| 3. My teammates Interact with me frequently outside of sport | 1 | 2 | 3 | 4 | 5 |
|--|---|---|---|---|---|

---

|  |   |   |   |   |   |
|--|---|---|---|---|---|
| 4. My teammates Offer help when needed | 1 | 2 | 3 | 4 | 5 |
|--|---|---|---|---|---|

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|   |   |   |   |   |   |
|---|---|---|---|---|---|
| 5. My teammates are consistent with actions away from sport | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|

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|                                   |   |   |   |   |   |
|-----------------------------------|---|---|---|---|---|
| 6. My teammates can keep a secret | 1 | 2 | 3 | 4 | 5 |
|-----------------------------------|---|---|---|---|---|

---

7. My teammates are loyal to teammates regardless

|  |   |   |   |   |   |
|--|---|---|---|---|---|
| of situation                                   | 1 | 2 | 3 | 4 | 5 |
| 8. My teammates are approachable people        | 1 | 2 | 3 | 4 | 5 |
| 9. My teammates are non-judgemental            | 1 | 2 | 3 | 4 | 5 |
| 10. My teammates show empathy                  | 1 | 2 | 3 | 4 | 5 |
| 11. My teammates are honest                    | 1 | 2 | 3 | 4 | 5 |
| 12. My teammates take other people seriously   | 1 | 2 | 3 | 4 | 5 |
| 13. My teammates are open about their feelings | 1 | 2 | 3 | 4 | 5 |

## Appendix F

Factor structure and loadings following preliminary EFA

Legend:

Affect-based task – Green

Affect-based social – Blue

Cognitive-based task – Red

Cognitive-based social – Purple

| FACTOR 1   | LOADINGS |
|--|----------|
| ABT 3. My teammates create a positive atmosphere at the arena or field       | .571     |
| ABT 4. My teammates consoles teammates when they are upset or frustrated     | .588     |
| ABT 6. My teammates Communicate effectively with other teammates and leaders | .739     |
| ABT 7. My teammates Help with team related problems                          | .643     |
| ABT 9. My teammates Demonstrate sportspersonship                             | .665     |
| ABT 10. My teammates Show a sincere caring for the team success              | .588     |
| ABT 12. My teammates Are rarely negative toward the team                     | .624     |
| ABT 13. My teammates Show they are willing to cooperate                      | .595     |
| ABT 16. My teammates Are supportive during team failures                     | .707     |
| ABS 1. My teammates Keep promises to teammates                               | .383     |
| ABS 10. My teammates show empathy  | .636     |
| ABS 11. My teammates are honest  | .635     |
| ABS 12. My teammates take other people seriously                             | .707     |



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|  |                 |                 |
|--|-----------------|-----------------|
| CBT 12. My teammates follow team rules | .370 (Factor 1) | .300 (Factor 2) |
|--|-----------------|-----------------|

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FACTOR 2

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|  |      |
|--|------|
| CBT 5. My teammates are dedicated to their sport | .698 |
|--|------|

---

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|   |      |
|---|------|
| CBT 6. My teammates are very focused on their own improvement | .628 |
|---|------|

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|  |                 |                 |
|--|-----------------|-----------------|
| CBT 7. My teammates are reliable in the context of sport | .441 (Factor 2) | .424 (Factor 4) |
|--|-----------------|-----------------|

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---

|  |      |
|--|------|
| CBT 14. My teammates mentally prepare for each practice/game | .442 |
|--|------|

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|  |      |
|--|------|
| CBT 16. My teammates show commitment to the team | .645 |
|--|------|

---

FACTOR 3

---

|  |       |
|--|-------|
| CBS 1. My teammates are highly motivated individuals | -.544 |
|--|-------|

---

---

|  |       |
|--|-------|
| CBS 3. My teammates cope well with demands | -.379 |
|--|-------|

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---

|   |       |
|---|-------|
| CBS 5. My teammates sets a strong personal example for teammates outside of sport | -.458 |
|---|-------|

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|  |       |
|--|-------|
| CBS 7. My teammates behave in a professional way | -.465 |
|--|-------|

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---

|  |       |
|--|-------|
| CBS 8. My teammates are committed in all aspects of their life | -.666 |
|--|-------|

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|   |       |
|---|-------|
| ABT 2. My teammates are equally driven towards goals outside of sport | -.689 |
|---|-------|

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|   |                  |                 |
|---|------------------|-----------------|
| ABS 5. My teammates are consistent with actions away from sport | -.449 (Factor 3) | .349 (Factor 1) |
|---|------------------|-----------------|

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FACTOR 4

CBT 8. My teammates play well under pressure .753

---

CBT 10. My teammates are highly confident athletes .751

---

CBT 9. My teammates do not quit regardless of the score .463 (Factor 4) .372 (Factor 1)

---

- Factor 4 because resilience thought to describe performance

CBT 11. My teammates are leaders on the team .312

---

NO FACTOR (Loading above .3)

11. My teammates are consistent in their actions  
in a game or practice .267 (F1) .232 (F2) .253 (F3)

---

18. My teammates Demand the best from other teammates .203(F1) .217 (2) .249 (4)

---

## Appendix G

### FINAL Trust in Sport Questionnaire (TSQ) Post EFA

This questionnaire is designed to assess your perceptions of your team. There are no wrong or right answers, so please give your immediate reaction. Some of the questions may seem repetitive, but please answer ALL questions. Your personal responses will be kept in strictest confidence.

#### *Cognitive – Based (Task)*

*Grounded in individual's beliefs about teammate reliability and dependability during sport*

**The following statements are designed to assess your feelings about YOUR PERSONAL INVOLVEMENT with your team. Please CIRCLE a number from 1 to 5 to indicate your level of agreement with each of these statements.**

|  | Disagree |   |   | Agree |   |
|--|----------|---|---|-------|---|
| 7. My teammates are reliable in the context of sport | 1        | 2 | 3 | 4     | 5 |
| 8. My teammates play well under pressure             | 1        | 2 | 3 | 4     | 5 |
| 10. My teammates are highly confident athletes       | 1        | 2 | 3 | 4     | 5 |
| 11. My teammates are leaders on the team             | 1        | 2 | 3 | 4     | 5 |

#### *Cognitive –Based (Social)*

*Grounded in individual's beliefs about teammate reliability and dependability outside of sport*

|   | Disagree |   |   | Agree |   |
|---|----------|---|---|-------|---|
| 1. My teammates are highly motivated individuals                              | 1        | 2 | 3 | 4     | 5 |
| 3. My teammates cope well with demands  | 1        | 2 | 3 | 4     | 5 |
| 5. My teammates sets a strong personal example for teammates outside of sport | 1        | 2 | 3 | 4     | 5 |
| 7. My teammates behave in a professional way                                  | 1        | 2 | 3 | 4     | 5 |

---

|  |   |   |   |   |   |
|--|---|---|---|---|---|
| 8. My teammates are committed in all aspects of their life | 1 | 2 | 3 | 4 | 5 |
|--|---|---|---|---|---|

---

***Affect – Based***

***Grounded in individual's beliefs about teammate reliability and dependability***

**Disagree**

**Agree**

---

|  |   |   |   |   |   |
|--|---|---|---|---|---|
| 3. My teammates create a positive atmosphere at the arena or field | 1 | 2 | 3 | 4 | 5 |
|--|---|---|---|---|---|

---

---

|  |   |   |   |   |   |
|--|---|---|---|---|---|
| 4. My teammates consoles teammates when they are upset or frustrated | 1 | 2 | 3 | 4 | 5 |
|--|---|---|---|---|---|

---

---

|  |   |   |   |   |   |
|--|---|---|---|---|---|
| 6. My teammates Communicate effectively with other teammates and leaders | 1 | 2 | 3 | 4 | 5 |
|--|---|---|---|---|---|

---

---

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| 7. My teammates Help with team related problems | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|

---

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|  |   |   |   |   |   |
|--|---|---|---|---|---|
| 9. My teammates Demonstrate sportspersonship | 1 | 2 | 3 | 4 | 5 |
|--|---|---|---|---|---|

---

---

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| 10. My teammates Show a sincere caring for the team success | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|

---

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|  |   |   |   |   |   |
|--|---|---|---|---|---|
| 12. My teammates Are rarely negative toward the team | 1 | 2 | 3 | 4 | 5 |
|--|---|---|---|---|---|

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---

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| 13. My teammates Show they are willing to cooperate | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|

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|  |   |   |   |   |   |
|--|---|---|---|---|---|
| 16. My teammates Are supportive during team failures | 1 | 2 | 3 | 4 | 5 |
|--|---|---|---|---|---|

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|  |   |   |   |   |   |
|--|---|---|---|---|---|
| 1. My teammates Keep promises to teammates | 1 | 2 | 3 | 4 | 5 |
|--|---|---|---|---|---|

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|                               |   |   |   |   |   |
|-------------------------------|---|---|---|---|---|
| 10. My teammates show empathy | 1 | 2 | 3 | 4 | 5 |
|-------------------------------|---|---|---|---|---|

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|                             |   |   |   |   |   |
|-----------------------------|---|---|---|---|---|
| 11. My teammates are honest | 1 | 2 | 3 | 4 | 5 |
|-----------------------------|---|---|---|---|---|

---

---

|  |   |   |   |   |   |
|--|---|---|---|---|---|
| 12. My teammates take other people seriously | 1 | 2 | 3 | 4 | 5 |
|--|---|---|---|---|---|

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## Appendix H

### Social Sciences & Humanities Research Ethics Board Letter of Approval

October 18, 2016

Brogan Bailey  
Health Professions\Health & Human Performance

Dear Brogan,

**REB #:** 2016-3937  
**Project Title:** Development and Validation of a Measure of Trust in Sport (Phase 1)  
**Effective Date:** October 18, 2016  
**Expiry Date:** October 18, 2017

The Social Sciences & Humanities Research Ethics Board has reviewed your application for research involving humans and found the proposed research to be in accordance with the Tri-Council Policy Statement on *Ethical Conduct for Research Involving Humans*. This approval will be in effect for 12 months as indicated above. This approval is subject to the conditions listed below which constitute your on-going responsibilities with respect to the ethical conduct of this research.

Sincerely,

Dr. Karen Beazley, Chair

## Appendix I

### Social Sciences & Humanities Research Ethics Board Letter of Approval

July 14, 2017

Brogan Bailey  
Health\Health & Human Performance

Dear Brogan,

**REB #:** 2017-4195  
**Project Title:** Development and Validation of a Measure of Trust in Sport (Phase 2)  
**Effective Date:** July 13, 2017  
**Expiry Date:** July 13, 2018

The Social Sciences & Humanities Research Ethics Board has reviewed your application for research involving humans and found the proposed research to be in accordance with the Tri-Council Policy Statement on *Ethical Conduct for Research Involving Humans*. This approval will be in effect for 12 months as indicated above. This approval is subject to the conditions listed below which constitute your on-going responsibilities with respect to the ethical conduct of this research.

Sincerely,

Dr. Karen Beazley, Chair

## Appendix J

### Social Sciences & Humanities Research Ethics Board Amendment Approval

November 27, 2017

Brogan Bailey  
Health\Health & Human Performance

Dear Brogan,

**REB #:** 2017-4195

**Project Title:** Development and Validation of a Measure of Trust in Sport (Phase 2)

The Social Sciences & Humanities Research Ethics Board has reviewed your amendment request and has approved this amendment request effective today, November 27, 2017.

Sincerely,

Dr. Karen Beazley, Chair