Abstract

In high performance team sports, athletes compete with athletes from other teams (e.g., game, event) but also with teammates (e.g., for playing time). The aim of the present study was to: a) present a conceptual framework to further the understanding of positional competition (i.e., the competition for playing time), and b) present the development and validation process of the Positional Competition in Team Sports Questionnaire (PCTSQ). A conceptual framework representing the inputs (e.g., individual characteristics, group processes, coaching decisions), mediators (e.g., information-related processes, performance-related processes, emergent states) and outputs (e.g., individual outputs, team outputs) of positional competition is proposed. The development of the PCTSQ was conducted over four stages (i.e., item generation, preliminary item analysis, scale refinement using CFA and ESEM, estimation of validity and reliability), which included data collected from two samples (i.e., 221 undergraduate Kinesiology students and 812 U Sports/NCAA team sport athletes). The questionnaire was reduced from 127 to 25 items, measuring positional competition across seven dimensions. The CFA and ESEM outputs revealed an acceptable fit of the final version of the PCTSQ. In addition, acceptable internal consistency scores for all dimensions of the scale and initial evidence of convergent validity were demonstrated. The PCTSQ is a novel scale to assess positional competition for playing time in team sport, which may aid researchers and practitioners to assess competitive processes within high performance team sports.

Advancement of a Conceptual Framework and Instrument to Assess Positional Competition in Sport Teams: The Positional Competition in Team Sports Questionnaire

Competition, as a social process, has been at the center of research attention in social sciences for over a century (Johnson & Johnson, 2003), likely due to its omnipresence in day-to-day life. Individuals encounter competition in organizations (e.g., for promotion), in schools (e.g., for grades), and even during leisure time (e.g., in video games). Additionally, one realm in which competition is frequently experienced is sports (Stanne, Johnson, & Johnson, 1999). Coakley and Donnelly (2004) argued that competition is an integral part of sports. The organization of sports is competitive, with organized leagues that provide structure and a sequence to competitive events (e.g., a schedule when a team is playing another team, rankings).

Competition manifests itself in sport in a variety of ways. Likewise, people will engage in competition in sports for a variety of different reasons, both intrinsic and extrinsic, instrumental and affective. For example, Deutsch (2000) pointed out that friends might engage in a weekly tennis match for the pure enjoyment of the competition. It is the engagement in the mutually pleasurable/profitable activity that is the driving force of participation. In contrast, a professional runner might engage in a competitive run for the sole purpose of winning and the financial rewards associated with it. The reason for the engagement is the excellence in performance in comparison to others. Typically, excellence in sport is often measured through the assessment of one's abilities in comparison to another (Stanne et al., 1999).

In a sports context, Chelladurai (2012) defined these two approaches to competition as the pursuit of pleasure and the pursuit of excellence. The *pursuit of pleasure* describes activities in which participants engage for participation's sake. In such egalitarian sports, everybody gets the chance to participate regardless of ability level. For example, athletes in a recreational soccer

may participate for the sake of enjoyment of the sport. In this context, the distribution of playing time may be kept somewhat equal between athletes of different ability levels to give everyone the chance to enjoy participation. On the contrary, the *pursuit of excellence* is characterized by comparison. Individuals engage in the pursuit to win. Chelladurai (2012) calls the pursuit of excellence 'serious business', which is exclusive in nature. That is, only selected athletes who meet the ability requirements at a high-performance level may participate in the pursuit of excellence. For example, on a professional soccer team, winning is an important component of the overall evaluation of the coaches' and players' performances. In such a context, only the best performing players will receive playing time to maximize the odds of winning.

Another important consideration about the pursuit of excellence is that competition does not only take place between teams (i.e., inter-team) but also within a team (i.e., intra-team). Typically, high performance teams (i.e., teams who follow the pursuit of excellence) will have more players on the roster than actual playing positions available. In this case, athletes are required to compete for playing time against their own teammates (Rees & Segal, 1984; Van Yperen, 1992). Although there is considerable anecdotal evidence for this competition within a team (e.g., Botterill, 2012), until recently the evaluation of this phenomenon in sport teams has been absent from the sport psychology literature.

Martens (1979) argued that constructs in the realm of social psychology, such as competition, should be examined in the context in which they occur. Fittingly, Harenberg, Riemer, Karreman, and Dorsch (2016a) conducted a qualitative exploration of competitive processes within university sport teams. The authors interviewed eight full-time Canadian University Sport (U Sports) coaches from various team sports. The findings revealed two types of competitive processes within teams. First, *situational competition* describes competitive

practice situations that vary in group size (e.g., one vs. ones, three vs. twos), scoring limit (e.g., first to seven goals), and/or time restrictions (e.g., a predetermined timeframe). These situations occur on a regular basis during practices. Coaches typically structure these competitive situations intentionally for developmental (e.g., tactical) and motivational (e.g., increasing the intensity and enjoyment) reasons. Although there is usually a winner in situational competition, the consequences for losing are minor to none, organizational (e.g., collection of equipment) or physical (e.g., a set of pushups) tasks. As Chelladurai (2012) suspected, the findings indicated that coaches use situational competition for overall improvement of abilities and other positive team outcomes in order to pursue excellence.

Another process described by the coaches was *positional competition*, the vying for playing time between teammates in a particular position (Harenberg et al., 2016a). There are usually several players per position on the roster of high performance sport teams. Thus, athletes need to compete for a scarce resource (i.e., playing time) against a specific reference group (i.e., players in the same position). Yet, in contrast to situational competition with a set end point (e.g., a score limit, expiry of time), positional competition is an ongoing group process between teammates. That is, the competition for playing time does not end at a particular moment (e.g., end of a game). It is rather a continuous process of comparison that only ends when a) an athlete leaves a team, or b) there is only one athlete for a particular position. Harenberg et al. (2016a) note that positional competition is a process that may have important implications for team functioning, yet it has not yet been examined empirically in the current sport psychology literature.

To gain a better conceptual understanding of positional competition, Harenberg, Riemer, Karreman, and Dorsch (2016b) examined athletes' perspectives of positional competition using a

qualitative phenomenological approach. The authors interviewed 16 Canadian University Sport (U Sports) athletes in team sports. The results demonstrated that positional competition is a multi-dimensional (e.g., information- and performance-related facets), ongoing group process that occurs between teammates competing for the same playing time in a particular position. The authors highlighted the adaptive potential of the process but also underline the need for a more structured approach to researching positional competition in a sport context. To carefully study this construct, it first needs to be clearly operationalized and conceptualized (Nunnally & Bernstein, 1994). Hence, the first purpose of the present study is to advance a definition and conceptual framework of positional competition in team sport, based on the qualitative evidence and relevant literature.

Defining Positional Competition

The first step to measuring a construct is to define the construct being measured (Tenenbaum, Eklund, & Kamata, 2012). According to the findings of Harenberg et al.'s (2016a, 2016b) studies, positional competition is defined as the process of teammates vying for the same limited playing time in one position. It is a team process that is dynamic (i.e., varies in intensity) and ongoing (i.e., does not have a clear end point), consequently lasts longer than a particular static situation, and involves all agents of sport teams (e.g., the athlete, teammates, coaches). There are four important considerations that accompany the definition of positional competition. First, positional competition only occurs between players in the same position (Rees & Segal, 1984; Van Yperen, 1992). Players in different positions (e.g., a forward and a goalie) do not compete directly for the same limited playing time. Second, high performance athletes desire the most amount of playing time and are encouraged to strive for more playing time. This competition may lead to superior outcomes because it may push individual athletes to perform to

higher standards, thus enhancing collective performance resources (Chelladurai, 2012). Third, positional competition is an ongoing process (Harenberg et al., 2016a, 2016b). There is no definite winner or loser. Rather starting/playing status may fluctuate over time. Also, positional competition begins and ends with the membership on a team, given that there are more players than available playing positions. Once an athlete has joined a team, vying for playing time begins and can last over multiple weeks, months, and seasons, until the athlete leaves the team. Lastly, positional competition always occurs with the awareness of the coach. The (head) coach is a central agent in positional competition because of the associated reward power of the distribution of playing time (Laios, Theodorakis, & Gargalianos, 2003).

Conceptualizing Positional Competition

One needs to have a clear conceptual understanding of a phenomenon before one can measure it empirically (Nunnally & Bernstein, 1994). A theoretical framework provides a good starting point in understanding a complex phenomenon (Tenenbaum et al., 2012). As such, the following section provides a conceptual framework of positional competition that builds largely on the qualitative studies conducted by Harenberg et al. (2016a, 2016b) and relevant literature. The conceptualization of positional competition will follow the Input-Mediator-Output (IMO) framework. As Mathieu et al. (2008) outlined, the IMO framework provides three main advantages in describing group processes compared to other traditional framework (e.g., Input-Process-Outcome, IPO, McGrath, 1964): First, the framework considers that group processes never fully develop as separate entities but are consistently influenced by emergent states. That is, these emergent states can be seen as cognitive, motivational, and affective states that are dynamic and consistently influence inputs, mediators, and outcomes of team functioning (Marks, Matthieu, & Zaccaro, 2001). An example of a common mediator for an emergent state in sport is

cohesion (e.g., Paradis & Loughead, 2012), which develops dynamically and affects several constructs related to team functioning (Carron, Colman, Wheeler, & Stevens, 2002; McEwan & Beauchamp, 2014; Paradis & Martin, 2012). Second, the IMO framework views the individual nested within the group. Team members, with their individual characteristics, are influenced by a team's group processes (e.g., leadership, social norms), which are nested in the larger organizational structure of the team (e.g., organizational characteristics). Lastly, the IMO framework captures the dynamics of group processes (i.e., they change over time). That is, groups are entities that consistently fluctuate in their effectiveness and social fabric, due to various internal and external influences (Carron & Eys, 2012). A larger discussion of the conceptual differences between the IMO and IPO frameworks is provided elsewhere (Mathieu et al., 2008).

In a sport context, the IMO model is well suited for the description of group processes. For example, McEwan and Beauchamp (2014) illustrated its applicability to the conceptualization of teamwork. Models using the IMO framework may capture the dynamics of changing processes within sport teams more accurately. Moreover, these processes may progress in episodic cycles (e.g., week-to-week) and may develop over a longitudinal perspective (e.g., season-to season). Positional competition, much like teamwork, is conceptualized as a dynamic process within teams. It changes over episodic cycles (e.g., from pre-season to mid-season) and may develop longitudinally (e.g., by changing compositions of the team from season to season). Hence, positional competition will be conceptualized using the IMO framework. A model of positional competition is described below and visually displayed in Figure 1.

Inputs of Positional Competition

Building on Mathieu et al.'s (2008) work, the anticipated sources of inputs of positional competition are threefold: 1) *individual inputs*, 2) *team inputs*, and 3) *environmental inputs*.

Among the *individual inputs*, a multitude of cognitive, affective, and behavioral factors may influence positional competition. The cognitive appraisal of the competence of other players might play an important role in formulating emotional and behavioral responses to positional competition (Fletcher & Fletcher, 2005). In addition, the competitiveness of an athlete (e.g., enjoyment and desire to strive for success in competition; Gill & Deeter, 1988) may influence positional competition. For example, competitive athletes may respond to positional competition with increased motivation and performance (Harenberg et al., 2016b). The expectations and goals set by the athlete (e.g., being a substitute player, desired playing time minutes, being a regular starter) may influence athletes' behavior in positional competition as well.

The individual athletes are nested within teams that have specific *team inputs* to positional competition. These are mainly structural, behavioral, and/or psychological processes within the team. In particular, Carron and Eys (2012) describe several factors (e.g., group size, leadership structure, task interdependence) that may influence group processes. For example, teams may establish certain norms (i.e., standards that regulate group members' behavior; Forsyth, 1999) that influence positional competition. That is, athletes may have established a common set of certain behaviors that are acceptable (e.g., being respectful to competitors) and not acceptable (e.g., trying to injure competitors) in positional competition (Harenberg et al., 2016b). Such team norms may influence how an athlete responds motivationally and behaviorally to positional competition. These responses have been documented in previous literature (Harenberg et al., 2016b; Boroumand, Eys, & Benson, 2018). Another important factor of the team is the group composition (i.e., the players who are selected for the team, which

comprise the team resources and talents). In a university sport context, the coach selects players to join the team. The individual ability of the recruited players influences positional competition. In addition, the coach assigns a position (i.e., a physical location on the field) and a task role (i.e., set of behaviors associated with the position) to each player (Carron & Eys, 2012). The overlap in position dictates the group of competitors for playing time (e.g., forward vs. forward).

Lastly, the *environmental inputs* describe factors external to the team that may influence positional competition. For example, organizational structures or sport rules may influence how playing time competition is carried out. In youth organizations, competitors for playing time may be assured a set amount of playing time despite differences in playing ability. In professional or university sport, this might not be the case. In addition, depictions of competition for playing time in the media (e.g., televised discussions of playing time decisions by experts) may influence how players experience positional competition. Lastly, some sports permit unlimited substitutions (e.g., volleyball, basketball, hockey) whereas other sports limit the amount of players to enter the game (e.g., soccer).

Mediators – Processes and Emergent States

Mediators in the proposed framework are comprised of processes and emergent states, which interact in a team environment. Yet, the distinction between the two is important. In the present conceptualization, positional competition is described as a team process, which manifests in observable behaviors that reflect the nature of team member interaction, which in turn influences group outcomes. Some of these observable behaviors include the setting of individual goals related to playing time and seeking out communication with the coach to understand the hierarchy structure within the team. As such, the processes in the present model reflect information-related and performance-related perceptual processes associated with positional

competition. Emergent states are by-products of team experiences, which are mutually related to inputs, processes, and outputs (Marks et al., 2001; McEwan & Beauchamp, 2014). For example, conflict may arise as a by-product of the positional competition between established and new team members (Boroumand et al., 2018; Harenberg et al., 2016b), which in turn may influence behaviors and perceptions associated with positional competition. Yet, teams engaging in positional competition may not always experience conflict.

Processes. Athletes described two groups of processes of positional competition: *information-related* (self-evaluation, feedback from teammates, feedback from coaches) and *performance-related* (teammates pushing each other to get better, and development of own ability) processes (Harenberg et al., 2016b). First, *information-related processes* reflect the desire of an athlete to gain information on his/her ability and competency relative to teammates in the same position. The three sub-processes for information-related processes can be self-evaluation, feedback from teammates, and feedback from the coach. These three sources of information are central to describing information-related processes in the proposed framework.

Individuals tend to seek out self-evaluative information by comparison when objective, nonsocial standards are absent (Festinger, 1954). This is usually the case for the distribution of playing time in interdependent team sports as some performance criteria may not be objectively measurable (e.g., tactical positioning). Thus, athletes will derive information of their ability in comparison to other athletes. In particular, Harenberg et al. (2016b) suggested that self-awareness (i.e., an athlete's perception about his/her capabilities when competing against teammates) and performance expectations (i.e., an athletes' understanding of expected behavior when competing against teammates) are processes of self-evaluation during positional competition.

Another source for information-related processes is the feedback that an athlete receives from teammates. In particular, athletes tend to praise teammates for good performance aspects or share constructive feedback on how to enhance collective performance (Harenberg et al., 2016b). Through this process, athletes may gain further insights into their ability level in relation to the competitors in their position.

The interaction with the coach is another central source for information-related processes in positional competition. In particular, there are three sub-processes in positional competition with regards how to gain information from their coach: evaluation, communication, and selection (Harenberg et al., 2016b). Coaches constantly evaluate their athletes' performances in a quantifiable (e.g., through the use of statistics) or non-quantifiable (e.g., video analysis) way. The information derived from these sources will usually be shared with athletes during individual or team meetings. Another central role of the coach is to provide communication of progress. The athletes derive information on how they have progressed in the competition for playing time from the coach. This information may be reflective of how the athlete has progressed, where the athlete can still make some improvements, and how the athlete's current performance ranks compared to other players in the same position.

The other main set of processes of positional competition—*Performance-related processes*—describes perceptions of performance enhancement in the process of competing for playing time. In particular, Harenberg et al. (2016b) identified two sub-processes. The first sub-process is the perception that teammates push each other to get better. That is, athletes strive to play and by doing so they must constantly perform to a superior degree than their positional competitors. The perception of being pushed and/or being able to push teammates is a key

component of contributing to the overall team's performance and is very much encouraged by coaches (Harenberg et al., 2016a).

The second sub-process is the development of one's abilities through forced improvement and learning from competitors. When athletes are competing for playing time, each other's performances are usually the reference point. If an athlete wishes to earn playing time, he/she needs to rise to and/or exceed the level of the competition in relation to their teammates in a particular playing position. Performance improvements are necessary to compete for playing time. During this process, athletes closely monitor the progress and strengths of competitors. From this monitoring, athletes may gain valuable insights into their performances and how they may improve further.

Emergent States. Two emergent states are included in the model (yet others may exist): cohesion and conflict. Cohesion has been defined as "a dynamic process that is reflected in the tendency of a group to stick together and remain united in pursuit of its instrumental objectives and/or for the satisfaction of member affective needs" (Carron, Brawley, & Widmeyer, 1998, p. 213). Cohesion is manifested in social (i.e., attraction to group/integration in group for interpersonal and affective activities and behaviors) and task (i.e., attraction to group/integration in group for instrumental objectives and behaviors) components. In the organizational literature, Tjosvold, Johnson, and Johnson (2003) suggest that the quality of the relationship between competitors in interdependent settings plays a central role in the constructiveness of competition. Accordingly, cohesion is an integral team process that may be associated with positional competition in sport (Harenberg et al., 2016b). As such, cohesion is integrated as an emergent state influencing the processes of positional competition.

A second emergent state is intrateam conflict (i.e., "a dynamic process that occurs between interdependent parties as they experience negative emotional reactions to perceived disagreements and interference with the attainment of their goals", Barki & Hartwick, 2004, p. 234). Similar to cohesion, conflict within teams may be experienced through social and task contexts (Paradis, Carron, & Martin, 2014a, 2014b). An extensive amount of literature has linked competition to intragroup conflict in educational and business settings (Deutsch, 2000; Tjosvold, Johnson, Johnson, & Sun, 2006). In sport, conflict was reported as an emergent process that may result in or influence competition for playing time in sport teams (Harenberg et al., 2016a, 2016b). Consequently, conflict is considered as an emergent state in the model of positional competition.

Outputs of Positional Competition

The anticipated outputs of positional competition are behavioral, affective, and social states within a team. In particular, these states may be visible at an individual and team level. Competition within a team is a process geared towards the performance enhancement of the team. As such, behavioral states may be an increase in performance excellence of individuals (Stanne et al., 1999) and performance coordination efforts between competitors (Harenberg et al., 2016b). From an affective perspective, positional competition may be linked to individuals' adaptive (e.g., heightened confidence, enjoyment) or maladaptive (e.g., frustrations, anxiety) emotions (Harenberg et al., 2016b). On a social level, positional competition may be used to create competence hierarchies within the team (Boroumand et al., 2018). A key concept related to hierarchies is status within the team (Jacob & Carron, 1998), particularly pertaining starting or non-starting playing status. In general, positional competition may be understood as a necessary, inevitable process that may influence the task effectiveness of the group. Athletes may help each

other, by competing, to make sure the selected player in each position brings the best performance for the team.

It should be noted here that the presented framework conceptualizes positional competition as a dynamic process that changes over *episodic cycles*. Teams may transition from cycle to cycle (e.g., from game to game; McEwan & Beauchamp, 2014). Based on the results (e.g., win or loss) and other contextual factors, inputs, mediators, and outputs of positional competition may vary in intensity. Lastly, it should be noted that positional competition develops over the course of a season. For example, in times of hierarchy uncertainty (e.g., preseason) positional competition may be experienced differently than at the end of the season. Much like other team processes (e.g., team effectiveness), positional competition changes over time as the team matures throughout a season and may be influenced by changes to the composition of the team (e.g., addition/removal of players, player injuries, coaching changes; (Matthieu et al., 2008; McEwan & Beauchamp, 2014).

Measurement Development

Based on the conceptual framework presented above, the next aim of the present study is to outline the creation of an instrument (i.e., a questionnaire) to measure the identified processes of positional competition: The Positional Competition in Team Sports Questionnaire (PCTSQ). The development of the instrument is described in four phases. The first phase describes the generation of items and procedures to establish face and content validity (i.e., the expert and/or researcher's judgment or ratings that the content of a self-report measure or item captures some or all aspects of the psychological construct of interest; Hagger & Chatzisarantis, 2009). The second phase describes procedures of item revision and deletion to reduce redundancy. Phases three and four describe procedures to enhance factorial and construct validity, demonstrate

measurement reliability through internal consistency, and assess convergent validity (i.e., the extent to which constructs are related that should theoretically share a relationship; e.g., Paradis, Carron, & Martin, 2014b).

Phase 1 – Item Generation and Content Validity

The goal of the first stage in the development of the PCTSQ was to generate items that reflect the processes of positional competition. To accomplish this, data on coaches' and athletes' perspectives of positional competition (Harenberg et al., 2016a, 2016b) and the existing literature on competition within sport teams were examined. A preliminary list of 108 items were generated and given to seven experts (female: $n = 4$) to assess the item content relevance (Dunn, Bouffard, & Rogers, 1999) for positional competition. This group was comprised of four researchers: two full professors, an associate professor, and a PhD student in the field of sport psychology. All of these members had extensive experience in research and measurement development of psychometrically sound instruments. In addition, one applied sport psychologist (Masters-level trained) was part of the group. The individual was employed full-time to work with high performance athletes in applied consulting. Lastly, two full-time head coaches of university team sports were part of the group of experts. The group was comprised of individuals that had experience in sport psychology and/or coaching ranging from 5 to 21 years.

Content Validity. The experts received a paper copy of the initial list of generated items and proposed dimensions. Under each item, experts were invited to provide qualitative feedback and suggestions for rewording via comment boxes. Moreover, experts provided quantitative feedback (e.g., rating of readability, clarity, and applicability of each item on a 7-point Likert scale, ranging from 1-very hard to 7-very easy) on each item. The comments and quantitative scores (i.e., a score ≤ 4 by any of the experts, which is the midway point of the scale) were

evaluated for the revision of items. Similar procedures have been employed by previous research (e.g., Cheung & Power, 2012). In general, experts agreed with the created dimension structure and set of items (i.e., only few of the items were rated ≤ 4). About 5.5% of the items (n = 6) were slightly revised in content. The experts commented on the comprehensiveness of the created items in reflecting each sub-dimension. For example, for the dimension *Improvement*, items reflecting more concrete performance parameters (e.g., learning team tactics, improving mental preparation) were added. Other items were reworded. For example, in the dimension *Push by Competitors*, the initial wording was changed from referring to the comparison group as 'competitors' to 'teammates in my position'. The intention for this change was to clarify the comparison group in positional competition. The resulting version of the questionnaire had 127 items reflecting 13 facets (listed in Figure 1 under Phase 1 & 2) of positional competition. The connection between the processes captured in the framework and the dimensions in the questionnaire can be found in Figure 2. A detailed list of all dimensions and items are outlined elsewhere and thus not repeated here (see Harenberg, 2014). Each facet was represented by at least seven items to allow for a reduction of redundant items. All items had the same preface (i.e., "Think about the competition for playing time that you have with your teammates who play in the same position. In this competition...") and were measured using a seven-point Likert scale with "Strongly Disagree" (1) and "Strongly Agree" (7) as extreme points.

Phase 2 – Preliminary Item Analysis

After obtaining ethical approval, the set of 127 items was administered to 221 undergraduate Kinesiology students (male n = 66; mean age = 20.77 years, SD = 2.74 years; mean year of study = 2.34, SD = 1.20) at a Canadian university. The participants were recruited from an undergraduate sport psychology class. The participation was voluntary and the students

did not receive any class credit for completing the questionnaire. Most of the participants had participated (97.3%) in competitive sports (e.g., local, high school, provincial level). Following recommendation by DeVellis (2017), data analyses (using SPSS) included a) the examination of distribution of responses, b) item mean and standard deviation, c) inter-item correlation, d) item-to-total correlations, and e) internal consistency (i.e., Cronbach's α, composite reliability; Peterson & Kim, 2013). These procedures were used to assess the variability in responses, the reliability of subscales, and preliminary factorial validity. Furthermore, the dimensions were correlated with each other to gather information regarding dimensional factor structure and parsimony.

Initial analyses suggested some dimensional modifications. Due to high correlations between the dimensions *Improvement, Push Self,* and *Responsibility to Perform* (all $r > .90$) these dimensions were combined and renamed *Effort to Improve*. Conceptually, these three dimensions reflect effort-related process within an athlete. Furthermore, the dimensions *Coach Feedback* and *Coach Recognition* correlated highly ($r > .90$) and were combined and renamed *Coach Communication.* Finally, the dimensions *Feedback from Peers* and *Peer Recognition* ($r = .83$) were combined to *Peer Communication*.

Inter-item correlations and item-to-total correlations were used to limit item redundancy and ensure the item ideally correlated the highest with its proposed dimension, as opposed to another dimension. If individual items correlated highly ($r > .80$) they were considered redundant, and one was deleted. All item-to-total correlations < .50 were considered weak and such items were deleted (Bearden, Netemeyer, & Teel, 1989). It was the objective to eliminate items that correlated weakly on their intended dimensions. However, it was also the intention to have a sufficient number of items reflecting the specific dimension in its conceptual entirety. The

resulting structure of the questionnaire had nine dimensions (see Figure 2) with 58 items, with each dimension having at least five items. All internal consistency values were satisfactory (i.e., Cronbach's α and composite reliability >.7; Nunnally & Bernstein, 1994).

Phase 3 – Scale Refinement

In the third phase of the questionnaire development, the PCTSQ was administered to its target population (i.e., university-level team sport athletes) and the resulting data were subjected to confirmatory factor analysis (using maximum likelihood estimation). The participants were recruited via their coaches. Once the coach granted permission for the team's participation, athletes were presented with a paper-based questionnaire at a convenient time for the team (e.g., after practice). While the athletes were advised that participation was voluntary, all invited athletes completed the questionnaire. In total, 812 U Sports or NCAA athletes (female n = 389; mean age = 20.30, SD = 1.97; mean experience = 2.57 years, SD = 1.31 years) from 36 teams participated. The athletes competed in soccer (n = 262, 32.3%, 12 teams), football (n = 201, 24.8%, 4 teams), hockey (n = 178, 21.9%, 8 teams), volleyball (n = 156, 19.2%, 11 teams), or basketball (n = 15, 1.8%, 1 team). The large sample sizes permitted the researchers to draw random subsamples from the entire sample to test and refine the structure of the PCTSQ. This procedure is similar to the development process of other measures in sport psychology (e.g., Team Sport Performances Processes Questionnaire; Karreman, 2010; Athlete Satisfaction Questionnaire; Riemer & Chelladurai, 1998). Hedayat and Sinha (1991) argue that two random subsamples can be considered different and distinct if they differ in the vector structure (i.e., same subjects, order of subjects) and if the same set of units from the population (or large sample) were employed. Therefore, two random samples drawn from a larger sample may be considered different and distinct.

Prior to analyses, cases with missing data were deleted listwise (n = 73, 8.9%). The remaining 739 cases were examined; item distributions, means, and standard deviations were calculated to ensure sufficient variability. At this point, no further items needed to be deleted. The sample was randomly split in half. The first half of the sample (n = 370) was used for the refinement of the factor structure. The second sample (n = 369) was used to confirm the resulting factor structure.

The 58 items in nine proposed dimensions were subjected to both Exploratory Structural Equation Modeling (ESEM) and Confirmatory Factor Analysis (CFA) using MPlus and AMOS. These structural equation models were chosen over other statistical techniques (e.g., exploratory factor analysis) because of an existing theoretical structure (as outlined in the framework) of the dimensions of positional competition (Finch, Immekus, & French, 2016). A key advantage of using ESEM is that items are permitted to cross-load on several factors, whereas CFA forces these cross-loadings to be 0 (Myers, Ntoumanis, Gunnell, Gucciardi, & Lee, 2018). As such, ESEM is a less restrictive estimation of model fit. However, Marsh and colleagues (2014) note that "in preliminary analyses at the level of individual items, researchers should compare ESEM and CFA measurement models based on the constructs to be considered" (p. 104). As such, CFA was calculated in addition to ESEM. The following goodness-of-fit indices were considered for all structural equation models (i.e., ESEMs, CFAs) in the present study: χ^2/df ratio (acceptable fit 2-3, good fit < 2; Schermelleh-Engel, Moosbrugger, & Müller, 2003), Incremental Fit Index (IFI, acceptable fit >.90, good fit > .95; Jaccard & Wan, 1996), Nonnormed Fit Index (NNFI or Tucker Lewis Index, acceptable fit > .90, good fit > .95; Bentler & Bonnet, 1980), Comparative Fit Index (CFI, acceptable fit > .90, good fit > .95; Bentler & Bonnet, 1980), and Root Mean Square Error of Approximation (RMSEA, acceptable fit .05-.08, good fit .00-.05; Schermelleh-

Engel et al. (2003). For a description of the mathematical principles of each indicator, please see Schermelleh-Engel et al. (2003).

Initial results suggested changes were warranted to the scale. First, high correlations ($r >$ .80) between the dimensions *Push by Teammates* and *Peer Communication* suggested collapsing these dimensions into one, together reflecting behavioral and communication processes received from teammates. The same was found for the dimensions *Push Teammates* and *Feedback to Teammates*. These were collapsed to one dimension reflecting behavioral and communication processes from an athlete to the teammates.

Next, the scale refinements were made based on the following criteria: (a) the factor loadings of the items to its respective dimensions (> .60 considered very good; Comery & Lee, 1992), (b) the modification indices (MI > 10; Byrne, 2016), and (c) the assessment of inter-item correlation ($r >$ .80; Kline, 1993). The criteria were assessed by considering the output of the ESEM and CFA. Application of these criteria led to an elimination of 33 items, resulting in a questionnaire structure with 25 items, reflecting seven dimensions. Each dimension consisted of three or more items, as suggested by Marsh (2007).

The internal consistency of each dimension was then assessed. All dimensions yielded acceptable Cronbach's α values (α = .69 - .90) and composite reliability (.71 - .90) values. Following recommendations by Smith, McCarthy, and Anderson (2000), the seven revised dimensions were correlated with the nine dimensions from the previous factor structure to examine whether the original factors were sufficiently represented by the revised factors. For the dimensions that were not combined with another dimension a strong correlation to the original structure was found ($r >$ .90). For the dimensions that were combined out of two dimensions, slightly weaker, but nonetheless sufficient, correlations ($r >$ .80) were found.

Finally, the factor structure was examined with the first subsample using ESEM. The results indicated a satisfactory fit ($\chi^2/df = 2.67$, NNFI = .90, CFI = .95, RMSEA = .065, $CI_{90\%}$ = .057 - .073). The CFA output demonstrated acceptable goodness of fit indicators ($\chi^2/df = 2.54$, IFI = .92, NNFI = .90, CFI = .92, RMSEA = .065, Confidence Interval, $CI_{(90\%)}$ = .059-.071). The results of the steps outlined above indicate that the proposed structure of the PCTSQ reflects the intended content of the prior structure appropriately, is internally consistent, and valid in its factorial structure.

Phase 4 – Confirming Validity and Reliability

The data of the second subsample (n = 369) of CIS/NCAA athletes from high performance team sports were used at this stage of the present study.

Reliability. The internal consistency values for the dimensions are provided in Table 1. The Cronbach's α values ranged from .81 to .87 and composite reliability values ranged from .75 to .90. According to Nunnally and Bernstein (1994), a sufficient cutoff for Cronbach's α and composite reliability is .7. Therefore, the results indicate acceptable levels of internal consistency.

Correlations between subscales. None of the correlations among the subscales (see Table 1) surpassed a value of $r > .60$. Only four correlations exceeded the value of $r > .50$, with the dimensions *Push by Teammates* and *Push Teammates* being the highest (r = .57). The highest explained variance between dimensions is 32.7%. Therefore, uniqueness of each dimension can be assumed.

Factorial validity. Before the factorial structure of the scale was examined, intraclass correlation coefficients (ICC) were calculated to check whether the data was nested within teams. Muthén and Satorra (1995) suggest that an ICC above .20 warrants a multi-level approach

to factor analysis. However, none of the ICCs of the items yielded a value above .16. As such, the data were analyzed at the individual level.

To confirm the final structure of the PCTSQ, we conducted exploratory structural equation modelling (ESEM) followed by CFA. For the present study, ESEM was calculated in MPlus 7.2 using a target rotation with the purpose of confirming the established factor structure from Step 3 (Marsh et al., 2014). ESEM revealed a good overall model fit (χ^2/df = 1.91, NNFI = .95, CFI = .97, RMSEA = .050, $CI_{90\%}$ = .041 - .058). The items loaded well on their intended factors (see Table 2, factor loading > .50) with the exception of one item (i.e., item 21 – my coach selects the starting lineup based on prior performance, factor loading = .48). Cross-loadings were acceptable (<.24). Overall, the results confirmed the hypothesized structure of the PCTSQ.

As a follow-up, a CFA with maximum likelihood estimation of the hypothesized factor structure was conducted in AMOS. The factor loadings of the items were satisfactory (>.58; see Table 2). The CFA output demonstrated satisfactory goodness of fit indicators of the proposed factor structure (χ^2/df = 2.26, IFI = .94, NNFI = .93, CFI = .94, RMSEA = .059, $CI_{(90\%)}$ .052-.065).

Convergent Validity. To examine convergent validity, measures of performance and satisfaction were collected. In particular, the subscales *Individual Effort* and *Interplayer Coordination* from the Team Sport Performances Processes Questionnaire (Karreman, 2010) were collected. The processes reflect the individual's perspective of own expended effort as well as the coordination of effort with teammates. Moreover, *Satisfaction with Training and Instruction* by the coach (Athlete Satisfaction Questionnaire; Riemer & Chelladurai, 1998) was measured. The scales were both administered as part of the questionnaire used in phase 3. All

scales had acceptable internal consistency (Cronbach's $\alpha > .70$). As anticipated, the correlations between the measures and the dimensions of positional competition indicated significant positive relationships ($r = .14$ - $.54$, see Table 1).

Discussion

The purpose of the present study was two-fold: a) to advance a conceptual framework of positional competition and b) to develop and validate a measure of positional competition in high performance team sports. The conceptualization of positional competition is based from the current literature on competition within sport teams and the qualitative findings from previous works (Harenberg et al., 2016a, 2016b) and presents a novel framework that may aid in the understanding of the competition within a team. The aim of the questionnaire development phase was to find the most parsimonious and psychometrically sound instrument to measure positional competition in high performance team sports. The resulting scale of 25 items across seven dimensions provides an instrument that is, to our knowledge, the first questionnaire to measure positional competition in a high performance team sport context. It is a relatively short and usable scale for a variety of team sport contexts (e.g., in different high performance team sports).

The PCTSQ represents two salient themes: (a) *information-related processes*, and (b) *performance-related processes*. The *information-related processes* are based on the premise that an athlete who engages in positional competition has a need for self-evaluation of his/her own abilities in relation to the other competitors (Festinger, 1954; Tesser, 1988). These processes are reflected in four dimensions (i.e., *Comparison*, *Self-Awareness*, *Coach Recognition*, *Selection*). *Comparison* and *Self-Awareness* are dimensions that describe information gained through internal perceptual processes of the individual. The dimensions *Coach Recognition* refers to the

information that an athlete gains through the feedback from a coach. The dimension *Selection* describes the information a player gains through the process of being selected to play by a coach.

The *performance-related processes* are based on the concept that competition within interdependent groups is used constructively to enhance effort by the competitors involved (Chelladurai, 2012; Tjosvold et al., 2003, 2006). This idea was described by athletes and coaches as 'pushing each other to get better' (Harenberg et al., 2016a, 2016b). Consequently, there are two dimensions that reflect this notion (i.e., *Pushing Teammates, Push by Teammates*). The dimensions *Pushing Teammates* describes perceptions of an athlete that s/he is encouraging (through physical performance or verbal guidance) other competitors for the same position to elevate their performance. Conversely, *Push by Teammates* describes the perception that an athlete's competitors for a position encourage him/her (through physical performance or verbal guidance) to perform better. Finally, the dimension *Effort to Improve i*s the perception that the athlete is working to foster his/her abilities while competing for playing positions.

An important conceptual consideration of the scale is that it measures perceptions regarding the involvement of three agents in the process of positional competition: (a) the individual athlete, (b) teammates in a particular position, and (c) the coach. By competing against others, the athlete gains more insight into his/her own capabilities. Teammates provide normative information on how one is to compete. Teammates also guide the athlete on how to develop his/her abilities further. The coach provides positive feedback and determines who will play. The involvement of those three agents is important because they all influence how positional competition is carried out within the team. Generally, all of these agents follow the same collective goals (e.g., being successful as a team) and are interdependent in their collaborative effort to achieve these goals.

From a technical perspective, an important consideration when constructing the scale was restricting the reduction of each dimension to no less than three items. It is recommended that multiple indicators (i.e., more than two) should be incorporated into the structure of each measured dimension (Bollen, 1989; Marsh, 2007). Yet, factors with three items may yield insufficient internal consistency in measuring psychological variables (e.g., Watson & Clark, 1997). However, for the present scale three dimensions were reduced to three items to prevent redundancy in item wordings. It should be noted that the eliminated items, surprisingly, did not correlate with each other to the extent that a deletion was necessarily required ($r < .80$, Kline, 1993). However, in the interest of uniqueness of the items and the brevity of the scale, the items were deleted respectively. Despite Watson and Clark's (1997) concern about the internal consistency of three-item factors, two of the three-item dimensions (i.e., *Self-Awareness*, *Coach Recognition*) demonstrated good internal consistency scores (α & composite reliability > .80). One of the three-item dimensions still demonstrated acceptable internal consistency scores (*Selection*; α = .81, composite reliability = .75). Taken together, these scores provide evidence for sufficient internal consistency. However, future research should evaluate whether these scores can be replicated in other samples.

Significant positive correlations between all dimensions of positional competition, perceptions of performance, and satisfaction provided preliminary evidence of convergent validity. Although the range of correlations was quite large ($r = .14$ - $.54$), we observed higher correlations between dimensions that conceptually should be related. More specifically, when we consider Table 2, we observe that the perception of individual effort is more highly correlated to *Effort to Improve* than to any other dimension of the PCTSQ. Furthermore, we see that the performance dimension *Inter-Player Coordination* and the inter-player dimensions in the

PCTSQ (i.e., *Push teammates* and *Push by Teammates*) share the highest correlation. Finally, the *Satisfaction with Training and Instruction* dimension, which describes the satisfaction with the coach's input into the development of the player, correlated highest with the coaching-influence dimensions (i.e., *Coach Recognition*, *Selection*) of the PCTSQ. Weaker correlations were found between *Effort to Improve* and *Coach Recognition* and *Selection*. Taken together, these correlations make conceptual sense and provide preliminary evidence of the convergent validity of the PCTSQ. These initial results provide promising evidence for confident utilization of the scale going forward. However, considering that validity testing is an ongoing process (Carron, Widmeyer, & Brawley, 1985), researchers and psychometricians should continue to further assess the validity of the scale with different samples.

To our knowledge, the PCTSQ is the only instrument that measures competition for playing time within sport teams. Other instruments measuring competition in sports focused on competitive anxiety (e.g., CSAI-2, Martens, Burton, & Vealey, 1990), motivational climate (e.g., PMCSQ-2, Newton, Duda, & Yin, 2000), and competitiveness (e.g., SOQ, Gill & Deeter, 1988). The only scale that takes competition within a team into account is the Peer Motivational Climate in Youth Sport Questionnaire (PeerMCYSQ, Ntoumanis & Vazou, 2005). In this questionnaire, a dimension named 'intrateam competition' measures the promotion of inter-individual competition by the peer group. It is measured with three items (i.e., On this team, most athletes try to do better than their teammates; On this team, most athletes encourage each other to outplay their teammates; On this team, most athletes look pleased when they do better than their teammates). Although these items are comparable to the dimension '*Comparison*' in the PCTSQ, there are conceptual key considerations that differ between the instruments. First, the PeerMYCSQ was conceptualized for youth sport, the PCTSQ was conceptualized for high

performance (e.g., university) sport. Secondly, the PeerMYCSQ conceptualized competition within a team as a facet of ego-oriented motivational climate and did not specify why the athletes were trying to out-compete each other. The PCTSQ is a measurement instrument of a multi-dimensional model of competition for playing time. Lastly, the PeerMYCSQ refers to 'most athletes' and does not specify which athletes are referred to. Building on the assumption that positional competition occurs between players that occupy the same playing position (Rees & Segal, 1984; Van Yperen, 1992), the PCTSQ examines the competition that occurs between athletes in the same position. For these conceptual differences, we argue for the use of the PCTSQ to measure competition for playing time in high performance team sport.

The PCTSQ was designed for high performance sport teams with a focus on intercollegiate team sports. The qualitative and quantitative phases included athletes from different interdependent sports (i.e., soccer, football, basketball, volleyball, hockey). This might make the scale more suitable for these particular team sports. From an applied perspective, researchers and applied consultants could use the scale to evaluate the perceptions of positional competition within a team. This information could be helpful in working with coaches and athletes to enhance positive performance outcomes associated with positional competition. Anecdotal evidence (see Botterill, 2005) indicates that the structure of positional competition is a vital element of creating high-performance environments. Empirical evidence collected via the PCTSQ might provide deeper insights into such environments.

In the sport context, emergent states, such as cohesion, have been considered key influencing processes into the constructiveness of positional competition (Tjosvold et al., 2003; Harenberg et al., 2016b). It is entirely possible that teams who stick together, socially and instrumentally, find ways to mitigate some of the possible negative consequences of positional

competition (e.g., envy). Future research is clearly needed to test this relationship. In addition, the coach plays an integral role in positional competition (Chelldurai, 2012). For example, the group composition, and the way a coach develops a team and encourages and establishes the norms around athletes engaging in positional competition may play a key role in its constructiveness (Harenberg et al., 2016a). Yet, there is an absence of quantitative evidence as, to our knowledge, this strategy is not reflected in any scales examining coaches' leadership style or behavior. As such, the connection between the coaching dimensions in the PCTSQ (i.e., coach recognition, selection) might provide a significant contribution to understand the role of the coach in positional competition.

There are some conceptual limitations of the PCTSQ, which ideally should be addressed by future research. The present scale has been generated for high performance sport teams in which playing time is distributed competitively. The data in the present study was exclusively collected from university teams. This limits the generalizability to other populations (e.g., high performance youth sport, professional sport). Future research needs to examine the usability, validity, and reliability of the PCTSQ in these populations. A second limitation is that this scale was designed primarily for team sports. However, competition could also take place between athletes in individual sports (Evans, Eys, & Wolf, 2013). The competition within individual sports has different characteristics. For example, in most individual sports, there is a measure (e.g., time) that provides more objectivity to the competition between athletes. Based on the results, the coach makes decisions as to who is going to participate in a specific event. For example, a university track and field coach may select only a few athletes of the team to compete in the upcoming meet. Yet, there are no decisions about to the extent to which an athlete can contribute to an event (e.g., with distribution of playing time, substitutions). Therefore, we can

assume that the competition in individual sport teams might look different than in team sports. This should also be examined by further research. A final main limitation is that this scale explicitly focuses on the competition for playing time within a team. Qualitative studies (Harenberg et al., 2016a, 2016b) demonstrated that there are other competitive processes that might take place within a sport team (e.g., competitive situations). Furthermore, athletes might also compete for formal roles (e.g., captaincy) or recognition beyond the team boundaries (e.g., rookie of the year). There is a definite need for further exploration of competitive processes within sport teams.

In summary, the present paper outlined the advancement of a framework of positional competition and the development of the PCTSQ. The steps taken in the development of the scale revealed initial evidence of content, factorial, and convergent validity as well as sufficient internal consistency reliability. From our perspective, the 25-item, seven-dimension scale is a unique instrument to measure positional competition in a team sport context that can be used with confidence going forward. It will provide key insights into the nature of positional competition in various environments (e.g., collegiate, professional) within sports.

Acknowledgements

The authors wish to acknowledge Miranda Kaye for her assistance with the statistical analyses.

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Table 1

Dimension Internal Consistency, Means, Standard Deviations, and Bivariate Correlations

Dimension	α/CR	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. PC - Effort to Improve	.87/.86	6.08 (.75)									
2. PC - Push by Teammates	.88/.86	.57**	5.33 (.99)								
3. PC - Push Teammates	.86/.83	.52**	.55**	5.40 (.97)							
4. PC - Comparison	.86/.88	.56**	.31**	.43**	6.01 (.97)						
5. PC - Social Awareness	.86/.82	.47**	.32**	.47**	.44**	5.54 (.92)					
6. PC - Coach Recognition	.84/.90	.47**	.43**	.34**	.12**	.32**	5.25 (1.21)				
7. PC - Selection	.81/.75	.37**	.33**	.24**	.13**	.26**	.56**	5.30 (1.25)			
8. PF – Individual Effort	.81/.82	.47**	.25**	.27**	.38**	.28**	.21**	.21**	6.18 (.76)		
9. PF – Interplayer Coordination	.72/.73	.46**	.52**	.54**	.27**	.29**	.36**	.24**	.40**	5.60 (.70)	
10. AS – Training and Instruction	.88/.88	.36**	.31**	.14**	.14**	.22**	.59**	.44**	.22**	.32**	5.09 (1.37)

Note: $N = 369$, ** $p<.01$, all dimensions are measured on a 7-point Likert scale, PC = Positional Competition, PF = Performance, AS = Athlete Satisfaction.

Table 2

Item Descriptives and Factor Loadings

Sub-scale	Item	M (*SD*)	CFA	1.	2.	3.	4.	5.	6.	7.
1. EI	**1 I am getting better at fulfilling my responsibilities as a player in my position.**	5.92 (.93)	**.72**	**.52**	.09	.12	.08	.01	.01	.09
	8 I challenge myself to be a better player.	6.32 (.90)	**.78**	**.71**	.01	.11	.13	-.09	.04	-.11
	15 I am pushing myself to improve the skills required in my position	6.19 (.90)	**.81**	**.82**	.02	-.10	-.04	.12	-.04	.15
	22 I am pushing myself to improve upon my weaknesses as a player.	6.22 (.86)	**.79**	**.71**	.01	-.02	.03	.04	.14	-.10
2. PbT	**2 my teammates in my position push me to work hard every day.**	5.58 (1.19)	**.77**	.22	**.72**	-.04	-.01	-.07	-.08	.09
	9 my teammates in my position encourage me when I am making progress as a player.	5.49 (1.14)	**.76**	-.10	**.90**	.00	.12	.02	-.01	-.02
	16 my teammates in my position point out aspects I am doing well in our position	5.38 (1.25)	**.76**	.07	**.59**	.12	-.06	.10	.07	-.04
	23 my teammates in my position push me to work on my weaknesses as a player.	5.32 (1.21)	**.82**	-.05	**.65**	.09	-.04	.13	.17	.00
3. PT	**3 I provide guidance for my teammates in my position.**	5.36 (1.22)	**.69**	-.01	-.19	**.79**	.02	.07	.06	.03
	10 I am pushing my teammates in my position to reach beyond their expected performance level.	5.36 (1.11)	**.76**	.14	.02	**.63**	.03	.01	.02	.02
	17 I am pushing my teammates in my position to work on their weaknesses as players.	5.30 (1.20)	**.78**	.06	.25	**.56**	-.01	.01	-.04	.05
	24 I talk to my teammates how they can do better in our position.	5.18 (1.31)	**.76**	-.11	.11	**.77**	.02	.04	-.05	.00
4. COM	**4 I am constantly trying to be ahead of my teammates in my position.**	6.11 (1.17)	**.71**	.08	-.09	.17	**.67**	-.09	.05	-.05
	11 I try to outperform my teammates in my position.	6.09 (1.13)	**.82**	.00	-.05	.04	**.82**	-.01	.02	.03
	18 I strive to show that I am better than my teammates in my position.	5.79 (1.26)	**.85**	-.09	.03	-.07	**.86**	.10	-.01	-.03
	25 I try hard to perform better than my teammates in my position.	6.04 (1.13)	**.86**	.09	.04	-.09	**.82**	.05	-.05	.06
5. SA	**5 I know how well I perform compared to my teammates in my position**	5.33 (1.12)	**.77**	.00	-.03	.02	.01	**.80**	-.03	-.02
	12 I know what I am capable of in relation to my teammates in my position.	5.79 (1.02)	**.81**	.18	.06	.15	-.01	**.62**	-.08	-.02
	19 I know where my performance ranks in comparison to my teammates in my position.	5.57 (1.18)	**.75**	-.07	-.02	-.06	.07	**.80**	.09	.03
6. CR	**6 my coach acknowledges when I am performing well in my position.**	5.25 (1.34)	**.86**	.00	.01	.06	-.02	.05	**.85**	-.01
	13 my coach acknowledges when I compete hard as a player.	5.46 (1.36)	**.87**	.07	.07	-.08	-.01	.01	**.81**	.03
	20 my coach compliments me on good plays that I make in my position.	5.33 (1.40)	**.89**	.03	.01	.01	.03	-.04	**.84**	.08
7. CS	**7 my coach <u>does not</u> select the athletes to play that perform the most consistent.**	5.26 (1.58)	**.67**	.00	-.07	.07	.00	-.07	.00	**.72**
	14 the best performing players get playing time.	5.41 (1.38)	**.85**	.00	.04	-.01	.00	.05	.01	**.81**
	21 my coach selects the starting lineup based on prior performance.	5.27 (1.46)	**.58**	-.01	.05	.02	.03	.02	.13	**.48**

Note: EI - Effort to Improve, PbT - Push by Teammates, PT - Push Teammates, COM - Communication, SA - Self-Awareness, CR - Coach Recognition, CS – Coach Selection, CFA = Factor Loadings from CFA, 1. – 7. = Factor Loadings from ESEM

Figure 1

A Conceptual Framework of Positional Competition

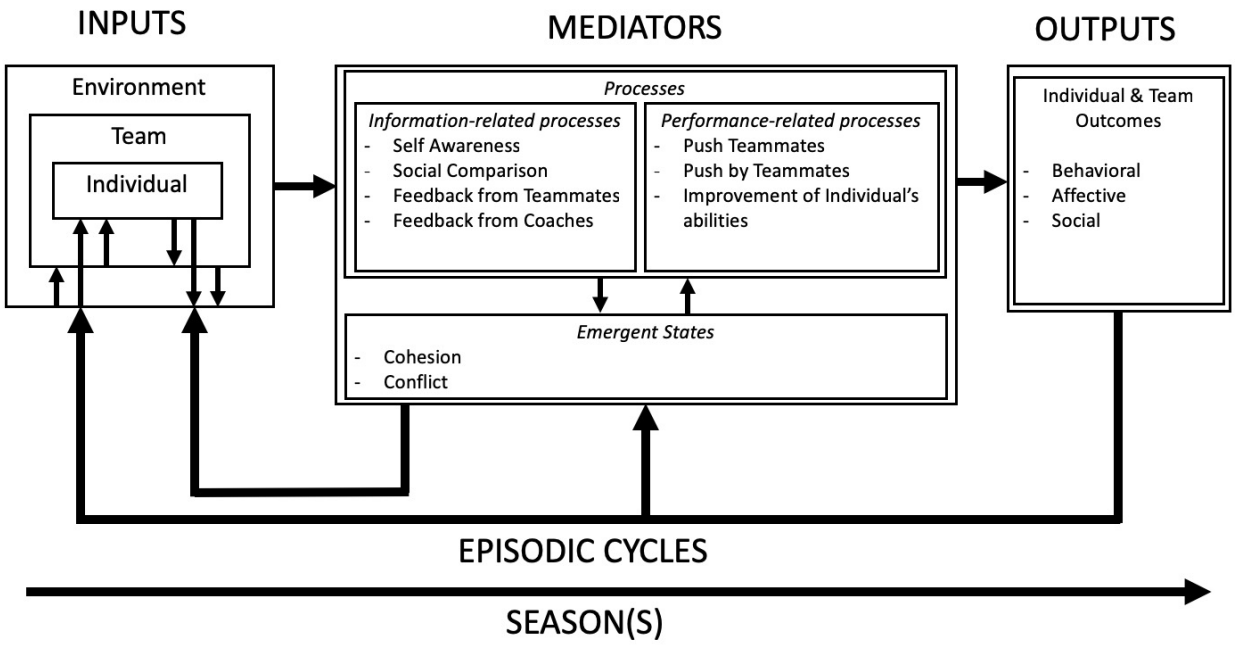

Figure 2

Steps of Dimension Reduction