The Relationship Between Cohesion, Collective Efficacy, Communication and Performance Outcomes in Youth Team Sports

Yasuda, Yuto

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The Relationship Between Cohesion, Collective Efficacy, Communication and Performance Outcomes in Youth Team Sports

by

Yuto Yasuda

A THESIS
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Abstract

One of the foremost challenges for coaches and applied sport psychologists working with teams is enhancing group functioning to maximize team performance. Group dynamics theorists and practitioners have consistently highlighted the importance of a number of group variables (communication, cohesion, and collective efficacy) which are positively associated with team success, and as a result could be a target for group interventions. To develop more effective interventions when working with sports teams, the relationships between communication, cohesion, collective efficacy and performance outcome should be examined. Thus, the purpose of this research is to examine the relationships between communication, cohesion, collective efficacy, and performance outcome in competitive youth sport soccer teams. The participants were competitive youth soccer players in Calgary Minor Soccer Association in Calgary, Canada. A cross-sectional study conducted at the end of a season measured communication, cohesion, collective efficacy, and performance outcome. Based on structural equation modelling, communication was marginally significant and positively related to cohesion. Also, cohesion was positively related to collective efficacy, which in turn, led to higher performance outcome. Also, communication was negatively related to performance outcome. Cohesion had an indirect effect on performance outcome. Therefore, the model proposed in this study was partially verified. That is, communication (behaviour in a team), team cohesion, situation-specific team confidence, and performance outcome were linearly related. Also, it is possible that the strong relationship between communication and performance outcome was due to multicollinearity. For team building interventions to enhance performance in team sports, communication should be considered with caution as communication was positively related to cohesion, but negatively related to performance outcome.
Acknowledgements

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Chapter 1 - Introduction

In sport, the sum of a team’s performance may not always reflect each of the team members’ actual individual performances. For example, in the 2016 Olympics, Japan’s track relay team won the silver medal in Men’s 4*100m by beating the United States (US) track relay team, even though the US team had faster individual runners. The reason given for the Japanese team winning was the smoothness (i.e., coordination) of their exchanges (i.e., baton passes). Based on this example, it is possible that less skilled teams based on their individual skills and abilities win against stronger teams, and group dynamic factors seems to be an important consideration as group dynamic factors have been related to performance in team sports. (Kleinert et al., 2012) Therefore, we need to consider not only individual potential performance but also group dynamic factors such as coordination and communication when we try to maximize team performance in team sports.

For the past 45 years, Steiner’s (1972) conceptual framework of group effectiveness has helped explain why team performance does not always equal the sum of individuals’ performances (see figure 1). According to this framework, actual performance equals potential productivity minus process losses. Potential productivity is viewed as the sum of the potential resources which individuals within the group have. These resources consist of an individual’s knowledge, ability, and skills. However, in team sports, players need to cooperate, coordinate, and communicate with teammates. When players on a team cannot optimize their cooperation, coordination, and communication, Steiner would label this loss of productivity ‘process loss’. These process losses would reduce potential productivity, which would then detrimentally impact actual productivity.
For example, if a miscommunication between two soccer players occurs and one makes a poor pass to another, or if ineffective coordination occurs as teammates are not playing within the same system and breakdowns occur, the team’s potential productivity is not maximized. Therefore, it is important for the team to minimize process losses in order to maximize team performance. In this sense, considering group processes such as cohesion and collective efficacy would be important to minimize process losses to increase potential productivity. In fact, group processes such as cohesion and collective efficacy have been shown to play an important role due to these constructs’ close relationships with sport performance (Carron, Colman, Wheeler, & Stevens, 2002; Leo, Gonzalez-Ponce, Sanchez-Olivia, Amado, & Garcia-Calvo, 2016; Paskevich, Brawley, Dorsch, & Widmeyer, 1999).

Paradis and Martin’s (2012) model (see figure 2) built on the conceptual framework developed by Carron and Spink (1993) and Carron, Spink, and Prapavessis (1997) to explain how team building can be an effective method for developing and enhancing group functioning. The first rationale for highlighting this model is to draw attention to the position that communication, cohesion, collective efficacy, and performance are seen to be important throughput and output variables. The second rationale in highlighting this model is to show the temporal order of the relationships between inputs, throughputs, and outputs. Inputs were divided
into two broad categories, the team structure and the team environment. Team environment (i.e., distinctiveness, togetherness, and proximity) and team structure (i.e., role clarity, role acceptance, leadership, conformity to norm, and team positions) are antecedents to throughputs, which include group process such as interaction, communication, sacrifice, and team goals. Outputs, which are the desired outcomes, include factors such as increased performance, satisfaction, cohesion, collective efficacy, and adherence.

Figure 2. Conceptual model for team-building in sport by Paradis and Martin (2012) (adapted from Carron & Spink, 1993; Carron, Spink, & Prapavessis, 1997).

In the present study, the relationships between and temporal ordering of communication (i.e., a throughput variable) and cohesion, collective efficacy, and performance outcome (i.e., all output variables) will be examined.
GROUP DYNAMIC FACTORS AND PERFORMANCE OUTCOME IN SPORT

Communication

Group dynamic theorists and practitioners have consistently highlighted the importance of effective communication in facilitating successful team functioning (cf., Carron & Hausenblas, 1998). Mabry and Barnes (1980) referred to communication as “a social process that involves the social exchange of symbols or behaviors (translatable into symbols) between two or more people” (p. 9), and communication is arguably the most essential social behavior for any group dynamics (Sullivan & Feltz, 2003).

Sullivan and Feltz (2003) conducted a series of studies to develop and examine a measure of effective intra-team communication in team sports. They identified four components of communication in team sports: acceptance, distinctiveness, positive conflict, and negative conflict. Acceptance refers to the communication of consideration and appreciation between teammates (i.e., verbal communication). The second aspect of communication is distinctiveness, which is the communication of a shared but unique identity, and is considered both non-verbal (e.g., high fives) and verbal communication (e.g., nicknames). The subscale of distinctiveness is different from distinctiveness in Paradis and Martin’s (2012) model. Distinctiveness in Paradis and Martin’s (2012) model is not based on communication. For example, distinctiveness in Paradis and Martin’s (2012) model is identical team shirts, socks, or team motto. On the contrary, distinctiveness in communication is related to interactions among two or more players such as nicknames and high fives. The third factor in communication is positive conflict, which involves intra-team conflict that expresses constructive and integrative ways of dealing with the disruption. Finally, the fourth factor in communication, negative conflict, refers to exchanges of intra-team conflict that are emotional, personal, and confrontational.
Based on the sub-components of communication in team sports, Sullivan and Feltz (2003) developed a questionnaire to measure communication in team sports, called the Scale of Effective Communication in Team Sport (SECTS). In 2011, Sullivan and Short, based on social exchange theory, updated the questionnaire and developed the Scale of Effective Communication in Team Sports (SECTS-2).

**Cohesion**

Cohesion is defined as “a dynamic process reflected in the tendency for a group to stick together and remain united in the pursuit of its instrumental objectives and/or for the satisfaction of members’ affective needs” (Carron, Brawley, & Widmeyer, 1998, p. 213). According to Carron et al. (1998), cohesion can be divided in two distinct aspects: task/social and group/individual levels. Task cohesion concerns an orientation or motivation to achieve the group’s goal, while social cohesion refers to an orientation or motivation to develop and sustain social relationships (Carron et al., 1998). The individual level, which is referred to as ‘individual attraction’, indicates the individuals’ perceptions about personal motivations and feelings about the group. The group level, which is referred to as ‘group integration’, indicates the individual’s perceptions about team unity such as closeness, similarity, and bonding (Carron et al., 1998). Therefore, cohesion has four perspectives: group integration-task (GI-T), group integration-social (GI-S), individual attraction-task (ATG-T), and individual attraction-social (ATG-S).

**Collective efficacy**

Collective efficacy is another group dynamic factor that has been well researched. Collective efficacy is defined as “a sense of collective competence shared among individuals when allocating, coordinating, and integrating their resources in a successful concerted response to specific situational demands” (Zaccaro, Blair, Peterson, & Zazanis, 1995, p. 309). Collective
efficacy is rooted in self-efficacy, which, in simple terms, is a construct that is related to confidence. George and Feltz (1995) suggested the antecedents of collective efficacy are the same as those of self-efficacy: past experience, vicarious experience, verbal persuasion, and physiological arousal. Additionally, the collective efficacy of each player has been found to be a better predictor of team performance than the simple aggregation of individual’s self-efficacy in team sports (Myers, Feltz, & Short, 2004). Therefore, when getting involved in team sports, practitioners should be considering collective efficacy as well as self-efficacy to enhance team performance.

Based on Paradis and Martin’s (2012) model and the work of Leo et al. (2016), a hypothetical relationship is suggested (see figure 3). In Paradis and Martin’s (2012) model, communication (i.e., a throughput) is seen to be an antecedent of outputs (i.e., cohesion, collective efficacy, and performance outcome). Additionally, Leo et al. (2016) examined the relationships between cohesion, collective efficacy, and performance in a longitudinal study, using male youth soccer players at the national level. Time 1 was identified as being at the beginning of the season, and the Time 2 was at the end of the season. Overall, GI-S and ATG-T at the beginning of the season significantly predicted collective efficacy at the end of the season. In turn, collective efficacy was positively related to the final ranking on the table and satisfaction of the performance at the end of the season. However, collective efficacy at Time 1 did not predict cohesion at Time 2, leading the researchers to believe that cohesion is an antecedent of collective efficacy and collective efficacy is an antecedent of performance. In the relationships between communication, cohesion, collective efficacy and performance outcome, communication is seen to be an antecedent of cohesion, which in turn, predicts collective efficacy. Finally, collective efficacy is hypothesized to lead to superior performance outcome.
Figure 3. The hypothesized relationships between group dynamic factors and performance outcome.
Chapter 2 - Literature review

Communication

As previously defined, Mabry and Barnes (1980) referred to communication as “a social process that involves the social exchange of symbols or behaviors (translatable into symbols) between two or more people” (p. 9). Although communication is identified as an important group process, research on communication in team sports has been quite limited. Of the work being done, research has revealed that communication is related to team cohesion (Kim, Magnusen, & Andrew, 2016; McLaren & Spink, 2018). McLaren and Spink (2018) examined the relationship between communication and cohesion in youth soccer teams and revealed communication was an antecedent of cohesion. Specifically, their findings revealed that acceptance and positive conflict in communication were significant positive predictors of task cohesion while negative conflict in communication was a significant negative predictor. However, surprisingly, there is little research that can be located that connects communication, collective efficacy, and team performance even though high quality of communication has been identified as a critical component for enhanced team performance (i.e., an essential social process).

In summary, communication has been overlooked in sport research even though communication in team sports is fundamental and essential to enhance team performance. Thus, communication should be a construct included when group dynamic factors in sport are examined. Based on the literature review, communication has been hypothesized to be an antecedent to cohesion.

Cohesion

As mentioned in the introduction section, cohesion is defined as “a dynamic process reflected in the tendency for a group to stick together and remain united in the pursuit of its
instrumental objectives and/or for the satisfaction of members’ affective needs” (Carron, Brawley, & Widmeyer, 1998, p. 213). One of the important factors which is strongly related to cohesion is interdependence among teammates. Gully, Devine, and Whitney (2012), in their meta-analysis examined the impact of the interaction among players to accomplish the goals of their sport. The results of their meta-analysis revealed that the more players needed to interact with other teammates, the more cohesion was necessary for improved performance. If this finding is extrapolated to the real world, then it could be said that soccer teams need more cohesion to perform well than a doubles tennis team because more players are necessary to play, and the greater number of interactions among the players necessitates a higher level of cohesion for effective team performance. Thus, the degree of interdependence the sport requires may be seen as a factor that impacts the relationship between cohesion and team performance.

**Relationship between cohesion and collective efficacy.** Previous researchers have revealed the positive relationship between cohesion and collective efficacy. For example, Kozub and McDonnell (2000) in their examination of rugby teams revealed that task cohesion (i.e., GI-T and ATG-T) had a strong relationship with collective efficacy at the end of the season, while Spink (1990) examined the relationship between collective efficacy and cohesion in both a competitive and recreational volleyball tournament. In the competitive tournament, ATG-T and GI-S types of cohesion were related to collective efficacy while there was no significant relationship found between collective efficacy and cohesion in the recreational tournament. Spink (1990) proposed that cohesion may only be related to collective efficacy at the elite rather than at the recreational level.

As previously mentioned, Leo et al. (2016) examined the relationships between cohesion, collective efficacy, and performance employing national-level youth soccer players. They
collected data at the beginning of the season and the end of the season. Overall, high level of cohesion at the beginning of the season significantly led to higher collective efficacy at the end of the season. In turn, collective efficacy at the end of the season positively predicted the final ranking on the table and satisfaction of the performance at the end of the season. Based on the results, they concluded that cohesion, collective efficacy, and performance were linearly related. To summarize, cohesion seems to be an antecedent of collective efficacy. Also, the relationship seems to be present at competitive levels, but not recreational levels.

**The relationship between cohesion and performance.** Cohesion is positively related to team performance in elite youth sport (Benson, Siska, Eys, Priklerova, & Slepicka, 2016; Grieve, Whelan, & Meyers, 2000), soccer performance (Aristotelis et al., 2013; Filho, Tenenbaum, & Yang, 2015), and ice hockey teams (Slater & Sewell, 1994). For example, Slater and Sewell (1994) found GI-S, which is group perspective of social cohesion, positively correlated with objective performance. Furthermore, cohesion has also been associated with subjective performance. Zakrajsek, Abildso, Hurst, and Watson (2007) examined the relationship between cohesion and subjective performance in both coactive and interactive sports. They revealed that the task aspects of cohesion (i.e., ATG-T and GI-T) were positively related to subjective performance. In this study, cohesion is hypothesized to be related to performance outcome via collective efficacy. That is, cohesion is hypothesized to have indirect effect on performance outcome.

However, the existence of the causal relationship is still vague. In fact, two meta-analyses revealed differing results. Based on the results of Carron et al. (2002), the causal relationship between cohesion and team performance is reciprocal, and both task and social perspectives of cohesion were related to team performance. In contrast, Filho, Dobersek, Gershgoren, Becker,
and Tenenbaum (2014) claimed that cohesion is the antecedent and performance is the consequence (i.e., not reciprocal). Moreover, they claimed that the task aspect of cohesion had bigger impact on performance than the social aspect. Overall, it may be obvious that cohesion is positively correlated with team performance. However, further research is necessary to firmly establish the causal relationship of cohesion and performance. In summary, cohesion is one of the most examined group dynamics factors in team sports, and it is strongly related to collective efficacy positively, as well as being positively related to performance.

**Collective Efficacy**

Collective efficacy is defined as “a sense of collective competence shared among individuals when allocating, coordinating, and integrating their resources in a successful concerted response to specific situational demands” (Zaccaro, Blair, Peterson, & Zazanis, 1995, p. 309), and has been positively related to sport performance.

**Relationship between collective efficacy and performance.** Collective efficacy has been related to objective and subjective performance in variety of team sports. With regard to the relationship between collective efficacy and objective performance, Myers, Feltz, and Short (2004) demonstrated that in football at the intercollegiate level, collective efficacy before a game predicted offence performance such as total yardage, turnovers, and number of punts. Moreover, the aggregated self-efficacy in each player did not predict offence performance. This demonstrated that collective efficacy is a unique and perhaps a better predictor of objective performance than aggregated self-efficacy in team sports.

Similarly, Myers, Payment, and Feltz (2004) examined the relationship between collective efficacy judgments and team performance in women ice hockey teams at the university level. They measured collective efficacy judgments and objective performance on
Fridays and Saturdays throughout the season. Results showed that the team’s performance on Friday predicted collective efficacy on the following day and their collective efficacy on Saturday (prior to the game) predicted performance on Saturday as well. More importantly, the effect of collective efficacy on performance was stronger than the effect of performance on collective efficacy. This evidence supports the notion that collective efficacy may be viewed as an antecedent rather an outcome of performance.

Collective efficacy has also been related to subjective performance levels. To investigate this relationship, Edmonds, Tenenbaum, Kamata, and Johnson (2009) studied adventure-racing teams. They observed that during the race, high levels of collective efficacy led to the perception of success and that high perceptions of success led to high collective efficacy. However, the magnitude of the direction was stronger from collective efficacy to performance as compared to the one from performance to collective efficacy. Thus, collective efficacy has been positively related to both subjective and objective performance, and consistent with Myers, Payment, et al. (2004) collective efficacy had a stronger impact on subjective performance than subjective performance had on collective efficacy.

Lastly, Fransen et al. (2015) examined group relationships within a team during soccer games. They measured collective efficacy before a game, during half-time, and after the game. The participants also evaluated subjective performances of the first-half and the second-half. Findings indicated that a) performance in the first-half predicted collective efficacy during the half-time, b) collective efficacy during the half-time predicted subjective performance in the second-half, and c) performance in the second-half predicted collective efficacy after the game.

Interestingly, collective efficacy before the game did not predict the performance in the first-half in the Fransen et al. (2015) study, while in the Edmonds et al. (2009) study, collective
efficacy measured before the race predicted the subjective performance at the first check point. One possibility is that soccer may be seen as more unpredictable than adventure racing due to the greater interdependence of the team (i.e., 11 players per team) and the opposition’s unknown skill level, while adventure racing consists of three individuals who believe they can achieve high team performance by focusing on their collective skills. As a result, soccer players may have general impressions about their performance before the game. However, they can evaluate their collective efficacy at half-time based on the actual performance. Therefore, the influence of collective efficacy on performance may vary depending on the sport.

Overall, collective efficacy seems to be related to both objective and subjective performance, and collective efficacy is seen to have a stronger impact on performance than performance has on collective efficacy.

Rationale and Research Questions

Few researchers have studied communication in the sport psychology field even though it has been implied that communication plays an important role in team sport settings (Carron & Hausenblas, 1998; Sullivan & Feltz, 2003). Additionally, even though cohesion and collective efficacy have been identified as two important group dynamic factors to optimize team performance in team sports (Eys et al., 2015; Heuze, Raimbault, & Fontayne, 2006), there is limited research on the relationship between communication and cohesion and no research could be found examining the relationship between communication and collective efficacy in team sports. Thus, the purpose of this study is to examine the relationships of three group dynamic factors (i.e., communication, cohesion, and collective efficacy) and their relationships to performance outcome in a team sport setting. I hypothesize a sequential model whereby
communication is an antecedent of cohesion, which in turn, predicts collective efficacy, which subsequently predicts performance outcome.
Chapter 3 - Methodology

Participants

The researcher contacted nine clubs belonging to the Calgary Minor Soccer Association, which is a boys’ and girls’ youth competitive soccer league in Calgary, Alberta, Canada. Two clubs agreed to participate in the research study. From these two clubs, data were collected from a total of six boys’ teams in U-15 (boys: n = 5) and U-17 (boys: n = 1), with a total of 89 males. For a team whose head coach is the author, a team manager collected data so that the head coach was not present at time of data collection with the intended goal of not influencing any of the player responses. Participation was open to both boys and girls’ teams, however, only a limited number of responses from girls’ teams were obtained so they were excluded from the analyses.

Measures

Communication. Communication between players was measured by The Revised Scale of Effective Communication in Team Sports (SECTS-2) (Sullivan & Short, 2011) (See Appendix C). It contains 15 items and is broken down into four subscales. The subscales are acceptance (4 items; e.g., “Trust each other.”), distinctiveness (3 items; e.g., “Use nicknames.”), positive conflict (4 items; e.g., “Get all problems out in the open.”), and negative conflict (4 items; e.g., “Shout when upset”). This questionnaire has a Likert scale from 1 (Hardly ever) to 7 (Almost always). Subscale scores were derived using the mean for each scale. Internal reliability, internal consistency, construct validity, and predictive validity have been previously reported by Sullivan and Short (2011) with Cronbach’s alpha of 0.77 for Acceptance, 0.77 for Positive Conflict, 0.80 for Negative Conflict, and 0.81 for Distinctiveness. Also, McLaren and Spink (2018) examined the concurrent validity of the SECT-2 by analyzing the correlation between the SECT-2 and
Youth Sport Environment Questionnaire at youth level, with all variables being moderately correlated.

**Cohesion.** Cohesion was measured by the Youth Sport Environment Questionnaire (YSEQ; see Appendix-C). Eys, Loughead, Bray, and Carron (2009) created an age-specific questionnaire for thirteen to seventeen years old due to lack of validity and reliability of GEQ for youth age. The YSEQ has a total of eighteen items measuring two aspects of cohesion: task cohesion and social cohesion. Task cohesion has eight items (e.g., “We all share the same commitment to our team’s goals”). Social cohesion also has eight items (e.g., “I invite teammates to do things with me”). Additionally, two items are spurious negative items. The YSEQ uses a Likert scale from 1 (strongly disagree) to 9 (strongly agree). Average scores of task cohesion and social cohesion were calculated. Eys et al. (2009) indicated a Cronbach’s alpha of 0.89 for task cohesion and 0.94 for social cohesion demonstrating support for its internal consistency and the use of the YSEQ with young athletes.

**Collective efficacy.** Collective efficacy was measured by the Collective Efficacy for Sport Questionnaire (CESQ; Short, Sullivan, & Feltz, 2005; see Appendix-C). This questionnaire has twenty items with five subscales measuring collective efficacy for ability (4 items; e.g., “ability to outplay the opposing team”), effort (4 items; e.g., “ability to demonstrate a strong work ethic”), persistence (4 items; e.g., “ability to perform under pressure”), preparation (4 items; e.g., “ability to be ready”), and unity (4 items; e.g., “ability to resolve conflicts”). This questionnaire has a Likert scale from 0 (not at all confident) to 10 (extremely confident). Each subscale was calculated by average score. The CESQ was found to have Cronbach’s alpha of 0.91 for Ability, 0.87 for Effort, 0.85 for Unity, 0.81 for Persistence, and 0.87 for Preparation (Short et al., 2005). Short et al. 2005 actually used GEQ and CESQ, and showed predictive and
convergent validity based on the relationship with them. Also, Dithurbide, Sullivan, and Chow (2009) found support for the predictive validity of using the CESQ with wide range of population by revealing moderately positive relationship between CESQ subjective and objective performances at ages from 16 to 49 years old. However, there has not been solid evidence which showed the validity of CESQ at youth level. Therefore, future research can examine this issue.

**Performance outcome.** Performance outcome was obtained by winning percentage (i.e., calculated by dividing the points the team earned by the points they could potentially achieve in the league). If a team wins the game, they receive three points. If the score is tied, the team gets one point. If the team loses a game, they get zero points. Thus, the following formula was used to calculate winning percentage:

\[ \text{Win} \% = \frac{3 \times (\text{Winning games}) + 1 \times (\text{tied games}) + 0 \times (\text{Losing games})}{3 \times (\text{total number of the games over the season})} \times 100 \]

**Procedure**

Permission to conduct this study was obtained from the Conjoint Health Research Ethics Board from a large Western Canadian University. Invitation letters to participate in the study were then sent to the technical directors of a number of soccer clubs which have U13, U15, and U17 teams. As a result of this invitation, two clubs agreed to participate in the study. To collect the data, the researcher either went to the field before or after the practice or passed the questionnaire packages to the head coaches who returned them once completed. Time to complete the questionnaires was approximately 10-15 minutes. Data were collected at the end of the season to ensure that group processes had already been in operation for a period of time (i.e., teams had been together and practicing for at least the season). The presence of group stability
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and regular member interaction was thought to allow necessary time for the development of both group cohesion and collective efficacy (Widmeyer, Carron, & Brawley, 1993; Zaccaro et al., 1995, respectively).

**Data Analysis**

All data were analyzed using SPSS 25 and Amos. Reliability analysis (i.e., Cronbach’s alpha) were calculated for all questionnaires (YSEQ, CESQ, and SECTS-2). If the coefficient was less than 0.60, correlations between items were analyzed, and the item whose correlation with the other items was the lowest was removed. Daud, Khidzir, Ismail, and Abdullah (2018) claimed coefficient alfa between 0.6 and 0.8 is acceptable.

Demographic data were collected and the average age, tenure on the team, and years of soccer experience was calculated. A correlation analysis was then conducted between communication, cohesion, collective efficacy, and performance outcome to see each relationship between communication, cohesion, collective efficacy, and performance outcome.

A measurement model was first examined to examine the relationships between observed variables and latent variables. Structural equation modeling was also conducted to analyze the relationships between communication, cohesion, collective efficacy, and performance outcome. In structural equation modelling, the hypothesized relationships between communication, cohesion, collective efficacy, and performance outcome were examined. In the relationships, communication, cohesion, collective efficacy, and performance outcome were positively sequentially related. That is, communication was hypothesized to be an antecedent of cohesion. In turn, cohesion was hypothesized to positively predict collective efficacy. Finally, collective efficacy was hypothesized to positively predict performance outcome. Based on Hooper, Coughlan, and Mullen (2008), the indices of goodness-of-fit that were used in this research were the model chi-square (non-
GROUP DYNAMIC FACTORS AND PERFORMANCE OUTCOME IN SPORT

significance indicating good fit), Goodness of Index (GFI; ≥ 0.90 indicating good fit), Adjusted Goodness of Index (AGFI; ≥ 0.90 indicating good fit), Comparative Fit Index (CFI; ≥ 0.90 indicating good fit), and the Root Mean Square Error of Approximation (RMSEA; ≤ 0.08 indicating good fit), because there is no single perfect index of goodness-of-fit currently (Kline, 2005).
Chapter 4 - Results

Demographic Analysis

Participants’ soccer experience and profile. The age of the participants ranged from 14 to 16 ($M = 14.51$, $SD = 0.88$). Mean length of tenure on the team is 1.79 years ($SD = 1.39$). Mean years of soccer experience is 8.99 years ($SD = 2.52$).

Table 1.

Demographic Analysis

<table>
<thead>
<tr>
<th></th>
<th>$M$</th>
<th>$SD$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>14.51</td>
<td>0.88</td>
</tr>
<tr>
<td>Team Tenure</td>
<td>1.79</td>
<td>1.39</td>
</tr>
<tr>
<td>Soccer Experience</td>
<td>8.99</td>
<td>2.52</td>
</tr>
</tbody>
</table>

Psychometric Analysis

For SECTS-2 (Sullivan & Short, 2011), the Cronbach’s alpha for each of the subscales was for acceptance (0.61), for distinctiveness (0.58), for positive conflict (0.72), and for negative conflict (0.73). For the acceptance subscale in SECTS-2, the acceptance subscale (0.61) is questionable to use, and researchers need to use the scale carefully. As the Cronbach’s alpha for distinctiveness was less than 0.60, the item that had lowest correlation with the other items in this subscale was deleted. The item was “When our team communicates, we use nicknames”.

When it was deleted, the Cronbach’s alpha for this subscale increased to 0.70. For YSEQ, the Cronbach’s alpha for social cohesion was 0.95 and for task cohesion was 0.92. For the CESQ, the reported Cronbach’s alpha for each subscale was ability (0.90), preparation (0.78), persistence (0.79), unity (0.73), and effort (0.72).
Descriptive Analyses.

Range of skewness of subscales of all questionnaires was -0.82 to 0.79. Range of kurtosis of subscales of all questionnaires was -1.18 to 0.64. Based on the recommendation of George and Mallery (2010), all data were determined to be normally distributed. Minimum and maximum score, means and standard deviation are reported in Table 2. The mean scores of distinctiveness and negative conflict in communication were low and all of scores were more than midpoint and relatively high (see Table 2 for details).

Table 2. Descriptive Statistics

<table>
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<tr>
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<th>Minimum</th>
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<tbody>
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<td>8.06</td>
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<tr>
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<td>9.00</td>
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<td>7.79</td>
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<td>10.00</td>
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<td>69.55</td>
<td>23.63</td>
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</table>
Correlation Analysis

Correlation between communication, cohesion, collective efficacy, and performance outcome.

To analyze correlations and see each relationship between all subscales of communication, cohesion, collective efficacy, and performance outcome, Pearson correlation analyses were conducted. See table 3 for detail.

Table 3.
"Correlation analysis"

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<td>.65**</td>
<td>.82**</td>
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</tr>
</tbody>
</table>

**Note:** Correlation coefficients are presented for each subscale.
GROUP DYNAMIC FACTORS AND PERFORMANCE OUTCOME IN SPORT

|     | 14.CE | .31** | .03  | .17  | -.27* | .30** | .71** | .45** | .62** | .76** | .64** | .88** | .92** | .88** | -    |
|-----|-------|-------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|
| 15.PO | -.26* | .09   | -.34**| -.20 | -.18  | .16   | .01   | .07   | .61** | .11   | .29** | .12   | .22*  | .31** | -    |

Note. Acc = Acceptance; Dis = Distinctiveness; PC = Positive Conflict; NC = Negative Conflict; Com = Communication; TC = Task Cohesion; SC = Social Cohesion; Co = Cohesion; Abi = Ability; Eff = Effort; Per = Persistence; Pre = Preparation; Uni = Unity; CE = Collective Efficacy; PO = Performance Outcome. *p < 0.05. **p < 0.01.

**Structural Equation Modeling Analysis**

**Measurement model.** This model allowed for 46 degrees of freedom (df) with $\chi^2 (46) = 94.32, p < 0.01$. This calculated $\chi^2$ is very sensitive to normality assumptions of the variables (Hooper, Coughlan, and Mullen, 2008). Goodness of Fit statistics should be considered instead. Fit statistics were GFI = 0.86, AGFI = 0.77, CFI = 0.93, RMSA = 0.11. These indices would suggest a moderate fitting model. All coefficients were standardized. Based on the recommended procedure of Joreskog and Sorbom (1986), if the modification index is more than five, it is necessary to set the parameter free and the model needs to be re-estimated. However, there was no modification index which is more than five.
Figure 4. Measurement model. This figure illustrates measurement model in structural equation modelling.

**Structural equation model 1.** This model allowed for 53 degrees of freedom (df) with $\chi^2_{53} = 551.55$, $p < 0.01$. This calculated $\chi^2$ is very sensitive to normality assumptions of the variables. Goodness of Fit statistics should be considered instead. Fit statistics were GFI = 0.43, AGFI = 0.16, CFI = 0.26, RMSEA = 0.33. Communication had a significant direct effect on cohesion. Also, collective efficacy had a significant positive direct effect on performance outcome (see table 3). However, these fit indices suggested it is very poor fit and modification indices suggested there was a path from communication to performance outcome.
Figure 5. Structural equation model 1. This figure illustrates the first model.

Table 4.

*Standardized Direct, Indirect, and Total Effects in Structural Equation Model 1*

<table>
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<tr>
<td>Collective efficacy</td>
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GROUP DYNAMIC FACTORS AND PERFORMANCE OUTCOME IN SPORT

<table>
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<th>Total effect</th>
<th>Cohesion</th>
<th>Collective efficacy</th>
<th>Performance outcome</th>
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<td>-0.01</td>
<td>0.35**</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Note. ** p < 0.05.

Structural equation model 2. This model allowed for 42 degrees of freedom (df) with $\chi^2 (42) = 50.47$, $p = 0.17$. This calculated $\chi^2$ is very sensitive to normality assumptions of the variables. Goodness of Fit statistics should be considered instead. Fit statistics were GFI = 0.92, AGFI = 0.85, CFI = 0.99, RMSEA = 0.05. These fit indices suggested a good fit to the data and there were no modification indices (> 5) which were theoretically significant. Therefore, this model was chosen to be the final model and other possible models were not tested. All coefficients were standardized. In this model, communication had a significant negative direct effect on performance outcome. Cohesion had a significant positive direct effect on collective efficacy. Collective efficacy had a significant positive direct effect on performance outcome. Also, cohesion had a significant positive indirect effect on performance outcome (see table 5).
Figure 6. Structural equation model 2. This figure illustrates the final structural equation model.

Table 5.

*Standardized Direct, Indirect, and Total Effects in Structural Equation Model 2*

<table>
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<td>0.47**</td>
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<tr>
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<tr>
<td>Performance outcome</td>
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</table>

Note. ** $p < 0.05$. 
Chapter 5 - Discussion

In team sports, two widely-used models from group dynamic perspective have been used to explain the relationships between group dynamic factors and performance outcome although focusing on two separate pathways. In Steiner’s (1972) model, the focus is on minimizing social process losses. According to this model, a team can achieve optimal performance when process losses are minimized so that the actual performance is as close to the team’s potential performance as possible. In Paradis and Martin’s (2012) conceptual model for team-building in sport, team outcomes (i.e., performance, cohesion, satisfaction, collective efficacy, and adherence) are obtained by focusing on inputs (proximity, togetherness, distinctiveness, leadership, role clarity, role acceptance, conformity to norm, and team positions) and maximizing throughputs (communication, interaction, cooperation, sacrifice, and team goals). Although the focus of the two models is different (i.e., minimizing losses in Steiner’s model and maximizing gains in Paradis and Marten’s model) the outcomes are the same, which is the ability to optimize team performance.

For this study, three group dynamic factors (i.e., communication, cohesion, and collective efficacy) and the relationships between these factors and performance outcome were examined. In team sports, cohesion and collective efficacy have been examined in a number of studies and have often been related to performance and performance outcome (Aristotelis et al., 2013; Benson et al., 2016; Edmonds et al., 2009; Fransen et al., 2015; Grieve et al., 2000; Myers, Payment, et al., 2004; Slater & Sewell, 1994). As well, cohesion and collective efficacy have been found to be positively related to each other (Kozub & McDonnell, 2000; Leo et al., 2016). In contrast, research in communication in team sports is scant even though the importance of
communication has been highlighted by a number of researchers (Carron & Hausenblas, 1998; Sullivan & Feltz, 2003).

Therefore, in this study, the research question addressed whether communication, cohesion, collective efficacy, and performance outcome were linearly related to each other based on the literature review. Based on the findings of Paradis and Martin (2012), communication is seen as an antecedent of cohesion, collective efficacy, and performance. Additionally, it had also been proposed in the literature (e.g., Leo et al., 2016) that cohesion is an antecedent of collective efficacy and, in turn, collective efficacy affects performance. Therefore, it was hypothesized that communication would be an antecedent to cohesion, and in turn, cohesion would affect collective efficacy with collective efficacy predicting performance outcome. This study is one of the first attempts to investigate the relationships between these three group dynamic factors and performance outcome. The hypothetical relationship was partially supported.

**Psychometric analysis**

When examining the measurement of communication using the SECTS-2 (Sullivan & Short, 2011), it was found that the reliability (i.e., Cronbach’s alpha) for acceptance and distinctiveness scales in SECTS-2 were low (i.e., distinctiveness: alpha = 0.58, acceptance: alpha = 0.61). Specifically, as the Cronbach’s alpha for distinctiveness was less than .60, the item which had the lowest correlation with the other items was deleted to increase its reliability (alpha = 0.70). In fact, Greco, O’Boyle, Cockburn, and Yuan (2018) recommend reliability’s cut-off point of 0.70. Thus, it is recommended that in future research this questionnaire, specifically acceptance and distinctiveness, be used with caution, and researchers should examine the reliability and modify if necessary.
Relationships between Group Dynamic Factors and Performance Outcome

Based on the correlation analyses, high values of quality of communication were positively related to cohesion and collective efficacy. In terms of relationship between communication and cohesion, acceptance in communication was positively related to both task and social cohesion. Acceptance in communication refers to the consideration and appreciation between teammates (i.e., verbal communication) (Sullivan & Feltz, 2003). Based on this finding, if team members can learn to accept and understand their teammates, this could lead to the greater fostering of social relationship with teammates (i.e., a dimension of social cohesion). Moreover, when team members understand teammates’ strength and weaknesses, it is easier to be supportive and united when executing team task. Thus, it is reasonable to see the positive relationship between acceptance and task cohesion.

The communication scale of positive conflict was positively related to social cohesion while the communication scale of negative conflict was negatively associated with task cohesion. Based on the results, when teams have conflict in constructive ways, they can foster social relationships. However, if the conflict is negative and more emotional and confrontational, this conflict negatively affects how united the team is to pursue achievement of tasks.

The correlations between communication and collective efficacy showed that acceptance was positively related and negative conflict was negatively related to all collective efficacy subscales except ability. Based on these results, negative conflict has potential to threaten collective efficacy while acceptance can improve collective efficacy in a team. Collective efficacy is described as collective competence when allocating, coordinating, and integrating resources. Therefore, when teammates are accepting of each other, they perceive that they can work together to succeed and use their resources effectively. Conversely, when negative conflict
GROUP DYNAMIC FACTORS AND PERFORMANCE OUTCOME IN SPORT

happens in a team and the conflict is not resolved, they may find it difficult to use their resources efficiently and effectively. Lastly, positive conflict was positively related to effort in collective efficacy. In fact, positive conflict might be a good chance to show effort. That is, when positive conflict happens, they need mental energy, and after they solve the conflict, they might feel competent that they can solve problems if they make effort. For the relationship between communication and performance outcome, the below discussion in structural equation modeling touches it.

In terms of cohesion, social and task cohesion were related to all subscales of collective efficacy, which supported past research (Spink, 1990). This means how cohesive a team is (i.e., both task and social) is positively related to team’s situation-specific confidence. Considering that both cohesion and collective efficacy are group dynamics factors, it can be surmised that cohesion, how united a team is, is related to team confidence in a specific situation.

Lastly, collective efficacy was related to performance outcome according to the correlation analyses. These results of this study support the Edmonds et al. (2009) and Fransen et al. (2015) studies, which revealed reciprocal relationships between performance and collective efficacy. This suggests that when a team is confident with an upcoming game, there is a greater chance they will optimize their performance and win the game.

Overall, in structural equation modelling, communication marginally predicted cohesion. In turn, cohesion predicted collective efficacy with collective efficacy predicting performance outcome. This result supports Paradis and Martin’s (2012) conceptual model for team-building in sport and gave more detailed relationships among the outputs elements (cohesion, collective efficacy, and performance outcome). That is, communication, one of the throughputs in the
model predicted cohesion, which is one of outputs. Within outputs elements, cohesion was an antecedent of collective efficacy. Collective efficacy eventually led to performance outcome.

Based on the SEM analysis, communication was marginally significantly related to cohesion. As research on communication in sport psychology is scant and this study was relatively new and explanatory, future research should examine the relationship between communication and cohesion. Communication is an intra-team behavioral level construct, while cohesion is an intra-team emergent state. Therefore, it is not surprising to see a relationship between these two variables. As a result, it seems logical to suggest that an increase in the quality of communication may lead to increases in cohesion. Additionally, communication did not have an indirect effect on collective efficacy. This finding was somewhat unexpected, and it is conjectured that because the SECTS-2 asked general communication type questions among the players (i.e., not task-specific communication related to performance) it may not be highly correlated with collective efficacy. This needs to be examined in future research.

Cohesion did have an indirect effect on performance outcome. This result supports Leo et al. (2016)’s assertion that cohesion is an antecedent of collective efficacy. In turn, collective efficacy had a direct effect on performance outcome. Leo et al. (2016) employed a similar sample, using male youth soccer players. Based on the present study, it is possible to say that team cohesion predicts team self-efficacy in a specific situation. In turn, specific team self-efficacy is associated with high performance. To get team self-efficacy, team cohesion is necessary because if a team breaks up, which is one of the example of low cohesion, the team cannot obtain confidence because they perceive that they cannot perform as a team. In turn, low team self-efficacy will have a direct effect on team performance. Therefore, cohesion-collective efficacy-performance outcome relationship makes sense.
The surprising result of the structural equation modeling was that communication had a strong negative relationship with performance outcome. This is contrary to the findings of Sullivan and Short (2011). In Sullivan and Short (2011), only the distinctiveness of communication was negatively related to ranking at the end of the season. Also, in their study, communication did not differentiate more and less successful teams. The competitive level of the sport in their study was recreational. Thus, performance and performance outcome were likely less emphasized than more competitive levels. In the present study, communication had a strong negative relationship with performance outcome at the competitive youth level. The top two teams in the sample based on the winning percentage had the lowest score in communication. Specifically, positive conflict of the two teams was relatively lower than the other teams. However, the absolute scores itself were above the middle (more than 3.5 out of 7). In fact, through speaking with the technical director, the top two teams in the sample were more skilled than the others. As a result, the top two teams won most of the games with at least a five goal difference and this indicates the divisions might have been too easy for the two teams to play. Based on this, it is possible that there were no situations where positive conflict happened over the season. Therefore, it might be difficult for the players in the two teams to imagine what the positive conflict is (e.g., trying to solve team problem in constructive ways).

Another possible explanation could be that from statistical perspective, it is possible that a multicollinearity situation happened between communication and collective efficacy. Based on the structural equation modeling, the relationship between communication and performance outcome controlling for collective efficacy was -0.96 ($p < 0.05$). The relationship between collective efficacy and performance outcome was 0.47 ($p < 0.05$) controlling for communication. Conversely, the correlation between communication and performance outcome was not
significant ($r = -0.18, p = 0.09$), while the correlation between communication and collective efficacy was positively significant ($r = 0.31, p < 0.01$). Therefore, it is possible to say that a multicollinearity situation happened between communication and collective efficacy, which might have magnified the relationship between communication and performance outcome in the model. If it is interpreted from the concept of a partial correlation’s approach, it is not uncommon that a partial correlation between Y (performance outcome) and X1 (communication) with X2 (collective efficacy) being controlled for (or partialled out) is larger than the bivariate correlation between Y (performance outcome) and X1 (communication).

Additionally, when looking at items in SECTS-2, the questions are of a more general nature (e.g., get all problems out in the open) and does not ask questions targeted specifically to communication for successful performance such as communication after conceding a goal. This might have impacted the results as well, specifically related to the relationships between communication and performance outcome. It may be if future researchers are interested in examining the relationship between communication and successful performance outcomes, a questionnaire other than the SECT-2 may want to be used.

**Limitations**

The first limitation is that participants were only males. Based on Eys et al. (2015), the relationship between cohesion and performance may depend on whether players are male or female. That is, for males, the causal relationship has been shown to move from performance to cohesion, while the direction for females has been from cohesion to performance. Therefore, if females had been included in this experiment, it is possible that a different pattern of results may have emerged. Therefore, future research is suggested to include both males and females.
The second limitation is research design. The research design was a cross-sectional study, and the data were collected at the end of the season. Therefore, the relationships between the group dynamic factors might be different at the beginning of the season or at the mid-season. A longitudinal study should be conducted to observe the relationship throughout the season.

Additionally, the result cannot be generalized to the adult population. The participants in the experiment were young athletes aged fourteen to sixteen. The importance of cohesion may differ depending on the ages. For youth sports, social cohesion may be more important because socialization is more emphasized in the younger generation. Therefore, this relationship should be used with caution when applied to the adult population.

Moreover, only six teams participated in the experiment, which prevented analysis of the data at a group level. As cohesion and collective efficacy are group dynamic factors, different results may have been found if the data had been analyzed at a group level.

Lastly, subjective team performance was not measured. Because the participants were soccer teams, performance outcome was per team. Thus, within a team, the performance of the players within the team could be improving (i.e., becoming more skilled and starting to maximize the group dynamic variables). However, this may not have been translated into winning. Thus, using only outcome measures may not reflect improvements in areas under investigation. Therefore, subjective performance should be measured as well as performance outcome to examine performance more precisely.

**Applied practices**

This study partially supports Paradis and Martin (2012) as well as others (Bosselut, McLaren, Eys, & Heuze, 2012; Loughead, et al., 2016; Paradis & Loughead, 2012; Ramzaninezhad & Keshtan, 2009; Vincer & Loughead, 2010) that in order to positively impact
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cohesion, collective efficacy, and performance, throughputs such as communication might be able to be targeted and maximized by coaches and players to optimize team performance. By optimizing these constructs, and thereby minimizing social process loses as suggested by Steiner (1972), a teams’ potential performance might then be realized.

In applied work, to optimize team performance in team sports settings, team building intervention is effective. Team building interventions described as “a method of helping the group to (a) increase effectiveness, (b) satisfy the needs of its members, or (c) improve work conditions” (Brawley & Paskevich, 1997, p. 13) have proven to be effective. In fact, group dynamic variables (e.g., cohesion and collective efficacy) have been associated with a number of positive individual and group consequences (Carron & Spink, 1993). Higher levels of group cohesion have led to superior group performance, task and social interactions, greater group stability, increased role acceptance and conformity to group norms (cf., Carron, 1988). In sport settings, team building interventions (e.g., Burton, 1989; Newin, Bloom, & Loughead, 2008; Stevens & Bloom, 2003) have improved group processes such as cohesion and performance (Paradis & Martin, 2012).

In a meta-analysis conducted by Martin, Carron, and Burke (2009), they found that team building interventions in sports tend to have significant, small to moderate positive effects on both task and social cohesion, performance, roles, and athlete cognition. Considering that the group dynamic factors are seen to have a positive association with performance, it seems that practitioners such as coaches and applied sport psychologists should focus on each of inputs and throughputs to minimize process losses conceptualized in Steiner’s (1972) framework. For example, with regard to inputs, it is already been established that leadership (Loughead et al.,
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2016; Paradis & Loughead, 2012; Ramzaninezhad & Keshtan, 2009; Vincer & Loughead, 2010) and role clarity (Bosselut et al., 2012) enhance cohesion.

As communication seemed to be the antecedent of cohesion in this study, it is recommended that interventions including communication be increased to impact positively on outputs. For example, Sullivan (1993) introduced seven activities to enhance communication in a team. One of the examples of seven activities was facilitating openness. The purpose of this activity is to enhance each person’s understanding of “mistakes” as opportunities for learning. In this activity, players pick sharing stories about mistakes they made and then think about the valuable lessons the mistakes taught. Next, the team members are split into two groups and take turns sharing their stories and talk about what they learned from the mistakes. The coach then states that each group decides which story was the greatest learning or turnaround. Following this step, the representatives from each group share their group’s “winning story”. Finally, the coach can ask team members to share their thoughts on their teammates’ reactions to their story, what the players learned from other players, and the feelings of the group after they share their own story. This activity may be beneficial to target acceptance among teammates in communication. Overall, team building interventions seem to be effective to optimize team performance and based on this study, team building may be more effective if communication training is included to optimize team functioning.

Future research

Future research should measure subjective performance as well as performance outcomes or objective performance. In this research, only performance outcome was measured. It is entirely possible to focus solely on performance outcome but not taking into account performance (e.g., a team plays very well. However, they end up losing due to a lucky bounce or
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playing poorly for a few minutes). In this case, the performance outcomes of one team could actually be lower even though their levels of cohesion, collective efficacy, and communication could possibly be higher. Collective performance data (i.e., number of completed passes, time of possession, or shots on goal) may present a much broader account of these constructs on performance and performance outcome.

Although interventions for communication have been suggested in the literature (e.g., Sullivan, 1993) as indicated in applied practices section, there is not a critical mass of empirical evidence to demonstrate that communication interventions increase cohesion. Therefore, it is recommended that future researchers perhaps use a longitudinal approach to study the relationship between communication and cohesion. Also, communication intervention-based research is needed to examine how to increase communication in a team.

If research in the area of sport psychology is going to continue to benefit from the research examining athletes’ and coaches’ perceptions regarding group constructs, it is necessary to continue to examine group dynamic factors and examine their relationships to performance outcome.
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GROUP DYNAMIC FACTORS AND PERFORMANCE OUTCOME IN SPORT


Appendix A - First Contact Letter

To Coaches and Managers:

My name Yuto Yasuda, and I’m completing a Master’s degree (specializing in sport psychology – under the supervision of Dr. Dave Paskevich) in the Faculty of Kinesiology at University of Calgary. My work examines four important group variables (i.e., cohesion, collective efficacy, team mental models and communication) that have been positively related to sport performance.

In order to examine these variables in youth soccer teams, I need your support to conduct this research.

**Your Involvement**

If you agree to participate (which is voluntary), you will meet with the researcher to set up a time for your team manager to administer the questionnaires to your team, either before or after a practice. All participants should complete their questionnaires within a 10-15 minute time-frame. Each athlete will receive a packet which contains (a) an ethics consent form, (b) general demographic questions, and (c) the cohesion, collective efficacy, team mental models and communication questionnaires. If a player does not want to participate in the study, he or she does will not fill out questionnaire (all participants will be asked to wait 10 minutes before handing back their questionnaires – this way – no participants will know who did - or did not – fill out the questionnaire), and then hand-in the unanswered questionnaires back to the team manager and the end of this time-frame.

Participants will complete their responses individually and will be ensured of the confidentiality of their responses from their coach and their peers by handing their questionnaires directly back to the team manager, who will place all questionnaires into a sealed envelope. Assessments will be made at time that is convenient for your team.

The questionnaire package will be distributed to one of the board members who would then pass it on to team mangers (who, as stated earlier, will distribute and collect the questionnaires once completed). I will collect the sealed package of questionnaires from the team managers.

The results from this study will advance our understanding of the relationships between the above-mentioned variables and sport performance – particularly in the context of youth soccer. Each team that agrees to participate will receive, at the conclusion of the study, a report.
including the descriptive statistics related to their team, as well as any of the subscales measures that may have acted (either positively or negatively upon their teams’ performance).

I am looking to recruit Girls and Boys U-15 and U-17 teams from Tier 1 to Tier 3. You are receiving the letter as you are currently coaching a team that fits within this category.

If you have any questions, please feel free to contact me, and if are interested in becoming part of this research project, would you kindly reply to the email below ASAP. Collection of data for this study would take place in the last two weeks of July and the first week of August.

This study has been approved by the University of Calgary Conjoint Health Research Ethics Board (REB18-0568).

Please feel free to email me directly at: yuto.yasuda1@ucalgary.ca

Thank you in advance.

Regards,

Yuto Yasuda, Faculty of Kinesiology, University of Calgary
yuto.yasudda1@ucalgary.ca
403.889.4791
Appendix B - Informed Consent Form

TITLE: The relationships between cohesion, collective efficacy, and team mental models in youth male and female soccer teams

SPONSOR: This study is not sponsored.

INVESTIGATORS: Dr. Dave Paskevich, and Yuto Yasuda,

Faculty of Kinesiology, University of Calgary

Principal Investigator: Dr. David Paskevich (403) 220-3434
Yuto Yasuda (403) 889-4791

This consent form is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, please ask. Take the time to read this carefully and to understand any accompanying information. You will receive a copy of this form.

BACKGROUND

Cohesion (i.e., how we stick together), collective efficacy (team confidence), team mental model (i.e., how well we understand our roles and responsibilities) and communication are all variables related to performance in team sport. The purpose of this study is to examine the relationships between cohesion, collective efficacy, communication, team mental models, and performance outcome.

WHAT IS THE PURPOSE OF THE STUDY?

The purpose of this experiment is to examine the relationship between the four group factors and performance in team sports. You will be asked to answer a questionnaire package. It will take 10-15 minutes to complete questionnaires.
WHAT WOULD I HAVE TO DO?

You will need to answer the paper questionnaires to measure team cohesion, collective efficacy, team mental models, and communication. It will take 10-15 minutes to complete the four questionnaires.

You will answer the questionnaires either before or after a practice. After you answer the questionnaires and submit them to the team manager, the questionnaires will be placed into a sealed envelope and the team manager will pass them to one to one of the study group members.

WHAT ARE THE RISKS?

There is no risk to mention.

WILL I BENEFIT IF I TAKE PART?

If you agree to participate in this study, there may or may not be a direct benefit to you. However, the researcher will provide a written report about your team’s performance to your coach and provide some suggestions that may improve your team’s performance.

DO I HAVE TO PARTICIPATE?

The participation is voluntary. Therefore, you can decide whether you will participate in this study. If you do not want to participate in the study, please don’t answer the questionnaire and hand back the unanswered questionnaire to the team manager. After you have answered the questionnaire, you cannot withdraw from the study (as all questionnaires are anonymous), so if you do not want to participate in the experiment, please don’t fill out the questionnaire.

WILL I BE PAID FOR PARTICIPATING, OR DO I HAVE TO PAY FOR ANYTHING?

You will not get paid to participate in this study. There will be no additional cost to you for being in this study.

WILL MY RECORDS BE KEPT PRIVATE?

Except for the researchers involved in this study (Dr. David Paskevich and Yuto Yasuda), no one will be able to view or access the information collected about you during this study. All information will be securely stored, and no personal information or results will be given to your coach.
SIGNATURES

Your signature on this form indicates that you have understood to your satisfaction the information regarding your participation in the research project and agree to participate as a participant. In no way does this waive your legal rights nor release the investigators or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time. If the questionnaire is not completed, we understand that you withdraw from the study. If you have further questions concerning matters related to this research, please contact:

Principal investigator: Dr. David Paskevich, (403) 220-3434
dpaskevi@ucalgary.ca

Or

Yuto Yasuda, (403) 889-4791
yuto.yasuda1@ucalgary.ca

If you have any questions concerning your rights as a possible participant in this research, please contact the Chair, Conjoint Health Research Ethics Board, University of Calgary at 403-220-7990.

Participant’s Name ___________________________ Signature and Date ___________________________

Investigator/Delegate’s Name ___________________________ Signature and Date ___________________________

The University of Calgary Conjoint Health Research Ethics Board has approved this research study.
Thank you for agreeing to complete this questionnaire.

Purpose

We are trying to get reactions of athletes to questionnaires dealing with your team's confidence in the team's skills and abilities to execute and perform a number of skills and processes necessary for successful performance in the sport of soccer.

Your honest and candid response is crucial

This questionnaire takes approximately 10-15 minutes to complete. Do not spend a lot of time on each question. Your immediate reaction is usually the best.

Please answer all questions. If you find some questions difficult, it is better to answer "neutral" than to not answer at all.

Some questions may also appear repetitious. They do have a specific purpose and we would appreciate your personal reaction on these.

Demographic Form

Team name: __________________________________________________

Age: ________

Sex: Boy / Girl

Tenure of the team (how many years have you played on this team): ________

Soccer experience (how many years have you played soccer): ________

Starting status: Are you typically a starter on this team? Yes / No
Collective Efficacy Questionnaire

Rate your team’s confidence, in terms of the upcoming game or competition, that your team has the ability to…

<table>
<thead>
<tr>
<th></th>
<th>Not at All Confident</th>
<th>Extremely Confident</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Outplay the opposing team</td>
<td>0 1 2 3 4 5</td>
<td>6 7 8 9 10</td>
</tr>
<tr>
<td>2. Resolve conflicts</td>
<td>0 1 2 3 4 5</td>
<td>6 7 8 9 10</td>
</tr>
<tr>
<td>3. Perform under pressure</td>
<td>0 1 2 3 4 5</td>
<td>6 7 8 9 10</td>
</tr>
<tr>
<td>4. Be ready</td>
<td>0 1 2 3 4 5</td>
<td>6 7 8 9 10</td>
</tr>
<tr>
<td>5. Show more ability than the other team</td>
<td>0 1 2 3 4 5</td>
<td>6 7 8 9 10</td>
</tr>
<tr>
<td>6. Be united</td>
<td>0 1 2 3 4 5</td>
<td>6 7 8 9 10</td>
</tr>
<tr>
<td>7. Persist when obstacles are present</td>
<td>0 1 2 3 4 5</td>
<td>6 7 8 9 10</td>
</tr>
<tr>
<td>8. Demonstrate a strong work ethic</td>
<td>0 1 2 3 4 5</td>
<td>6 7 8 9 10</td>
</tr>
<tr>
<td>9. Stay in the game when it seems like your team isn’t getting any breaks</td>
<td>0 1 2 3 4 5</td>
<td>6 7 8 9 10</td>
</tr>
<tr>
<td>10. Play to its capabilities</td>
<td>0 1 2 3 4 5</td>
<td>6 7 8 9 10</td>
</tr>
<tr>
<td>11. Play well without your best player</td>
<td>0 1 2 3 4 5</td>
<td>6 7 8 9 10</td>
</tr>
<tr>
<td>12. Mentally prepare for this competition</td>
<td>0 1 2 3 4 5</td>
<td>6 7 8 9 10</td>
</tr>
<tr>
<td>13. Keep a positive attitude</td>
<td>0 1 2 3 4 5</td>
<td>6 7 8 9 10</td>
</tr>
<tr>
<td>14. Play more skillfully than the opponent</td>
<td>0 1 2 3 4 5</td>
<td>6 7 8 9 10</td>
</tr>
<tr>
<td>15. Perform better than the opposing team(s)</td>
<td>0 1 2 3 4 5</td>
<td>6 7 8 9 10</td>
</tr>
<tr>
<td>16. Show enthusiasm</td>
<td>0 1 2 3 4 5</td>
<td>6 7 8 9 10</td>
</tr>
<tr>
<td>17. Overcome distractions</td>
<td>0 1 2 3 4 5</td>
<td>6 7 8 9 10</td>
</tr>
<tr>
<td>18. Physically prepare for this competition</td>
<td>0 1 2 3 4 5</td>
<td>6 7 8 9 10</td>
</tr>
<tr>
<td>19. Devise a successful strategy</td>
<td>0 1 2 3 4 5</td>
<td>6 7 8 9 10</td>
</tr>
<tr>
<td>20. Maintain effective communication</td>
<td>0 1 2 3 4 5</td>
<td>6 7 8 9 10</td>
</tr>
</tbody>
</table>
Revised Scale for Effective Communication in Sport Teams

The following items are concerned with how players on your team (and only the players) usually communicate with each other. They refer to any situation in which the team interacts, not just games or practices. Please consider the team as a whole when answering these questions. Read each question and answer honestly. Thank you.

Answer using this Scale:

<table>
<thead>
<tr>
<th>Hardly ever</th>
<th>Almost always</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td></td>
</tr>
</tbody>
</table>

When our team communicates, we…

1. Use nicknames.
   1   2   3   4   5   6   7
2. Shout when upset.
   1   2   3   4   5   6   7
3. Get all problems out in the open.
   1   2   3   4   5   6   7
4. Trust each other.
   1   2   3   4   5   6   7
5. When disagreements arise, we try to communicate directly with those (with whom) we have a problem.
   1   2   3   4   5   6   7
6. Communicate our feelings honestly.
   1   2   3   4   5   6   7
7. Use slang that only team members would understand.
   1   2   3   4   5   6   7
8. Get in “each other’s faces” when we disagree.
   1   2   3   4   5   6   7
9. Use gestures that only team members would understand.
   1   2   3   4   5   6   7
10. Communicate anger through body language.
    1   2   3   4   5   6   7
11. Share thoughts with one another.
    1   2   3   4   5   6   7
12. Show that we lose our temper.
    1   2   3   4   5   6   7
13. Are willing to discuss our feelings.
    1   2   3   4   5   6   7
14. Try to make sure all players are included.
    1   2   3   4   5   6   7
15. Compromise with each other when we disagree.
    1   2   3   4   5   6   7
Youth Sport Environment Questionnaire

The following questions ask about your feeling toward your team. Please CIRCLE a number from 1 to 9 to show how much you agree with each statement.

1. We all share the same commitment to our team’s goals.

   1 2 3 4 5 6 7 8 9

   Strongly Disagree   Strongly Agree

2. I invite my teammates to do things with me.

   1 2 3 4 5 6 7 8 9

   Strongly Disagree   Strongly Agree

3. As a team, we are all on the same page.

   1 2 3 4 5 6 7 8 9

   Strongly Disagree   Strongly Agree

4. Some of my best friends are this team.

   1 2 3 4 5 6 7 8 9

   Strongly Disagree   Strongly Agree

5. I like the way we work together as a team.

   1 2 3 4 5 6 7 8 9

   Strongly Disagree   Strongly Agree

6. I do not get along with the members of my team.

   1 2 3 4 5 6 7 8 9

   Strongly Disagree   Strongly Agree

7. We hang out with one another whenever possible.

   1 2 3 4 5 6 7 8 9

   Strongly Disagree   Strongly Agree

8. As a team, we are united.

   1 2 3 4 5 6 7 8 9

   Strongly Disagree   Strongly Agree

9. I contact my teammates often (phone, text message, internet).

   1 2 3 4 5 6 7 8 9

   Strongly Disagree   Strongly Agree

10. This team gives me enough opportunities to improve my own performance.

    1 2 3 4 5 6 7 8 9

   Strongly Disagree   Strongly Agree

11. I spend time with my teammates.

    1 2 3 4 5 6 7 8 9

   Strongly Disagree   Strongly Agree

12. Our team does not work well together.

    1 2 3 4 5 6 7 8 9

   Strongly Disagree   Strongly Agree

13. I am going to keep in contact with my teammates after the season ends.

    1 2 3 4 5 6 7 8 9

   Strongly Disagree   Strongly Agree

14. I am happy with my team’s level of desire to win.

    1 2 3 4 5 6 7 8 9

   Strongly Disagree   Strongly Agree

15. We stick together outside of practice.

    1 2 3 4 5 6 7 8 9

   Strongly Disagree   Strongly Agree

16. My approach to playing is the same as my teammates.

    1 2 3 4 5 6 7 8 9

   Strongly Disagree   Strongly Agree

17. We contact each other often (phone, text message, internet).

    1 2 3 4 5 6 7 8 9

   Strongly Disagree   Strongly Agree

18. We like the way we work together as a team.

    1 2 3 4 5 6 7 8 9

   Strongly Disagree   Strongly Agree