Efficacy Beliefs are Related to Task Cohesion: Communication is a Mediator

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Abstract

Efficacy beliefs and communication are key constructs which have been targeted to develop task cohesion. This study's purpose was to: (1) examine whether collective efficacy, team-focused other-efficacy, and team-focused relation-inferred self-efficacy (RISE) are predictive of task cohesion, and (2) evaluate the possibility that communication mediates efficacy-task cohesion relationships. British university team-sport athletes (*n* = 250) completed questionnaires assessing efficacy beliefs, communication (i.e., positive conflict, negative conflict, and acceptance communication), and task cohesion (i.e., attractions to group; ATG-T, group integration; GI-T). Data were subjected to a multi-group path analysis to test mediation hypotheses while also addressing potential differences across males and females. Across all athletes, collective efficacy and team-focused other-efficacy significantly predicted ATG-T and GI-T directly. Positive conflict and acceptance communication significantly mediated relationships between efficacy (team-focused other-efficacy, collective efficacy) and cohesion (ATG-T, GI-T). Findings suggest enhancing athletes' collective efficacy and team-focused efficacy beliefs will encourage communication factors affecting task cohesion.

Keywords: task cohesion; collective efficacy; other-efficacy; relation-inferred self-efficacy; communication

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Possessing a talented group of players is not always enough to win a sports game. Researchers have consistently observed that group factors, such as team cohesion, are pivotal to maximizing several favorable outcomes including member satisfaction, increased length of stay in a team, and performance (Carron, Colman, Wheeler, & Stevens, 2002; Casey-Cambell, & Martens, 2009). It is, therefore, not surprising that practitioners, coaches, and researchers continue to determine variables that enhance cohesion in sports teams. Specific focus has been targeted at team athletes' efficacy beliefs and communication qualities as both independently important to the development of cohesion (Carron, Spink, & Prapavessis, 1997; Heuzé, Bosselut, & Thomas, 2007). Moreover, similar communication qualities have been identified as both outcomes of efficacy beliefs and antecedents of cohesion (Jackson, Knapp, & Beauchamp, 2008; Holt & Sparks, 2001; Widmeyer & Williams, 1991). Conceptual linkage of these variables has been explicitly identified within various models of teamwork (e.g., Carron & Spink, 1993; McEwan & Beauchamp, 2014; Lent & Lopez, 2002) that, when taken together, suggest being confident in teammates encourages athletes to, for example, accept communication from their teammates, which in turn may result in enhanced team cohesion. Despite the above mentioned theoretical and empirical support, the potential for communication as a mediating mechanism of the efficacy-cohesion relationship has yet to be empirically tested in sports teams. Accordingly, the purpose of this study was to: (1) examine whether collective efficacy, team-focused other-efficacy, and team-focused relation-inferred self-efficacy (RISE) are predictive of task cohesion, and (2) evaluate the possibility that communication mediates efficacy-task cohesion relationships.

Carron, Brawley, and Widmeyer (1998) defined cohesion as "a dynamic process that is 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 member affective needs" (p. 213). In line with this definition, Carron, Widmeyer, and Brawley (1985) proposed team cohesion is comprised of two aspects: social cohesion and task cohesion. Social cohesion is the extent to which teammates get along and enjoy being a member of a team, while task cohesion is the extent to which team members work together towards a team's goals. At the same time, cohesion is postulated to occur at the group level (i.e., group integration; GI) and the individual level (i.e., individual attractions to the group; ATG). GI concerns how well a group as a whole works together, and ATG relates to how attracted individuals are towards the task (T) or social (S) aspects of a team. The four aspects of cohesion (i.e., GI-T, GI-S, ATG-T, ATG-S) are argued to be central to the maintenance of teams (Carron et al., 1985).

To help practitioners develop cohesion, Carron and colleagues (Carron & Spink, 1993; Carron, Spink, & Prapavessis, 1997) identified an input-thruput-output framework for improving team functioning. They specifically identified input categories of environmental, team, leadership, and personal factors that can impact subsequent group processes (i.e., thruputs; Carron, 1982). Thruputs are dynamic interactions of the members of the group, such as the communication and interactions within the team, that convert inputs into team outputs such as cohesion or performance. A similar framework has been outlined in McEwan and Beauchamp's (2014) conceptual model of teamwork, in which they argue that cohesion is an emergent state, or by-product, shaped by athletes' teamwork behaviors such as communication. They describe each emergent state (e.g., cohesion) as the result of previous emergent states and as input for future emergent states that are each connected by mediating teamwork behaviors, or processes (e.g., communication, goal setting). This more recent model of teamwork builds the input-thruput-output framework to reflect more explicitly the episodic cycles and developmental changes in team cohesion that can occur across a season.

Collective efficacy, another emergent state identified by McEwan and Beauchamp (2014), has been extensively investigated alongside cohesion (e.g., Paskevich, Brawley, Dorsch & Widmeyer, 1999; Spink, 1990). Collective efficacy corresponds to a group's shared belief regarding the group's shared capability to execute a task. Bandura (1986, 1997) described the construct as a group property which emerges, not only as a product of shared skills and knowledge, but also as a result of the interactive and synergistic dynamics between team members. The development of this type of efficacy is posited to result from the four main sources of vicarious experience, mastery experience, verbal persuasion, and emotional and physiological responses, while some posited outcomes include increased effort and satisfaction (Bandura, 1997). A number of studies have corroborated that efficacy has a more prominent relationship with task cohesion than social cohesion within a variety of sports including football, rugby, basketball, and volleyball (Heuzé, Raimbault, & Fontayne, 2006; Kozub & McDonnell, 2000; Marcos, Miguel, Oliva, & Calvo, 2010; Spink 1990). Consequently, our focus in this study was narrowed to the relationship between efficacy and task cohesion (ATG-T, GI-T). The association between collective efficacy and cohesion is often tied to both constructs' positive relationship with team performance (Carron, Coleman, Wheeler, & Stevens, 2002; Gully, Incalcaterra, Joshi, & Beaubien, 2002).

The relationship between collective efficacy and task cohesion is likely reciprocal (Burke, Davies, & Carron, 2014; Marcos et al., 2010; Paskevich et al., 1999; Spink, 1990). Both predictive directions have been examined across different studies of the relationship between collective efficacy and task cohesion. For example, Kozub and McDonnell (2000) found that both ATG-T and GI-T were positive predictors of rugby union teams' collective efficacy, with GI-T being a slightly stronger predictor. On the other hand, Heuzé et al. (2007) found that early season collective efficacy was a positive predictor of midseason ATG-T in female handball teams, while controlling for early-season ATG-T. Heuzé et al. (2007) also found early season ATG-T predicted midseason collective efficacy. Further, Heuzé, et al. (2006) conducted a study to compare (a) collective efficacy as a mediator of the previous performance-GI-T relationship and (b) GI-T as a mediator of the previous performance-collective efficacy relationship. They concluded that GI-T and collective efficacy had mediating effects equivalent in magnitude, when controlling for previous performance. While several studies support the proposition that cohesion is a stronger predictor of efficacy, there is less evidence specifically focused on the prospective efficacy-cohesion direction of the relationship. It is important to further investigate the efficacy-cohesion direction because, as stated by Leo, Gonzalez-Ponce, Sanchez-Oliva, Amado and Garcia-Calvo (2016), regardless of predictive magnitude, the two constructs mutually predict one another. An investigation of relational efficacy beliefs and communication, as presented in the current study, offers one strategy to address this gap in the literature.

While collective efficacy is an important characteristic for a number of favorable team performance outcomes (Moritz, Feltz, Fahrbach & Mack, 2000), it has been argued that sporting experiences are supported (or thwarted) by the relationships athletes form with others, and consequently, a focus upon perceptions developed in inter-personal environments is warranted (Jackson, Beauchamp & Knapp, 2007). This argument is grounded in the tripartite model of efficacy (Lent & Lopez, 2002), in which two relational efficacy constructs are posited to exist. The first construct, other-efficacy, refers to "an individual’s beliefs about his or her significant other's ability to perform particular behaviors" (Lent & Lopez, 2002, p. 264). For example, a rugby player may lack confidence in her teammate’s ability to tackle opponents. The second construct, relation-inferred self-efficacy (RISE), refers to individuals' beliefs concerning how others view their own capabilities. For example, a basketball player (i.e., Athlete A) may believe that his teammate (i.e., Athlete B) has high confidence in his (i.e., Athlete A’s) ability to shoot a free-throw. Central to the tripartite efficacy model is the notion that the additional relational efficacy constructs (i.e., other-efficacy and RISE) are related, yet uniquely contribute towards the prediction of team performance (Dunlop, Beatty,

& Beauchamp, 2011; Habeeb, Eklund, & Coffee, 2019; Jackson et al., 2008). Further, higher levels of other-efficacy and RISE predict athletes' increased effort, motivation, satisfaction in a relationship, and intention to remain in a partnership, while low levels can result in unfavorable outcomes including dissatisfaction, lower commitment, and increased conflict with significant others in their sport (Jackson et al., 2007; Jackson et al., 2008; Jackson, Gucciardi, Lonsdale, Whipp, & Dimmock, 2014). Specific to the current study, a strong positive correlation has been observed between athletes' other-efficacy beliefs and cohesion (Marcos et al., 2010). These findings collectively highlight the importance of other-efficacy and RISE for athletes required to work together toward a team outcome.

Athletes' other-efficacy and RISE beliefs can be targeted towards a group of teammates. *Team-focused other-efficacy* and *team-focused relation-inferred self-efficacy (RISE)* are distinct from efficacy appraisals based on singular significant others and hold consequences of their own including self-efficacy, enjoyment, and continuance intentions (Jackson et al., 2014). While there has been a predominate focus on only collective efficacy and task cohesion in teams (Gaudreau, Fecteau, & Perreault, 2010), team-focused other-efficacy and team-focused RISE have implications for larger-sized teams (Habeeb, Eklund, & Coffee, 2017; Jackson et al., 2008; Wickwire, Bloom, & Loughead, 2004). The investigation of team-focused efficacy beliefs in addition to collective efficacy, would align to the heavily supported contention in athlete dyads that several efficacy constructs have a complimentary and mutual influence towards team outcomes (Lent & Lopez, 2002; Stonecypher, Bloom, Johnson, Bolin, & Hilliard, 2018). Investigation of the efficacy-performance relationship, for example, has provided support that while shared predictive variance among relational and collective efficacy constructs exist, each type of efficacy belief provides unique contribution to the prediction of dyad performance (Habeeb et al., 2019). A similar investigation comprised of several types of efficacy beliefs, examined simultaneously, and task cohesion could offer practitioners additional team-building mechanisms, but this type of investigation has yet to be conducted. Taken together, these findings warrant the testing of the first purpose of this study: to examine whether collective efficacy, team-focused other-efficacy, and team-focused relation-inferred self-efficacy (RISE) are predictive of task cohesion.

As a result of the extensive research supporting the relationship between efficacy and task cohesion, it is also important to investigate potential mediators (i.e., teamwork behaviors; McEwan & Beauchamp, 2014) of the relationship. Communication is one variable which shares considerable commonality with the efficacy and cohesion literature and has been explicitly identified by Carron and colleagues as a thruput mechanism (Carron & Spink, 1993; Carron et al., 1997). Communication can be observed as having three factors: positive conflict, negative conflict, and acceptance communication (Sullivan & Feltz, 2003, Sullivan & Callow, 2005). Positive conflict relates to productive or positive communication concerning interpersonal differences, whereas negative conflict refers to confrontational or aggressive communication in relation to interpersonal differences. In contrast, acceptance communication relates to communication of support and consideration for team members. Jackson et al. (2008) conducted a qualitative study, with athlete dyads across a range of sports (e.g., tennis, swimming, and skating), indicating that a prominent consequence of other-efficacy was positive communication and responsiveness to the partner (i.e., acceptance communication). Participants reported that they were more inclined to direct positive communication towards teammates whom they have confidence in, as well as accept communication from teammates regarding how best to execute certain tasks. Given the interconnected nature of the efficacy constructs (Lent & Lopez, 2002), it would be reasonable to investigate if high levels of team-focused RISE result in high levels of positive and acceptance communication, despite athletes not explicitly identifying these communication types as outcomes of RISE. Communication has also been illustrated as a correlate (e.g., Sullivan & Feltz, 2003) and predictor (e.g., Widmeyer & Williams, 1991) of both ATG-T and GI-T cohesion, and a mediator in well established relationships with task cohesion such as transformational leadership (Smith, Arthur, Hardy, Callow, & Williams, 2013). Further, Holt and Spark (2001) observed a team's positive communication improved GI-T in the mid- and late season, while negative communication reduced both ATG-T and GI-T cohesion in the midseason. Consequently, the second purpose of this study is warranted: to evaluate the possibility that communication mediates efficacy-task cohesion relationships.

In summary, in addition to athletes' beliefs about the team's collective abilities (i.e., collective efficacy), athletes with a strong belief in their teammates' abilities (i.e. team-focused other-efficacy) and a strong belief that their teammates are confident in them (i.e. team-focused RISE), might encourage athletes to positively communicate and be accepting of communication, which may result in enhanced task cohesion. In the current study, British team-sport athletes reported on the three types of efficacy beliefs, communication, and task cohesion related to their current university team. Following the review of the literature (Carron & Spink, 1993; Heuzé et al., 2007; Jackson et al., 2008, 2014; McEwan & Beauchamp, 2014; Stonecypher et al., 2018; Widmeyer & Williams, 1991), we hypothesized that collective efficacy, team-focused other-efficacy, and team-focused RISE would significantly predict ATG-T and GI-T cohesion directly. We also hypothesized that communication (i.e., positive conflict, negative conflict, and acceptance communication) would mediate the efficacy-task cohesion relationships.

Method

Participants

British University and College Sport (BUCS) league athletes (*n* = 120 females, 130 males) aged between 18 and 42 (*M* = 20.7, *SD* = 2.71) participated in the study. Participants were competitive members of either a first (*n* = 136; 54.4%), second (*n* = 88; 35.2%), or third (*n* = 26; 10.4%) team within their respective university sport, with the first and third teams, respectively, being the most and least elite competitive levels. The 25 teams included in the study represented soccer (*n* = 62 from 5 teams), basketball (*n* = 41 from 4 teams), rugby (*n* = 41 from 4 teams), American football (*n* = 37 from 1 team), netball (*n* = 25 from 3 teams), futsal (*n* = 16 from 6 teams), Gaelic football (*n* = 15 from 2 teams), and volleyball (*n* = 13 from 2 teams). The number of participants per team ranged between 1 and 37 with a mean of 10. As an a priori inclusion criterion, teams from these sports were selected because the prospect of winning games required the athletes to work together to score points against an opposition team (Carron et al., 2002).

Measures

Efficacy beliefs. Three 10-item measures adapted from Saville and Bray (2016) were used to obtain athletes' perceptions of collective-efficacy, team-focused other-efficacy, and team-focused RISE. Saville and Bray's (2016) items were based on measures of RISE and self-efficacy developed by Jackson et al. (2012) for a physical education setting. As suggested by Bandura (1986, 2006), the measures were tailored towards team sport training and competition relevant tasks. All three measures involved the items from Saville and Bray's (2016) study (e.g., " Try your hardest in every game..."), and only differed in wording that reflected the different meanings attached to each of the three efficacy constructs. The stem statement for collective efficacy and team-focused other-efficacy read, "How confident are YOU in [YOU and YOUR TEAM'S collective/ YOUR TEAMMATES'] capabilities right now at this moment in time to…" The stem statement for team-focused RISE was, "How confident do you think YOUR TEAMMATES ARE in YOUR capabilities right now at this moment in time to…" Participants recorded their responses to each item on a 5-point Likert-type scale anchored by 1 (*not at all confident*) and 5 (*completely confident*), with higher scores representing higher levels of efficacy. The internal consistency (α) of responses to the items was .89 for collective efficacy, .90 for team-focused other-efficacy, and .87 for team-focused RISE within this sample of participants.

Communication. The Scale for Effective Communication in Team Sports-British (SECTS-B; Sullivan & Callow, 2005) was used to obtain athletes' perceptions of team communication. The multidimensional underpinning of this measure of communication was originally developed by Sullivan and Feltz (2003), and involved the four factors of positive conflict, negative conflict, distinctiveness, and acceptance. Sullivan and Callow (2005) conducted a rigorous validation process, in the form of exploratory and confirmatory factor analyses, to examine the factor structure of the scale within a British athlete population wherein a 3-factor model was found to have the best fit. The three factors identified included: positive conflict (7 items; e.g., "... compromise with each other when we disagree"), negative conflict (6 items; e.g., "... shout when we get upset"), and acceptance (5 items; e.g., "...share thoughts with one another"). The stem statement was: "When our team communicates we...". Participants recorded their responses to items on 7-point Likert-type scales anchored by 1 (*hardly ever*) and 7 (*very frequently*) with higher scores indicating higher levels of positive conflict, negative conflict, and acceptance communication. The internal consistency (α) of responses to the items was .83 for positive conflict, .84 for negative conflict, and .70 for acceptance communication within this sample of participants.

Task Cohesion. The task cohesion subscale of the positively worded version of the Group Environmental Questionnaire (GEQ; Carron et al., 1985; Eys, Carron, Bray, & Brawley, 2007) was used to obtain athletes' perceptions of task cohesion, the outcome variable of interest in the current study (Carron, Brawley, & Widmeyer, 2002; Smith et al., 2013). This 9-item scale includes the two aspects of task cohesion (i.e., ATG-T, GI-T) illustrated in Carron's (1982) conceptualization. Four items measure ATG-T (e.g., "I'm happy with the amount of playing time I get") and five items measure GI-T (e.g., "Our team is united in trying to reach its performance goals"). Participants recorded their responses to items on 9-point Likert-type scales anchored by 1 (*strongly disagree*) and 9 (*strongly agree*), with higher scores indicating higher levels of task cohesion. The internal consistency (α) of item responses was .72 for ATG-T and .87 for GI-T within this sample of participants.

Procedure

After obtaining ethical approval from the General University Ethics Committee (GUEC) at the University of Stirling, team coaches were contacted via email requesting permission to invite their athletes to participate in this study. All teams participated in competitive British University and College Sport (BUCS) competitions, and, as a consequence, participated in their sport season over the same time period (i.e., September – May). Data collection commenced two-thirds into the BUCS season to allow for a sufficient period of time in which participants could meaningfully report on team-focused efficacy beliefs, communication, and task cohesion. Following coaches' consent, the first author attended the beginning of a single training session for each team. Each questionnaire packet included an information sheet, consent form, and the five questionnaires (i.e., team-focused RISE and other-efficacy, collective efficacy, the GEQ, and the SECTS-B). Efficacy measures were always presented first; however, the presentation of the collective efficacy, team-focused other-efficacy and team-focused RISE measures were counterbalanced across participants to minimize potential order effects. Athletes (n = 38; 15.2%) absent from the training session were invited to participate in the study by completing an online version of the questionnaires (created using the 'Bristol Online Surveys' software) to obtain broader representation of each team. Online questionnaire links were sent to coaches to forward onto participants. Data collection occurred over the course of a four-week period.

Analyses

Descriptive statistics, Pearson product-moment correlations, and intraclass correlation coefficients (ICCs) were calculated using SPSS Statistics software (version 23). ICCs (reported in Table 1) ranged from .13 - .35 indicating there was a meaningful amount of team-level variance and the nested structure of the data (i.e., athletes nested within teams) should be considered in the subsequent analyses. The current study sample included 25 teams, however, as Preacher, Zyphur, and Zhang (2010) highlight, most recommendations suggest the number of teams required to conduct a multi-level analysis (e.g., TYPE = TWOLEVEL in Mplus) ranges from a minimum of 40 to 100 teams. As a consequence, we adopted an alternative approach recommended for such instances (Hox & Mass, 2001). Consistent with previous studies (e.g., Smith et al., 2013), the TYPE = COMPLEX command within Mplus 8.0 was employed to test the mediation hypotheses of the current study while accounting for the nested structure of the data. The three efficacy constructs were entered as predictor variables of ATG-T and GI-T, to allow for assessment of the direct predictive effects of each efficacy construct on ATG-T and GI-T cohesion. The communication factors of positive conflict, negative conflict, and acceptance were also entered as mediators of the efficacy–task cohesion relationship. In this model, the exogenous variables (i.e., collective efficacy, team-focused other-efficacy, and team-focused RISE) were allowed to freely correlate with each other as were the residuals of the communication mediating variables (i.e., positive conflict, negative conflict, and acceptance) and task cohesion variables (i.e., ATG-T, GI-T; Preacher & Hayes, 2008).

Males and females have been observed in previous research to differ on efficacy (e.g., Lirgg, 1991), communication (e.g., Sullivan & Feltz, 2003), and task cohesion (e.g., Carron et al., 2002), with some evidence suggesting the impact and relevance of these variables for male and female teams may have many similarities (e.g., Eys et al., 2015; Jackson et al., 2007). Warner and Dixon (2015) argue that the sport experience is complex and there is a need for more in-depth approaches to examining similarities and differences across males and females in sport research. In line with their call, a sequence of multi-group path analytic invariance tests using the TYPE = COMPLEX command and default restricted maximum likelihood estimator was conducted to evaluate the effect of these potential group-based differences on model fit. Through the process of invariance tests, described subsequently, the potential for differences of means, correlations, and pathways can be examined. The four multi-group path models examined to this end included:

1. Model 1 (M1). The first estimated multi-group path model featured equality constraints across male and female groups on all mean, correlation, and pathway coefficient parameter estimates. This model effectively specified that there were no model-based differences across the male and female samples.
2. Model 2 (M2). This model resulted from M1 and featured testing of invariance of means across males and females on the eight variables in the multi-group path model. Individual constraints were to be released in instances where Bonferroni-corrected (i.e., $p < .006$) Wald tests indicated that model fit would be improved by estimation of different means (for the implicated variable) for the male and female samples.
3. Model 3 (M3). This model resulted from M2 and featured testing of invariance of the seven model-specified correlations across males and females in the multi-group path model. Individual constraints were to be released in instances where Bonferroni-corrected (i.e., $p < .007$) Wald tests indicated that model fit would be improved by estimation of different correlations (between the implicated variables) for the male and female samples.
4. Model 4 (M4). This model resulted from M3 and featured testing of invariance of the 21 predictive pathway coefficients across males and females in the multi-group path model. Individual constraints were to be released in instances where Bonferroni-corrected (i.e., $p < .00\mathbf{2}$) Wald tests indicated that model fit would be improved by

estimation of different predictive pathway coefficients (between the implicated variables) for male and female samples.

The release of equality constraints at each step can affect other aspects of the model so Wald tests were re-evaluated for remaining equality constraints at each step before proceeding further in the series. The fit of the model to the data was evaluated in each step using the chi-square (χ^2) test, comparative fit index (CFI), Tucker-Lewis index (TLI), and root mean square error of approximation (RMSEA) with its 90% confidence interval. CFI and TLI values close to (i.e., greater than or equal to) .90 and .95 are typically interpreted to indicate, respectively, adequate and excellent model fit, while RMSEA values close to (i.e., less than or equal to) .08 and .06 are typically interpreted to indicate acceptable and good model fit (Hu & Bentler, 1999). To test hypotheses about mediation, 95% bias-corrected bootstrap confidence intervals (95% CIs) were estimated for indirect effect parameters from 1000 bootstrap samples using TYPE = COMPLEX command and the default maximum likelihood estimator for the bootstrap command (MacKinnon, Lockwood, & Williams, 2004). An indirect effect was considered significant if the value of zero was not within the estimated CI.

Results

Descriptive statistics, correlations, and ICCs among variables for males and females are reported in Table 1. Similar patterns in the correlations were observed for males and females, except in associations involving negative conflict. Negative conflict had a positive small-to-moderate correlation with the three types of efficacy and two task cohesion variables for female athletes (r = .16 – .39, p < .01 – .05), but not for male athletes (r = -.16 – .07, p > .05). No violations of the homoscedasticity and normality of residuals assumptions were observed, so no modification to the plan of analysis was required. There were no missing data.

The fit of M1 to the data was not acceptable, χ^2 (36) = 130.236, p < .001, CFI = .824, TLI = .756, RMSEA = .145, 90% CI [.118, .172]. The Bonferroni-corrected Wald tests indicated that the releasing of mean constraints across males and females for negative conflict (p < .001) would significantly improve model fit. The fit of the respecified model (i.e., M2) to the data was noticeably better, χ^2 (35) = 65.182, p = .002, CFI = .944, TLI = .920, RMSEA = .083, 90% CI [.051, .114] with, relative to M1, Satorra-Bentler scaled $\Delta\chi^2(1)$ = 16.15, p < .001, ΔCFI = +.120, ΔTLI = +.164, ΔRMSEA = -.062. Nonsignificant Bonferroni-corrected Wald tests were observed in testing M2 invariance constraints indicating that the model fit would not be significantly improved by any removal of cross-sample constraints on model-specified correlations. In testing of M3 (i.e., unchanged from M2) cross-sample invariance constraints, a significant Bonferroni-corrected Wald test was observed for one pathway indicating that releasing the constraint to freely estimate different coefficients from collective efficacy to negative conflict (p < .001) for males and females would significantly improve model fit. The fit of the respecified model (i.e., M4) was noticeably better, χ^2 (34) = 52.950, p = .020, CFI = .965, TLI = .948, RMSEA = .067, 90% CI [.027, .100] with, relative to M3, Satorra-Bentler scaled $\Delta\chi^2(1)$ = 18.06, p < .001, ΔCFI = +.021, ΔTLI = +.028, ΔRMSEA = -.016. The unstandardized effects observed in M4, the final model, are depicted in Figure 1 and discussed subsequently. In the instance where the model fit was improved by allowing the pathway coefficient to be freely estimated for males and females, the standardized values are reported in the text to allow for ease of comparison of those coefficients. Significance of the pathway coefficients are all based on the bootstrapped standard errors computed in M4.

Predictive relationships across collective efficacy, communication, and task cohesion. As depicted in Figure 1, collective efficacy was observed to have significant direct effects on acceptance communication (B = .36, p = .036), GI-T (B = .36, p = .024), and ATG-T that was trending towards significant (B = .57, p = .057) as hypothesized, but not positive conflict (B = .22, p = .144). Acceptance communication was a significant predictor of ATG-T (B = .31, p = .012) and GI-T (B = .34, p < .001) raising the possibility that it may, as hypothesized, serve in a mediating role in the relationship between collective efficacy and task cohesion. Bias-corrected bootstrapped testing of indirect effects provided further support for this possibility because a significant indirect pathway from collective efficacy to ATG-T (B = .06, 95% CI [.000, .154]) and GI-T (B = .06, 95% CI [.001, .147]) through acceptance communication was observed.

Only one predictive path exhibited significantly different coefficients across males and females, with collective efficacy being a significant predictor of negative conflict among the female athletes (β_{females} = .37, p = .003), but not among the male athletes (β_{males} = .00, p = .975). Negative conflict was not, however, a significant predictor of either aspect of task cohesion; a result falsifying the hypothesis that this variable may serve as a mediator of the relationship between collective efficacy and task cohesion.

Predictive relationships across team-focused other-efficacy, communication, and task cohesion. As depicted in Figure 1, team-focused other-efficacy was observed to have significant direct effects on positive conflict (B = .36, p = .012), acceptance communication (B = .31, p = .012), and GI-T (B = .47, p = .011) as hypothesized, but not negative conflict (B = .13, p = .540) or ATG-T (B = .19, p = .333). Positive conflict was a significant predictor of GI-T (B = .39, p < .001) and acceptance communication (B = .33, p = .001) was a significant predictor of ATG-T (B = .31, p = .012) and GI-T (B = .34, p < .001), raising the possibility that they may, as hypothesized, serve as mediators of relationships between other-efficacy and task cohesion. Bias-corrected bootstrapped testing of indirect effects provided further support for these possibilities because significant indirect pathways were observed from team-focused other-efficacy to ATG-T through acceptance communication (B = .04, 95% CI [.012, .107]), and from team-focused other-efficacy to GI-T through positive conflict (B = .06, 95% CI [.013, .131]) and acceptance communication (B = .05, 95% CI [.016, .107]).

Predictive relationships across team-focused RISE, communication, and task cohesion. As depicted in Figure 1, team-focused RISE was not observed to have significant direct effects on positive conflict, acceptance communication, negative conflict, or task cohesion. These findings were contrary to our hypotheses.

Percentage of variance explained by hypothesized model. A significant proportion of variance in ATG-T ($R^2_{males} = .31$; $R^2_{females} = .27$, $p \leq .002$) and GI-T ($R^2_{males} = .52$; $R^2_{females} = .51$, $p < .001$) was accounted for by a combination of the three efficacy constructs and the three subcomponents of communication. Further, collective efficacy, team-focused other-efficacy, and team-focused RISE explained a significant proportion of the variance in positive conflict ($R^2_{males} = .20$, $p = .017$; $R^2_{females} = .19$, $p = .004$) and acceptance communication ($R^2_{males} = .18$, $p < .001$; $R^2_{females} = .20$, $p = .003$). In line with the observed differences across males and females, a significant proportion of variance in negative conflict was accounted for in the group of females ($R^2 = .16$, $p = .010$), but not males ($R^2 = .00$, $p = .904$).

Discussion

The purpose of this study was to: (1) examine whether collective efficacy, team-focused other-efficacy, and team-focused relation-inferred self-efficacy (RISE) are predictive of task cohesion, and (2) evaluate the possibility that communication mediates efficacy-task cohesion relationships. The findings provided considerable, but not complete, support for our hypotheses. A pattern of direct and indirect effects was observed to support mediation relative to acceptance communication in the relationships between collective efficacy and team-focused other-efficacy with ATG-T and GI-T cohesion, and for positive conflict in the relationship between team-focused other-efficacy and GI-T cohesion. Conversely, support was not observed relative to negative conflict communication as a mediator in any efficacy-task cohesion relationship. Collective efficacy, however, was observed to have a significant direct effect on negative conflict for females but not males. Overall, there was partial support for the theoretical contentions surrounding mediation of the efficacy-task cohesion relationship through positive conflict and acceptance communication.

From an applied perspective, the findings of this study may have substantial implications for team coaches and practitioners. The current study corroborates collective efficacy is a unique significant predictor of GI-T and a unique, trending towards significance, predictor of ATG-T directly (Heuzé et al., 2006; Heuzé et al., 2007). The current study also indicates the impact of collective efficacy on task cohesion exists in the presence of other unique predictors of task cohesion; namely, team-focused other-efficacy directly and the mediation effects of acceptance communication and positive conflict communication. Coaches and practitioners should, therefore, focus on many efficacy types and mediating factors such as communication when aiming to enhance task cohesion. Overall, this investigation's focus on efficacy-communication-task cohesion relationships advances McEwan and Beauchamp's (2014) model of team work in which team behaviors such as communication mediate emergent states in the efficacy-cohesion direction and, in line with the input-thruput-output framework (Carron & Spink, 1993; Carron et al., 1997), offers strategies for practitioners, coaches, and researchers to promote task cohesion.

Overall, the findings of this study contribute to the team cohesion literature by highlighting the possibility that team-focused efficacy beliefs in addition to collective efficacy may have an influence on the extent to which a team is cohesive around its task. The findings observed by Marcos et al. (2010) indicated a positive correlation between athletes' other-efficacy and both individual and group aspects of task cohesion in professional soccer. The finding that team-focused other-efficacy significantly predicts GI-T cohesion directly and ATG-T indirectly sheds light on the unique importance of this efficacy construct within the interdependent settings of teams. Consistent with earlier research (e.g., Heuzé et al., 2006;

Kozub & McDonnell, 2000; Paskevich et al., 1999), collective efficacy remained to be a significant predictor of task cohesion in the present study. The results suggest that while a network of efficacy beliefs is important to investigate, collective efficacy should continue to be acknowledged in applied interventions. Notwithstanding, all efficacy types in this study were positively and significantly correlated with each other. This is supported by the theoretical contentions underpinned in the tripartite efficacy framework (Lent & Lopez, 2002) which highlights that efficacy beliefs are mutually and complimentarily influential towards each other and, as such, it is important to continue to acknowledge this network of beliefs.

As the specific mediators of the efficacy-task cohesion relationship have received scarce attention, this study contributed that acceptance communication significantly mediates the relationship between collective efficacy and both ATG-T and GI-T cohesion. Accordingly, acceptance communication and positive conflict significantly mediated the relationship between team-focused other-efficacy and both ATG-T and GI-T cohesion. These findings are not surprising, however, as researchers have previously observed that relationships between productive and positive communication behaviors and cohesion exist (e.g. Holt & Spark, 2001). Moreover, the current findings are in accordance with Jackson et al.'s (2008) observations that elite dyad athletes reporting higher levels of other-efficacy beliefs also report more acceptance of a partner’s communication. While this was established in two-person teams, the findings of the present study suggest that team-focused efficacy beliefs aid the functionality of larger-sized teams, and extends previous research on athlete dyads to larger-sized teams (Habeeb et al., 2017, 2019; Jackson et al., 2008; Wickwire et al., 2004). A team athlete who has high confidence in the group of teammates, for example, is more likely to communicate to resolve disruptions and listen to what his or her teammates communicate. In turn, the results in the present study indicate that this type of communication potentially enhances task cohesion. Previous research directed at enhancing cohesion supports this claim by illustrating that communication is a key teamwork behavior for developing task cohesion (McEwan & Beauchamp, 2014). Despite this, it is important we acknowledge communication did not fully mediate the relationships between efficacy and task cohesion. Task cohesion is a multifaceted phenomenon which has potential to be influenced by many factors that were not examined in the current study (e.g., leadership; Carron, 1982, Smith et al., 2013).

In comparison to team-focused other-efficacy and collective efficacy, team-focused RISE was not a significant predictor of task cohesion. Although different from task cohesion, Feltz and Lirgg (1998) found that collective efficacy was a stronger predictor of team success than personal (i.e. self-) efficacy. This relates to the findings in the current study with regards to team-focused RISE reflecting a perception concerning an individual's abilities as opposed to a perception concerning multiple individuals' abilities (e.g., team-focused other-efficacy). In this study team-focused RISE was not a unique predictor of task cohesion, however, this finding does not transcribe to its importance for team enactment. As described in the tripartite efficacy framework (Lent & Lopez, 2002), each of the efficacy constructs measured in the current study will likely influence each other, as supported by the positive correlations among all efficacy types in the present study. Moreover, it has been observed that RISE beliefs elicit a number of beneficial outcomes, such as personal motivation and relationship satisfaction, which aid the joint enactment of athlete dyads (e.g. Jackson et al., 2008; Wickwire et al., 2004). Team-focused RISE should, therefore, not be neglected.

The multi-group analysis conducted in the study revealed there were many similarities across male and female athletes in the efficacy-communication-task cohesion investigation, with negative conflict being an exception. First, there were mean differences reported, with females reporting higher levels of negative conflict compared to males. This was different to

Sullivan and Feltz's (2003) study in which males reported higher negative conflict scores. Differences in cultural and competitive context across the two studies may contribute to inconsistencies in the findings. Specifically, the current sample included athletes participating in competitive British university sport while Sullivan and Feltz's sample included athletes participating in recreational and competitive Canadian sport. Second, the role of collective efficacy for negative conflict was negligible for male athletes and of a moderate magnitude for female athletes. To speculate, negative conflict was defined as confrontational or aggressive communication in relation to interpersonal differences, representing conflict among team members. Conflict includes cognitive, behavioral, and affective components (Barki & Harkwick, 2004). It appears that collective efficacy, a cognitive component, has different antecedent effects on the perception of negative conflict for males and females. This difference was not observed for other-efficacy suggesting that, for males, team-focused perceptions that are inclusive of one's own abilities (i.e., collective efficacy) do not account for the interpersonal differences (i.e., negative conflict) experienced in the team. Conversely, team-focused other-efficacy, which ignores personal qualities, does account for interpersonal differences. Regardless, further examination is needed for an evidence-based explanation.

The present study has effectively extended the research on the relationship between collective efficacy and task cohesion with the inclusion of additional team-focused efficacy beliefs and potential mediators. However, it does have some limitations including the cross-sectional design of the study. Testing mediation hypotheses using data collected in the same time point can result in biased estimates and caution is warranted in extending interpretation of the results of the current study to reflect an influence of efficacy on task cohesion over time (Maxwell & Cole, 2007). Second, all constructs were measured using self-report methods and this lends the likelihood of common method variance to explain some amount of the variance shared between efficacy, communication, and task cohesion (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Additionally, a different choice of measures for each variable could provide additional insights about relationships among the variables. First, there are other measures of collective efficacy in sport (e.g., collective efficacy questionnaire for sports; Short, Sullivan, & Feltz, 2005) that focus on competition behaviors, whereas the efficacy measures in the current study focused on both competition and training behaviors. Second, the communication measure used in the present study was representative of a perception of the team as opposed to an objective measure. As such, it is possible that participants' responses were not completely representative of actual team communication. Relatedly, examining efficacy beliefs that were focused on interpersonal skills may offer insight to how the network of efficacy beliefs also informs social cohesion, which was not included in the current study due to an expected disconcordance between the task-focused efficacy items and social cohesion. Notwithstanding, the communication measure effectively incorporated the types of communication previously observed to be related to the efficacy constructs and task cohesion measured in the present study. The findings, therefore, have developed understanding of the efficacy-communication-task cohesion relationships.

In future research, it would be useful to explore the tested efficacy beliefs within a different sample of athletes out with university and adopt a longitudinal design. Not only would this increase ecological validity of the findings, but it would allow for a deeper understanding of how spirals in efficacy beliefs regarding the self and others across time impacts group dynamics (e.g., cohesion; Stonecypher et al., 2018). Moreover, this would increase practitioners' understanding of how to target interventions so that athletes with low efficacy beliefs are not a detriment to the team. Examining other potential mediators of the efficacy-cohesion relationship would also be worth investigation. It is well illustrated that several of the factors that influence task cohesion, are also consequences of the tested efficacy constructs, such as motivation, effort and relationship satisfaction (Carron, 1982;

Dunlop et al., 2011; Jackson et al., 2007, 2008). It is, therefore, reasonable to investigate these factors as additional mediators in the relationship between efficacy and task cohesion. Finally, it is likely that communication also mediates the cohesion-collective efficacy relationship (McEwan & Beauchamp, 2014). No research to date has evidenced how and to what extent team-level constructs, such as cohesion, and processes, such as communication, inform team-focused relational efficacy beliefs (Jackson et al., 2014). We, therefore, encourage researchers to investigate the cohesion-communication-efficacy relationship to better understand how team-focused relational beliefs emerge in larger-sized teams.

The results of this study shed light on the relationships between efficacy constructs and task cohesion at a university sport level. First, the findings of this study consolidate the importance of collective efficacy as a contributing factor towards task cohesion. Second, while relational efficacy (i.e., other-efficacy and RISE) has been highlighted as important for dyads to perform well as a unit (e.g. Wickwire et al., 2004), little research has explored their impact in larger teams' enactment. Finally, the results revealed that positive and acceptance communication served as mediators within the predictive relationships between collective efficacy and team-focused other-efficacy with both ATG-T and GI-T cohesion. Consequently, practitioners, coaches, and researchers alike should acknowledge several types of team-focused efficacy beliefs when aiming to enhance task cohesion and target positive conflict and acceptance communication to bolster the efficacy-task cohesion relationship.

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Table 1. Descriptive statistics and Pearson product-moment correlations for male and female athletes' efficacy, communication, and cohesion variables

Variable	M_{male}	SD_{male}	M_{female}	SD_{female}	ICC	1	2	3	4	5	6	7	8
1. Collective Efficacy	3.84	0.57	3.91	0.54	.13	--	.82**	.57**	.38**	.03	.34**	.42***	.56***
2. TF Other-Efficacy	3.77	0.59	3.89	0.58	.14	.80**	--	.46**	.34**	.07	.34**	.40***	.59***
3. TF RISE	3.88	0.55	3.76	0.55	.13	.61**	.34**	--	.33**	-.02	.23**	.89***	.34***
4. Positive conflict Com	5.08	0.80	5.31	0.92	.16	.44**	.47**	.32**	--	-.04	.68**	.34***	.56***
5. Negative conflict Com	4.12	1.06	5.25	1.27	.35	.39**	.31**	.21*	.16	--	.09	-.16	.05
6. Acceptance Com	5.49	0.77	5.83	0.82	.14	.47**	.46**	.21*	.75**	.14	--	.24***	.57***
7. Attractions to Group	7.30	1.22	7.23	1.28	.16	.53***	.45***	.43***	.36***	.19*	.41***	--	.57***
8. Group Integration	7.16	1.28	7.48	1.24	.18	.55***	.52***	.37***	.61***	.26**	.57***	.60***	--

Note. TF = team-focused. RISE = relation-inferred self-efficacy. Com = communication. Correlations presented in the lower triangle and upper triangle correspond to females and males, respectively. *** $p < .001$. ** $p < .01$. * $p \leq .05$.

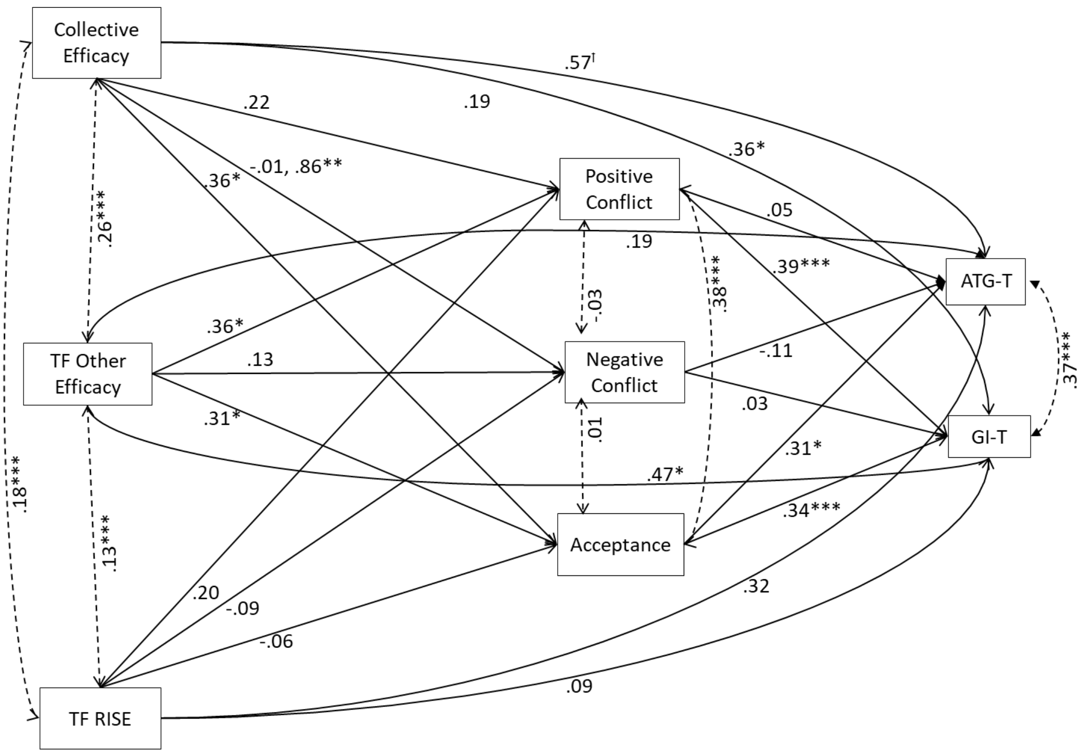

Figure 1. Synthesis of the results of the multi-group path analysis involving male and female athletes' efficacy beliefs, communication, and task cohesion. TF = team-focused. RISE = relation-inferred self-efficacy. ATG-T = individual attractions to the group task cohesion. GI-T = group integration task cohesion. Full arrows indicate hypothesised pathways and the direction of prediction. Dashed arrows indicate correlations allowed among efficacy constructs and error term correlations among communication constructs. Unstandardized beta values are provided in the figure. The estimates for each path are based on data from all participants except in the instance where the equality constraint was relaxed (i.e., collective efficacy to negative conflict), thus requiring the provision of the different estimated coefficients for, respectively, the male and female subsamples. ᵼ$p = .057$. *$p < .05$. **$p < .01$. ***$p < .001$.