Interpersonal Emotion Regulation Among Adolescent Athletes: A Bayesian Multilevel Model Predicting Sport Enjoyment and Commitment

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Efforts to regulate emotions can influence others, and interpersonal emotion regulation within teams may affect athletes’ own affective and motivational outcomes. We examined adolescent athletes’ (N = 451, N teams = 38) self- and interpersonal emotion regulation, as well as associations with peer climate, sport enjoyment, and sport commitment within a multilevel model of emotion regulation in teams. Results of multilevel Bayesian structural equation modeling showed that athletes’ self-worsening emotion regulation strategies were negatively associated with enjoyment while other-improving emotion regulation strategies were positively associated enjoyment and commitment. The team-level interpersonal emotion regulation climate and peer motivational climates were also associated with enjoyment and commitment. Team-level factors moderated some of the relationships between athletes’ emotion regulation with enjoyment and commitment. These findings extend previous research by examining interpersonal emotion regulation within teams using a multilevel approach, and they demonstrate the importance of person- and team-level factors for athletes’ enjoyment and commitment.

Keywords: emotion regulation; peer motivational climate; youth sport; team sport; emotional climate, Bayesian structural equation model

Emotion regulation occurs in an interpersonal context in which individuals can influence one another to improve or worsen relationship and performance outcomes (Eisenberg, Fabes, Guthrie, & Reiser, 2000; Tamminen & Gaudreau, 2014). However, sport researchers have mostly taken an intrapersonal perspective by focusing on how individual athletes appraise stressors (Thatcher & Day, 2008); how they experience, express, and regulate their own emotions (Martinent, Campo, & Ferrand, 2012); and how they cope with stress before and during competitions (Gaudreau, Nicholls, & Levy, 2010; Mellalieu, Hanton, & Shearer, 2008). This study adopted an interpersonal, multilevel approach to examine the ways adolescent athletes try to regulate their own emotions and the emotions of their teammates, and the associations of these emotion regulation strategies (ERS) with enjoyment and commitment.

Emotion regulation refers broadly to the “processes by which individuals influence which emotions they have, when they have them, and how they experience and express these emotions” (Gross, 1998, p. 275). Recently, Niven and colleagues proposed a conceptual framework that differentiates the intrinsic ERS that individuals may use to improve and worsen their own emotions and extrinsic ERS to try to improve or worsen the emotions of others (Niven, Totterdell, & Holman, 2009;
Niven, Totterdell, Stride, & Holman, 2011). Actions to improve one’s own emotions may include strategies such as seeking support, thinking about positive things, or doing something enjoyable (self-improving ERS). In contrast, emotion regulation actions to worsen one’s own emotions could include strategies such as thinking about negative experiences or shortcomings, expressing cynicism, or looking for problems in the current situation (self-worsening ERS). Emotion regulation actions to try to improve the emotions of others may include strategies such as giving someone helpful advice, doing something nice with someone, or listening to their problems (other-improving ERS). Emotion regulation actions to try to worsen others’ emotions may include acting annoyed toward someone, telling someone about their shortcomings, and explaining to someone how they had hurt others to make them feel worse (other-worsening ERS). This conceptual framework moves beyond an intrapersonal perspective to propose that individuals play an active role in trying to shape the emotional experiences of others.

Coping and emotion regulation share many conceptual similarities (Compas et al., 2014) and, as such, they each provide a reasonable anchor point to inform the development of hypotheses in regard to intrinsic or intrapersonal emotion. Researchers examining coping and emotion regulation from an intrapersonal perspective have provided evidence that athletes perceive they are effective in regulating their emotions (Wagstaff, 2014), and that task-oriented or problem-focused coping and emotional self-regulation in sport are associated with positive outcomes such as improved performance (Balk, Adriaanse, de Ridder, & Evers, 2013; Gaudreau, Nicholls, & Levy, 2010), positive affect (Gaudreau & Blondin, 2004), motivation, and well-being (Smith, Ntoumanis, Duda, & Vansteenkiste, 2011). Beyond the sport domain, there is also evidence that self-regulation strategies such as problem solving, reappraisal, and acceptance are negatively associated with depression and anxiety (Aldao, Nolen-Hoeksema, & Schweizer, 2010), and such self-improving ERS are associated with increases in positive mood (Niven et al., 2011; Niven, Totterdell, Miles, Webb, & Sheeran, 2013). Conversely, self-regulation strategies such as rumination, avoidance, and emotion suppression have been associated with increased depression and anxiety (Aldao et al., 2010; Nolen-Hoeksema & Aldao, 2011), and similar self-worsening ERS have been associated with increases in negative mood (Niven et al., 2011; Niven et al., 2013). Overall, there is evidence that individuals can and do improve and worsen their own emotions across a variety of situations and that emotional self-regulation can be associated with a number of positive or negative affective and motivational outcomes.

Previous researchers have noted that much of the coping and emotion regulation research in sport has been conducted from an intrapersonal perspective (Crocker, Tamminen, & Gaudreau, 2015; Friesen, Lane, et al., 2013; Tamminen & Gaudreau, 2014). Despite the social proximity, interdependence, and ubiquitous interactions among teammates in competitive sports, only a handful of studies have examined emotion regulation among athletes from an interpersonal perspective. Researchers examining mood linkage and emotional contagion have demonstrated that the positive moods of professional cricket players are linked to the collective happy moods of their teammates (Totterdell, 2000; Totterdell & Leach, 2001). Additional research has shown that athletes are aware of their influence on the emotions, cognitions, and behaviors of their teammates, and they also deliberately try to regulate the emotions of their teammates (Friesen, Devonport, Sellars, & Lane, 2013; Tamminen & Crocker, 2013). Research beyond the sport domain indicates that efforts to regulate the emotions of others can influence one’s own emotions. In field and laboratory studies, Niven, Totterdell, Holman, and Headley (2012) revealed that individuals who engaged in other-improving ERS reported greater emotional well-being whereas individuals who engaged in other-worsening ERS reported worse emotional well-being 1 month later. Efforts to improve the emotions of a coworker have also been associated with interpersonal connections in which the coworkers each experience an increase in their perceptions of friendship (Niven, Holman, & Totterdell, 2012). However, sport researchers have yet to examine affective and motivational outcomes associated with athletes’ use of other-improving and other-worsening ERS among teammates.

A Multilevel Model of Emotion Regulation of Athletes in Teams

In this study, our goal was to examine intrinsic (self-improving and self-worsening) and extrinsic (other-improving and other-worsening) ERS within a multilevel model of emotion regulation of athletes in teams (MERAT; Figure 1). In the MERAT, we propose that an emotion regulation climate emerges to create differences across teams in terms of how teammates interact to regulate their own emotions and the emotions of others. On the one hand, athletes in some teams may tend to use more other-worsening ERS, thereby creating an emotion regulation climate in which it is socially acceptable to act in ways that worsen the emotions of others. Athletes interacting and competing in such teams are likely to experience affective and motivational deficits. Conversely, some teams may develop an emotion regulation climate that is constituted by a high degree of extrinsic other-improving ERS. In such teams, athletes would typically engage in actions to try to improve the emotions of teammates. As such, it is expected that involvement in this emotion regulation climate would contribute to fostering better emotional and motivation adjustment of athletes.

The MERAT also incorporates some of the basic principles from achievement goal theory because it offers a fertile conceptual framework to delineate how distinct sets of values and priorities can set the tone for the emergence of qualitatively different dimensions of peer motivational climate in sport. The peer motivational climate refers to perceptions of motivational cues.
Figure 1 — Multilevel model of emotion regulation of athletes in teams (MERAT).
and expectations that encourage a particular goal orientation and influence goal involvement states (Ames, 1992; Ntoumanis & Vazou, 2005). An ego-involving (or performance) climate emphasizes social comparison and normative ability while a task-involving (or mastery) climate emphasizes effort and improvement. A recent systematic review demonstrated that an ego-involving peer motivational climate was positively associated with negative affect and negative cognitions among athletes while showing negative associations with positive affect; conversely, a task-involving climate showed positive associations with positive affect and negative associations with negative affect (Harwood, Keegan, Smith, & Raine, 2015). Researchers have argued that perceptions of the peer motivational climate appear to vary between teams (Vazou, 2010) and that the motivational climate should be studied as a team-level variable within sport settings (Papaioannou, Marsh, & Theodorakis, 2004). In a year-long study, Ntoumanis, Taylor, and Thogersen-Ntoumani (2012) reported that athletes on teams with higher average perceptions of a peer task climate showed greater positive and prosocial attitudes in sport, greater subjective vitality and commitment, and decreased burnout. In contrast, athletes on teams with higher perceptions of a peer ego climate displayed higher levels of antisocial attitudes (i.e., endorsement of cheating) and burnout, and an ego peer climate was negatively associated with commitment. Overall, findings suggest that the peer motivational climate is an important team-level factor which may influence the emotions, cognitions, and interpersonal behaviors of athletes.

In the MERAT, we hypothesized that the emotion regulation and peer motivational climates within teams have the potential to shape the relationship of interpersonal emotion regulation with emotional and motivational outcomes experienced by competitive athletes. More specifically, the peer motivational climate and emotion regulation climate were conceptualized as team-level factors that could moderate the associations between intrinsic and extrinsic emotion regulation and the aforementioned outcomes of athletes at the person level (see Figure 1). In a team with a high task-oriented motivational climate and a high other-improving emotion regulation climate, athletes are likely to be receptive to and supportive of their teammates’ extrinsic other-improving ERS. The collaborative nature of these climates should create the needed social nexus to bolster the positive effects and dampen the negative effects associated with extrinsic other-improving and other-worsening ERS, respectively. Conversely, athletes in teams with a high ego-involving peer motivational climate and a high other-worsening emotion regulation climate are likely to compete for limited resources, rewards, and privileges, thereby minimizing the likelihood that teammates will attempt to improve the emotions of others and to be supportive of their emotional needs. As a result, an ego-involving motivational climate and other-worsening emotion regulation climate have the potential to reduce the positive effects and aggravate the negative effects of athletes’ extrinsic other-improving and other-worsening ERS.

This Study

We selected sport enjoyment and commitment as our dependent variables to provide an empirical test of hypotheses from the MERAT because they can be viewed as indicators of pleasurable engagement—a positive psychological state that plays an important role in promoting self-regulation, learning, and achievement (Fredrickson, 2001). Sport enjoyment is defined as “a positive affective response to the sport experience that reflects generalized feelings such as pleasure, liking, and fun” (Scanlan, Carpenter, Simons, Schmidt, & Keeler, 1993, p. 18) whereas sport commitment represents a motivational desire and resolve to continue sport participation (Scanlan et al., 1993). We proposed that both individual differences and team-level factors need to be considered because enjoyment and commitment can be impacted by the actions of others, particularly during adolescence as interactions with peers are thought to be particularly salient during this developmental period (Chan, Lonsdale, & Fung, 2012). Positive affiliation with peers and perceived peer acceptance as well as many correlates of sport dropout (e.g., conflict with teammates, negative team atmosphere) are associated with young athletes’ sport enjoyment and commitment (e.g., Boiché & Sarrazin, 2009; MacDonald, Côté, Eys, & Deakin, 2011; Ulrich-French & Smith, 2006). Thus, enjoyment and commitment were appropriate dependent variables to provide an account of affective and motivational outcomes that are important in the lives of adolescent athletes.

We hypothesized that self-improving and self-worsening ERS of athletes would be associated with higher and lower enjoyment and commitment, respectively. We also hypothesized that other-improving and other-worsening ERS of athletes would be associated with athletes’ higher and lower sport enjoyment and commitment, respectively. Beyond these Level 1 effects, we expected that climates characterized by positive interactions (e.g., a task-involving peer motivational climate or an emotion regulation climate consisting of other-improving ERS) could strengthen the positive effects associated with person-level ERS aimed at improving our own and others’ emotions. These climates could also weaken the negative effects associated with ERS aimed at worsening our own and others’ emotions. In contrast, climates characterized by negative interactions (e.g., an ego-involving peer motivational climate or an emotion regulation climate consisting of other-worsening ERS) could strengthen the negative effects associated with person-level ERS aimed at worsening emotions while such climates could weaken the positive effects associated with athletes’ use of strategies to improve their own and their teammates’ emotions.
Method

Participants and Procedure

This study used a cross-sectional design with 465 team sport athletes recruited from 38 competitive sport teams in Ontario and British Columbia in Canada (i.e., hockey, volleyball, soccer, basketball, baseball, softball, lacrosse, rugby). The study was approved by University Research Ethics Boards in both provinces and all participants provided informed consent before completing the survey. Researchers contacted coaches to arrange a time to meet with teams to inform athletes about the study; 1 week later the researchers returned to distribute surveys to athletes. Data were collected midway through their season to ensure teams had played together for a minimum of 1 month, and data were collected before a team practice to ensure recent successes or losses did not bias or unilaterally influence participants’ responses. Team sizes ranged from 10 to 30 athletes, and the response rates ranged from 35% to 100% (M = 83%). We had 15 teams in which all the athletes completed surveys; only two teams had less than a 50% response rate. These two teams had 11/30 and 7/20 athletes who completed the surveys. We included all the teams in the analyses because retaining only the teams with high participation rates would produce inflated effect size estimates and decreased statistical power (Hirschfeld, Cole, Berneth, & Rizzuto, 2013). Fourteen participants were removed as they did not complete the surveys or more than 50% of their data were missing, leaving 451 athletes in the final sample (247 males, 204 females, M age = 16.3, SD = 1.02) who had an average of 7.82 (SD = 3.17) years of competitive experience in their sport. Thirty-six of the athletes recruited from 38 competitive sport teams across 38 different groups (i.e., A, AA, AAA levels of competition; competitive at regional or local level). The remaining two teams competed at B and C levels (elite/competitive at provincial or regional level) while teams competed at A, AA, or AAA levels of competition (competitive at provincial or regional level) while the remaining two teams competed at B and C levels (competitive at regional or local level).

Measures

Intrinsic and Extrinsic Emotion Regulation. Athletes completed the intrinsic and extrinsic self-regulation subscales of the Emotion Regulation of Others and Self scale (EROS; Niven et al., 2011). The intrinsic subscales measure individuals’ efforts to improve (e.g., “I thought about my positive characteristics to make myself feel better”; six items) and worsen their own emotions (e.g., “I looked for problems in my current situation to make myself feel worse”; four items). Athletes rated each item on a scale ranging from 1 = strongly disagree to 7 = strongly agree. Previously reported Cronbach’s alphas indicate acceptable levels of internal consistency for scale scores: self-improving ERS (α = .87) and self-worsening ERS (α = .83; Niven et al., 2011). Cronbach’s alphas for our sample were as follows: self-improving ER (α = .81) and self-worsening ERS (α = .77).

The extrinsic subscales of the EROS contained six items designed to measure efforts to try to improve the emotions of teammates (e.g., “I listened to a teammate’s problems to improve how they felt”) and three items to measure efforts to try to worsen teammates’ emotions (e.g., “I acted annoyed towards a teammate to try to make them feel worse”). The original measure (Niven et al., 2011) asks, “To what extent have you used the following strategies to influence the way someone else feels over the past two weeks?” which was adapted to ask “To what extent have you used the following strategies to influence the way one of your teammates feels over the past two weeks?” Neither the intrinsic nor the extrinsic subscale was specific to sport, and this decision was motivated to ensure that the scale could be widely used in group-based settings requiring team work. Athletes rated each item on a Likert scale to indicate the extent to which they used each strategy to influence the way a teammate felt over the past two weeks (1 = not at all, 5 = a great deal). The intrinsic and extrinsic subscales of the EROS measure have been tested among participants ranging from 10 to 67 years of age (Niven et al., 2011). Previously reported Cronbach’s alphas indicate acceptable levels of internal consistency for scale scores: other-improving ERS (α = .89) and other-worsening ERS (α = .74; Niven et al., 2011). Cronbach’s alphas for our sample were as follows: other-improving ERS (α = .88) and other-worsening ERS (α = .77). A fuller examination of the factor structure obtained in this study is presented in a supplementary file.

Peer Motivational Climate. The Peer Motivational Climate in Youth Sport Questionnaire (PMCYSQ; Ntoumanis & Vazou, 2005) consists of 21 items measuring athletes’ perceptions of the motivational climate within the team. Consistent with Ntoumanis and Vazou (2005), the PMCYSQ contains two higher order factors that each consist of lower order factors: Task peer climate consists of the lower order factors improvement, relatedness support, and effort, and ego peer climate consists of the lower order factors intrateam competition/ability and intrateam conflict. Following the statement “On this team, most athletes . . . ,” an example of items reflecting the task peer climate was “Help each other improve” while an example of items reflecting the ego peer climate was “Criticize their teammates when they make mistakes.” Athletes rated the items on a scale ranging from 1 = strongly disagree to 7 = strongly agree. Previously reported Cronbach’s alphas indicate acceptable levels of internal consistency for scale scores: task peer climate (α = .92), ego peer climate (α = .75; Ntoumanis et al., 2012). Cronbach’s alphas for our sample were as follows: task peer climate (α = .90) and ego peer climate (α = .80).

Sport Enjoyment and Commitment. Sport enjoyment and commitment were measured using four items from Scanlan et al.’s (1993) measure of enjoyment (e.g., “Do you have fun playing in this program this season?”) and four items to measure athletes’ commitment (e.g., “How
Plan of Analyses

The data were screened for missing responses and outliers and examined to test the assumptions of normality, linearity, and homoscedasticity (Tabachnick & Fidell, 2014). Less than 5% of the data were missing, and missing values were handled with median replacement (using the participant’s median values for the other items on each subscale; Tabachnick & Fidell, 2014). Two subscales (self-worsening and other-improving ERS) were positively skewed, and two subscales (sport enjoyment and commitment) were negatively skewed. The correlations were examined with the raw and transformed variables, and the results were comparable; the untransformed results are presented for ease of interpretation. Descriptive statistics and bivariate correlations between variables at Level 1 and at Level 2 are reported in Table 1.

A multilevel structural equation model (MSEM) was performed to simultaneously examine the relations of person-level (Level 1) and team-level (Level 2) predictors with sport enjoyment and commitment (see Figure 1). The MSEM approach was preferable to multilevel regression because it can easily accommodate multivariate models with correlated dependent variables (e.g., Preacher, Zyphur, & Zhang, 2010). A Bayesian estimator was selected over the traditional maximum likelihood estimator to facilitate convergence of the model and minimize the risk of producing untrustworthy estimates (e.g., negative residual variance), particularly with small samples (e.g., Hox, van de Schoot, & Matthijssse, 2012; Muthén & Asparouhov, 2012). The Bayesian MSEM assumes that effects are random, thus enabling the effects of the Level 1 predictors to vary across the Level 2 units (i.e., teams). Random effects with the maximum likelihood estimator are obtained with computationally demanding numerical integration that often fails to converge (e.g., Preacher et al., 2010). Not including the random effects in a model could potentially increase the risk of biasing the estimate of the fixed effects, their significance testing, and their effect size (e.g., Nezlek, 2012). Bayesian MSEM was deemed to offer a flexible approach to examine the Level 1, Level 2, and cross-level interaction effects proposed in the MERAT. The analyses were performed with Mplus 7.4 with the default specification to use uninformative priors to ensure that results are only a mirror of the current data. Analyses were conducted using manifest variables. All predictors were grand mean centered (Hofmann & Gavin, 1998). Intrinsic and extrinsic ERS were entered at Level 1 whereas teams’ average scores for extrinsic emotion regulation (e.g., the emotion regulation climate), team task peer climate, and team ego peer climate were calculated and entered at Level 2. The covariances among the four Level 1 predictors and the four Level 2 predictors were freely estimated, respectively. Sport enjoyment and commitment were freely correlated at both levels. The residual variance terms representing the part of person- and team-level variance not explained by predictors in the model were used to calculate a series of pseudo $R^2$ values to determine the percentage of variance explained by predictors in the model (Hofmann, Griffin, & Gavin, 2000). Simple intercepts and slopes for significant cross-level interactions were analyzed for all the cross-level interactions that reached $p < .10$. The simple intercepts and slopes of a Level 1 predictor were estimated at $+1 SD$ (high) and $-1 SD$ (low) of the mean of the Level 2 predictor (Gaudreau, Fecteau, & Perraault, 2010). The fit indices that are used in Bayesian structural equation modeling (e.g., posterior predictive probability value, the 95% confidence interval [CI] of the difference in observed and replicated chi-square) are currently not available for multilevel models. Hence, we only reported the deviance information criteria (DIC) for which smaller values indicate better fit (e.g., Asparouhov, Muthén, & Morin, 2015). Model convergence was closely followed using the potential scale reduction convergence criteria (PSR) with values lower than 1.10 taken as the indicator that convergence has been obtained (Muthén & Asparouhov, 2012). Syntax codes used in Mplus for this analysis are reported in the supplementary file.

Results

Preliminary Analyses

Descriptive statistics and bivariate correlations at Level 1 and Level 2 are reported in Table 1. At the person level, self-improving ERS was significantly correlated with higher sport enjoyment whereas other-improving ERS was significantly correlated with higher sport enjoyment and commitment. Self-worsening ERS was significantly correlated with lower sport enjoyment whereas other-worsening ERS was significantly correlated with lower sport enjoyment and commitment. At the team level, team other-improving and team-other worsening were respectively correlated with higher and lower sport commitment but not significantly associated with sport enjoyment. Team task peer climate was significantly positively correlated with both sport enjoyment and commitment whereas team ego peer climate was significantly negatively correlated with sport enjoyment.

The intraclass correlation (ICC) indicated that 8% and 19% of the variability in athletes’ sport enjoyment and commitment scores can be attributed to between-teams variance (see Table 1). According to Hox (2010), ICCs of .05, .10, and .15 can be considered small, medium, and large values. As expected, the intrinsic ERS variables (i.e., self-improving ERS and self-worsening ERS) showed a small amount of between-teams variance. In contrast, the extrinsic ERS variables (i.e., other-improving ERS and other-worsening ERS) and the peer climate variables
## Table 1  Descriptive and Correlational Results for Level 1 and Level 2 Variables

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<tr>
<th>Variable</th>
<th>Range</th>
<th>M</th>
<th>SD</th>
<th>ICC</th>
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<th>4</th>
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<td>1. Self-improving ERS</td>
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<td>2. Self-worsening ERS</td>
<td>1–5</td>
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<td>3. Other-improving ERS</td>
<td>1–5</td>
<td>3.29</td>
<td>0.93</td>
<td>.120</td>
<td>.56**</td>
<td>.05</td>
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<td>4. Other-worsening ERS</td>
<td>1–5</td>
<td>1.49</td>
<td>0.74</td>
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<td>−.01</td>
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<td>−.09</td>
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<td>5. Task peer climate</td>
<td>1–7</td>
<td>5.30</td>
<td>0.96</td>
<td>.240</td>
<td>.31**</td>
<td>−.06</td>
<td>.42**</td>
<td>−.29**</td>
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<td>6. Ego peer climate</td>
<td>1–7</td>
<td>3.91</td>
<td>1.09</td>
<td>.260</td>
<td>−.03</td>
<td>.09</td>
<td>−.08</td>
<td>.35**</td>
<td>−.17**</td>
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<td>7. Sport enjoyment</td>
<td>1–5</td>
<td>4.42</td>
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<td>.081</td>
<td>.12*</td>
<td>−.14**</td>
<td>.20**</td>
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<td>.42**</td>
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<td>8. Sport commitment</td>
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<td>0.69</td>
<td>.195</td>
<td>.08</td>
<td>−.07</td>
<td>.19**</td>
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<td>.38**</td>
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<tr>
<td>1. Team other-improving ERS</td>
<td>1–5</td>
<td>3.31</td>
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<td>2. Team other-worsening ERS</td>
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<td>0.34</td>
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<td>3. Team task peer climate</td>
<td>1–7</td>
<td>5.26</td>
<td>0.55</td>
<td>.42**</td>
<td>−.52**</td>
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<td>4. Team ego peer climate</td>
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<td>.61**</td>
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<td>5. Sport enjoyment</td>
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<td>4.41</td>
<td>0.12</td>
<td>−.22</td>
<td>−.12</td>
<td>.35*</td>
<td>−.35*</td>
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<td>6. Sport commitment</td>
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<td>.61**</td>
<td>−.62**</td>
<td>.61**</td>
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Note. ICC = intraclass correlation; ERS = emotion regulation strategies.

\(^a^N = 451\) athletes. \(^b^N = 38\) teams.

\(^*p < .05. \;++p < .01\.)
exhibited larger between-teams variance. The findings were consistent with our decision to include the latter variables as team-level predictors because it can be assumed that reports of extrinsic ERS and perceptions of the peer motivational climate entail overt behaviors that may be observed, repeated, and shared among members of a sport team.

**Bayesian Multilevel Structural Equation Model**

Model convergence was attained with a PSR value smaller than 1.10 after 600 iterations and a value nearing 1.00 from the 12,000th to the 60,000th iterations. The deviance criterion of the model and the effective number of parameters (DIC = 5769.99, pD = 90.059) were smaller than a model that did not contain the cross-level interactions (DIC = 5991.30, pD = 130.39). The main effects of the Level 1 and the Level 2 predictors are reported in Figure 2, and the cross-level interactions (i.e., effect of a Level 2 predictor on the effect of a Level 1 predictor) are reported in Table 2. At the person level, self-worsening ERS was negatively associated with sport enjoyment whereas other-improving ERS was positively associated with both sport enjoyment and commitment. The random effect of each of the Level 1 predictors was statistically significant, and the predictors explained 10.7% and 6.4% of the between-persons variance of sport enjoyment and commitment. At the team level, the team task peer climate was positively associated with both sport enjoyment and commitment whereas the team ego peer climate was positively associated with sport commitment. Team other-improving ERS was negatively associated with sport enjoyment and marginally significantly associated with higher sport commitment. Finally, team-other worsening ERS was marginally significantly associated with lower sport commitment. The predictors explained 71.7% and 82.4% of the between-teams variance of sport enjoyment and commitment.

As shown in Table 2, four Level 1 effects were substantially (p < .10) predicted/moderated by one of the

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**Figure 2** — Bayesian multilevel structural equation model of sport enjoyment and commitment. All parameters were unstandardized. Random effects are reported in parentheses. Covariance between the predictors were freely estimated but not depicted. Level 1 effects in bold were moderated by a Level 2 team-level predictor, but the cross-level interactions are not depicted in this figure. †p < .10. *p < 01. **p < .01. All probability values are one-tailed.
Table 2  Cross-Level Interactions From the Bayesian Multilevel Structural Equation Model of Sport Enjoyment and Commitment

<table>
<thead>
<tr>
<th>Level 1 effects/team moderators</th>
<th>Sport Enjoyment</th>
<th></th>
<th>Sport Commitment</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficient</td>
<td>SD</td>
<td>p</td>
<td>Coefficient</td>
</tr>
<tr>
<td>Self-improving ERS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Team other-improving ERS</td>
<td>0.095</td>
<td>0.216</td>
<td>.331</td>
<td>0.060</td>
</tr>
<tr>
<td>Team other-worsening ERS</td>
<td>–0.230</td>
<td>0.266</td>
<td>.190</td>
<td>–0.108</td>
</tr>
<tr>
<td>Team task peer climate</td>
<td>–0.137</td>
<td>0.168</td>
<td>.207</td>
<td>–0.224</td>
</tr>
<tr>
<td>Team ego peer climate</td>
<td>0.016</td>
<td>0.141</td>
<td>.454</td>
<td>–0.129</td>
</tr>
<tr>
<td>Self-worsening ERS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Team other-improving ERS</td>
<td>–0.064</td>
<td>0.184</td>
<td>.361</td>
<td>–0.040</td>
</tr>
<tr>
<td>Team other-worsening ERS</td>
<td>0.373</td>
<td>0.249</td>
<td>.069†</td>
<td>0.297</td>
</tr>
<tr>
<td>Team task peer climate</td>
<td>0.146</td>
<td>0.134</td>
<td>.137</td>
<td>0.090</td>
</tr>
<tr>
<td>Team ego peer climate</td>
<td>–0.230</td>
<td>0.127</td>
<td>.039*</td>
<td>–0.231</td>
</tr>
<tr>
<td>Other-improving ERS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Team other-improving ERS</td>
<td>–0.062</td>
<td>0.176</td>
<td>.360</td>
<td>0.004</td>
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<tr>
<td>Team other-worsening ERS</td>
<td>–0.064</td>
<td>0.220</td>
<td>.385</td>
<td>0.064</td>
</tr>
<tr>
<td>Team task peer climate</td>
<td>0.108</td>
<td>0.116</td>
<td>.169</td>
<td>0.083</td>
</tr>
<tr>
<td>Team ego peer climate</td>
<td>–0.023</td>
<td>0.118</td>
<td>.422</td>
<td>–0.020</td>
</tr>
<tr>
<td>Other-worsening ERS</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Team other-improving ERS</td>
<td>–0.235</td>
<td>0.215</td>
<td>.132</td>
<td>–0.075</td>
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<tr>
<td>Team other-worsening ERS</td>
<td>0.042</td>
<td>0.267</td>
<td>.436</td>
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<tr>
<td>Team task peer climate</td>
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<td>0.167</td>
<td>.242</td>
<td>–0.183</td>
</tr>
<tr>
<td>Team ego peer climate</td>
<td>–0.178</td>
<td>0.146</td>
<td>.108</td>
<td>0.070</td>
</tr>
<tr>
<td>Grand mean estimate (intercept)</td>
<td>4.378</td>
<td>0.050</td>
<td>.001**</td>
<td>4.297</td>
</tr>
</tbody>
</table>

Note. ERS = emotion regulation strategies.
†p < .10. *p < .05. **p < .01. All probability values are one-tailed.

Level 2 predictors. These four cross-level interactions were probed using simple intercepts and slopes shown in Figure 3.

First, self-worsening ERS was significantly negatively related to enjoyment in teams with low team other-worsening ERS, \( \text{intercept} = 4.29; \text{slope} = -0.29, t[33] = -5.04, p < .01 \) but not in teams with high team other-worsening ERS \( \text{intercept} = 4.47; \text{slope} = 0.01, t[33] = 0.02 p > .05 \); see Figure 3A). These results did not support our hypotheses, and they suggest that the use of self-worsening ERS was negatively associated with enjoyment within teams in which the team-level other-worsening ERS was low, and the association was nonsignificant when team-level other-worsening ERS was high.

Second, self-worsening ERS was significantly negatively related to enjoyment in teams with high team ego peer climates \( \text{intercept} = 4.30; \text{slope} = -0.31, t[33] = -5.37, p < .01 \) but not in teams with low team ego peer climates \( \text{intercept} = 4.46; \text{slope} = 0.02, t[33] = 0.37 p > .05 \); see Figure 3B). These results provide support for our hypotheses regarding the moderating role of the team ego peer climate and suggest that athletes’ use of regulation strategies to make themselves feel worse was negatively associated with enjoyment within teams with a high ego-involving peer motivational climate that is competitive and driven by normative comparisons. However, this association was nonsignificant when the ego-involving peer motivational climate is low.

Third, self-improving ERS was significantly positively related to commitment in teams with low team task peer climate \( \text{intercept} = 4.06; \text{coefficient} = 0.15, t[33] = 2.76 p < .05 \) but negatively related to commitment in teams with high team task peer climate \( \text{intercept} = 4.53; \text{coefficient} = -0.14, t[33] = -2.57, p < .05 \); see Figure 3C). These results were contrary to our hypotheses and suggest a compensatory mechanism whereby efforts to improve one’s own emotions were positively associated with commitment in teams that were not supportive of individual mastery and self-improvement (e.g., in teams with a low task peer climate). However, efforts to improve one’s own emotions were negatively associated with commitment in teams that were supportive of individual athletes’ mastery and self-improvement (e.g., in teams with a high task peer climate).
Figure 3 — Simple slopes for cross-level interactions. (A) Self-worsening emotion regulation (ER) with sport enjoyment moderated by team other-worsening ER (A) and team ego peer climate (B). Self-improving ER with sport commitment moderated by team task peer climate (C). Self-worsening ER with sport commitment moderated by team ego peer climate (D).
Fourth, self-worsening ERS was significantly negatively related to commitment in teams with high team ego peer climate (intercept = 4.46; coefficient = –0.23, r[33] = –4.13, p < .01), but not in teams with low team ego peer climate (intercept = 4.14; coefficient = 0.11, r[33] = 1.95, p > .05; see Figure 3D). Similar to the findings for enjoyment and in support of our hypotheses, athletes’ use of regulation strategies to make themselves feel worse was negatively associated with commitment when used within teams in which the peer climate was competitive and driven by normative comparisons. Within teams with a low ego peer climate, athletes reported similar levels of commitment regardless of the extent to which they used self-worsening ERS.

Discussion

In this study, we proposed a MERAT to distinguish how athletes try to regulate their own emotions and the emotions of their teammates. Our findings provided initial evidence that athletes’ intrinsic and extrinsic ERS were associated with sport commitment and enjoyment, and the results also provided initial evidence for the direct and moderating effects of team-level motivational and emotion regulation climates on sport enjoyment and commitment. These findings highlight the need to consider the interplay between person- and team-level factors to better explicate the role of intrapersonal and interpersonal ERS for the sport enjoyment and commitment of adolescent athletes.

Partially consistent with our hypotheses, athletes’ intrinsic self-worsening ERS appeared to be more important for (negatively) predicting enjoyment than self-improving ERS, which was not significantly associated with enjoyment. These results are consistent with the idea that efforts to worsen one’s own emotions are associated with negative affective responses in sport (Lane, Beedie, Devonport, & Stanley, 2011) and nonsport contexts (Niven et al., 2011; Niven et al., 2013). These findings also provide support for the idea that efforts to worsen one’s own emotions are easier than efforts to improve one’s emotions (Niven et al., 2013; Webb, Miles, & Sheeran, 2012); thus, actions to worsen one’s own emotions may have a stronger impact on affective and motivational outcomes in sport than improving one’s own emotions. However, the concept of enjoyment offers a global and unspecific perspective about the feelings of pleasure and fun experienced in sport and should therefore be complemented with finer grained assessments of specific achievement-related emotions in sport in future research.

Consistent with our hypotheses, athletes’ extrinsic other-improving ERS was positively associated with their own enjoyment and commitment while other-worsening ERS was negatively associated with enjoyment. These findings support previous work by Niven, Totterdell, et al. (2012) indicating that trying to improve the emotions of others has consequences for one’s own emotional well-being. Theoretical propositions and empirical findings suggest that actions to try to improve the emotions of others contribute to positive affective outcomes such as increased enthusiasm and lower anxiety (Niven, Totterdell, et al., 2012), possibly due to processes of emotional contagion (Hatfield, Cacioppo, & Rapson, 1994), vicarious affect (Zaki & Williams, 2013), or inferential processing (van Kleeck & Fischer, 2016). Our findings were particularly interesting in light of the fact that athletes’ self-improving ERS was not directly associated with enjoyment or commitment, which did not support our hypotheses. These results support the value of considering emotion regulation from an interpersonal perspective as they demonstrate that efforts to try to improve the emotions of others could have affective and motivational effects that appeared to be more important than efforts to regulate their own emotions.

Our findings provide support for the direct positive effect of a peer task motivational climate at the team level on sport enjoyment and commitment, which was consistent with our hypotheses based on propositions that athletes report positive outcomes when they are on teams that have a high task peer climate (Ntoumanis et al., 2012). These findings further emphasize the importance of a team-level task peer climate as a possible protective factor for adolescent athletes’ sport enjoyment and commitment. The findings regarding the moderating effect of the team-level task peer climate on associations between emotion regulation and our outcomes partially supported our hypotheses. We anticipated that being in a team with high levels of task peer climate would strengthen the positive association between athletes’ self-improving ERS with commitment and enjoyment. The result for enjoyment was not significant, whereas the effect for commitment, at first glance, appeared to contradict our hypothesis. More specifically, the relation between self-improving ERS and sport commitment was positive in teams with lower task peer climate. In team with higher task peer climate, this relation was negative, but the level of sport commitment nonetheless remained higher. As shown in Figure 3C, it appears that athletes with lower use of self-improving ERS are less committed when they belong to a team in which task peer climate is low. In contrast, the disadvantage associated with being in such a team shrinks among the athletes who are making higher use of self-improving ERS. This result is interesting because it does offer some support for the idea that efforts to improve one’s emotions act as a compensatory mechanism to promote positive outcomes for athletes in teams that are less oriented toward the pursuit of task mastery. This finding is important because it also helps qualify the nonsignificant path from self-improving ERS and sport commitment (see Figure 2). Overall, it appears that self-improving ERS matters the most and should be promoted when athletes are participating in teams in which learning, improving, and effort are not emphasized, valued, and reinforced by teammates.

We did not expect that team-level ego peer climate at Level 2 would have a direct positive association with sport commitment while showing a null association with enjoyment; this finding may be attributable to the competitive level and age group of the athletes in the study.
The majority of the teams were among the highest levels of competition within their sport, and older youth athletes on competitive teams have been reported to have a strong ego goal orientation (Vazou, Ntoumanis, & Duda, 2006). Our findings may also be attributable to a third-variable effect, wherein athletes on teams with higher ego peer climates could report higher commitment if they are experiencing success in achieving their goals. Further research is required to determine whether these findings would generalize to lower levels of competition or if they may be explained by team success. At a first glance, the findings suggest that the presence of a high ego peer climate may not necessarily be detrimental for sport enjoyment and commitment. However, when considering the moderating effect of the motivational climate at the team level, a high ego peer climate within the team may exacerbate the negative association between athletes’ self-worsening ERS with commitment and enjoyment. Thus, athletes who engage in greater self-worsening ERS within teams with a high ego peer climate may report lower enjoyment and commitment than athletes engaging in such behaviors within teams with a lower ego peer climate. These findings highlight the importance of examining both person- and team-level factors in studies examining youth athletes’ experiences in sport.

In terms of the emotion regulation climate within teams, we expected that teams characterized by interactions intended to improve the emotions of teammates would be associated with higher sport enjoyment and commitment. Contrary to our hypotheses, however, team-level other-improving ERS was only marginally associated with commitment and it was negatively associated with sport enjoyment, although person-level other-improving ERS was positively associated with enjoyment and commitment. These divergent results suggest that person-level and team-level emotion regulation potentially represent two distinct phenomena. At the person level, trying to improve the emotions of teammates appears to be a valuable strategy to improve one’s sport enjoyment and commitment. However, a team-level tendency to use extrinsic other-improving ERS while athletes are also reporting lower sport enjoyment could be explained by a third-variable effect—that is, teams characterized by an emotion regulation climate where athletes are trying to improve the emotions of one another might reflect a greater need for the team to cope with adversity and performance difficulties. As such, the performance difficulties of some teams could potentially explain their lower levels of sport enjoyment and also their greater reliance on extrinsic emotion regulation efforts to try to improve the emotions of teammates. Only one of the cross-level effects regarding team-level interpersonal emotion regulation was significant: On teams with low other-worsening ERS, athletes’ higher self-worsening ERS was associated with lower enjoyment. This suggests that athletes who use self-worsening ERS may be vulnerable to experiencing lower sport enjoyment even when they are on teams where their teammates are not trying to make them feel bad.

Although additional research is needed to test the direction and causality of these effects, some applied implications can nonetheless be provided based on the findings from this study. First, engaging in actions to improve the emotions of teammates may contribute to improved enjoyment and commitment among adolescent athletes. Hence, parents and coaches should emphasize the positive effects of engaging in these types of positive interactions. The team-level task peer climate was also positively associated with athletes’ enjoyment and commitment, which provides further support for encouraging athlete behaviors that promote effort and personal improvement among teammates. Furthermore, the team-level ego peer climate appeared to exacerbate the negative associations between athletes’ emotion regulation with enjoyment and commitment. Thus, coaches should seek to minimize or forestall actions within teams that emphasize social comparisons among teammates.

**Limitations and Future Research Directions**

One limitation of this study was the sample size; while we had a large sample of athletes at Level 1, the Level 2 sample size of 38 teams may have been a limitation for this work. Our cross-sectional design limited our ability to draw causal inferences from our data, and it will be important for future research to adopt longitudinal and experimental designs to test the direction of the associations identified in this study. Additional work with larger samples is needed to determine whether the interaction effects identified in this study can be reproduced in other samples and to assess the practical and theoretical value of the interactions. We also noted additional cross-level interactions that had probability values slightly higher than .10 (see Table 2), which would be valuable to examine in future research. In addition, we sampled team sport athletes, and it would be important to examine whether interpersonal emotion regulation differs among athletes in sports that vary in their structural interdependence (Evans, Eys, & Bruner, 2012). We also acknowledge that the EROS scale (Niven et al., 2011) has yet to undergo full validation, but the results of the Bayesian confirmatory factor analyses reported in the supplementary file nonetheless offered preliminary support for its factor structure.

As shown in previous research (Scanlan et al., 1993), enjoyment may be a mediator of commitment in sport. The present study was the first to demonstrate the effect self- and interpersonal emotion regulation of athletes on enjoyment and commitment as dependent variables. A larger and independent sample would be needed, ideally with a longitudinal panel design, to replicate the original effects reported in this study while offering a robust test of mediation. Multilevel mediated-moderation structural equation modeling would be desirable to offer an optimal test of such a complex model.

Finally, we did not explore the purpose or function of interpersonal emotion regulation within teams. Expressions of anger, frustration, pride, and appreciation...
can have adaptive functions for relationships within groups by strengthening social relationships and enhancing commitment and belonging, and the expression of some emotions may communicate to team members that their behavior is not acceptable and that corrections are required (Fischer & Manstead, 2008; von Scheve & Ismer, 2013). Accordingly, efforts to try to regulate a teammate’s emotions may serve instrumental functions (Tamir, 2016) to reinforce behaviors among teammates intended to improve the team’s performance. Qualitative research has found evidence that athletes regulated their own and others’ emotions to improve the team’s performance and to maintain teammate relationships (e.g., Tamminen & Crocker, 2013). However, little research has systematically explored the factors that determine when and why people regulate others’ emotions and when each approach is more or less useful (Zaki & Williams, 2013). Identifying the conditions under which athletes regulate their teammates’ emotions will provide useful information for developing team emotion-regulation interventions.

Conclusion

This study examined athletes’ efforts to try to improve and worsen their own and their teammate’s emotions, capturing different types of interpersonal emotion regulation interactions that may occur in team sport settings. Examining athletes’ interpersonal emotion regulation within a team sport context is a novel addition to the sport psychology literature as it broadens the scope of emotion regulation research from an intrapersonal to an interpersonal perspective. At the person level, athletes’ attempts to regulate their own emotions and the emotions of their teammates were associated with their own enjoyment and commitment. Team-level factors such as the peer motivational climate and the team’s overall use of interpersonal ERS were also associated either directly (Level 2 effects) or indirectly (cross-level effects) with athletes’ own enjoyment and commitment. Taken together, these findings highlight the importance of taking into account the team-level emotion regulation climate and peer motivational climate as potential moderators of the associations between interpersonal emotion regulation with affective and motivational outcomes in sport.

Acknowledgments

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References


