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# The differential interaction effect of mastery and performance climate on athletes' emotional/physical exhaustion: The role of athletes' gratitude

Lung Hung Chen (ORCID: 000-0001-5217-1117)
National Taiwan Sport University
fjudragon@ntsu.edu.tw

Chia-Huei Wu
University of Leeds
chiahuei.wu@gmail.com

Ying-Lien Ni (ORCID: 0000-0002-2758-0135)
National Chiayi University
colabear0413@gmail.com

Che-Chun Kuo
Tunghai University
chechunk@gmail.com

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Corresponding author: Che-Chun Kuo

# The differential interaction effect of mastery and performance climate on athletes' emotional and physical exhaustion: The role of athletes' gratitude

Abstract

Motivational climate (i.e., mastery and performance climate) has been found to shape athletes' emotional and physical exhaustion, the core dimension of burnout. However, the interactional effect between mastery and performance climate on emotional and physical exhaustion has been rarely examined. In this study, we proposed that athletes' gratitude will determine the interaction effect of mastery climate and performance climate on emotional and physical exhaustion. Specifically, we hypothesized that among athletes high in gratitude, mastery climate can mitigate the association between performance climate and emotional and physical exhaustion; among those low in gratitude, mastery climate can intensify the association between performance climate and emotional and physical exhaustion. Using a time-lagged survey, data from 293 athletes revealed a three-way interaction effect among mastery climate, performance climate and gratitude. We did not find that mastery climate can mitigate the association between performance climate and emotional and physical exhaustion for those high in gratitude but found that among athletes low in gratitude, the positive association between performance climate and emotional and physical exhaustion was stronger in a higher mastery climate than in a lower mastery climate. Our study offers an interactionist perspective to help further understand the joint effect of mastery and performance climates on emotional and physical exhaustion by taking the role of individual differences into account.

Keywords: social network, goal conflict, motivational ambivalence, chronic stressors.

**The differential interaction effect of mastery and performance climate on athletes' emotional and physical exhaustion: The role of athletes' gratitude**

Athlete burnout is determinantal to athletes in various aspects, as it has been associated with, for example, poor sleep quality (Li et al., 2018), higher dropout intention (Isoard-Gautheur et al., 2016), and depression (Gerber et al., 2018). Athlete burnout is a syndrome characterized by emotional and physical exhaustion, reduced sense of accomplishment, and sport devaluation in response to chronic stressors (Goodger et al., 2007; Gustafsson et al., 2017). These three dimensions represent different aspects of burnout experience. Emotional and physical exhaustion reflects depletion of emotional and physical energy, reduced sense of accomplishment reflects negative evaluation of one's abilities in sport, and sport devaluation reflects the loss of interest in sports (Raedeke & Smith, 2001). While these three dimensions collectively capture athlete burnout in different aspects, findings suggests that they are not tightly associated with each other and should be examined individually to thoroughly understand athlete burnout (Isoard-Gautheur et al., 2015; Lundkvist et al., 2018; Martinent et al., 2020).

In this study, we focus on emotional and physical exhaustion not only because it is a core syndrome of burnout (Gustafsson et al., 2017; Gustafsson, Lundkvist, et al., 2016) but also because it reflects the training stress syndrome developed from day to day (Silva, 1990). As indicated by Silvas (1990, p.11), "an exhaustive psychophysiological response exhibited as a result of frequent, sometimes extreme, but generally ineffective efforts to meet excessive training and competitive demands", studying emotional and physical exhaustion can help understand athletes' burnout in their training routine.

Relevant to the consideration of emotional and physical exhaustion from a training stress perspective, the motivational climate or goal perspective in teams (Ames & Archer, 1988), which

can shape how athletes perceived and interpret the meaning of their training and competitions, has been identified as a factor that can broadly shape athletes' emotional and physical exhaustion or burnout. Based on goal perspective theory (Duda, 2001), individuals are likely to perceive a mastery climate when goals concerning improvement and effort are emphasized in the environment and a performance climate when goals involving performance comparisons between individuals are emphasized. Performance climate has been found to be positively associated with maladaptive experiences such as sport anxiety (Smith et al., 2008) and athlete burnout (Gustafsson, Hill, et al., 2016), whereas mastery climate has been negatively associated with those maladaptive experiences (Harwood et al., 2015).

Mastery and performance climates, however, are not mutually exclusive. Teams can vary in their degrees and combinations of the two motivational climate dimensions. To date, studies have only examined the main effects of the two motivational climates on emotional and physical exhaustion (e.g., Lemyre et al., 2008) and have not examined their joint effect. From the multiple goal perspective (Harackiewicz et al., 2002), mastery climate could weaken the positive effect of performance climate on emotional and physical exhaustion because it can help athletes change their idea of success and appreciate achievement in self-improvement, releasing them from a focus on interpersonal comparisons. From the goal ambivalence perspective (Grant et al., 2011), mastery could climate intensify the positive effect of performance climate on emotional and physical exhaustion because athletes may experience goal conflict and confusion when different motivational focuses are emphasized simultaneously.

While recognizing those possibilities, we argue that how the two motivational climates can jointly shape one's emotional and physical exhaustion will depend on athletes' characteristics, as people with different personal characteristics could respond to the same situation differently, as

suggested by a person-in-situation or interactionist perspective (Reynolds et al., 2010). In this study, we suggest that the joint effect of mastery and performance climates on emotional and physical exhaustion will vary across athletes due to their levels of gratitude, a tendency to recognize and respond with grateful emotion to the roles of other people's benevolence in one's positive experiences and outcomes (McCullough et al., 2002, p. 112). As we elaborate shortly, we propose that for athletes high in gratitude, mastery climate will mitigate the association between performance climate and emotional and physical exhaustion. For athletes low in gratitude, a mastery climate will intensify the association between performance climate and emotional and physical exhaustion.

**Motivational climates relate to athlete emotional** and **physical exhaustion**

Mastery climate is negatively associated with athlete emotional and physical exhaustion for several reasons. First, mastery climate advocates process-based self-evaluation. Ability is judged by the progress of acquiring new skills that motivate athletes to focus on their learning, improvement and efforts (Walling et al., 1993). This focus also makes athletes resilient to competition failure, preventing emotional and physical exhaustion. Second, mastery climate helps develop positive relationships and interpersonal cooperation within teams, facilitating athletes' learning and improvement by working with others (e.g., coaches and teammates). Empirically, Lemyre et al. (2008) investigated Olympic team members and junior elite athletes and found that a mastery climate was negatively associated with athlete emotional and physical exhaustion.

In contrast, performance climate can result in athlete emotional and physical exhaustion because of its emphasis on outcome-based self-evaluation and interpersonal comparisons (Ames & Archer, 1988). Success under a performance climate is defined by defeating others in

competition, which direct athletes to compare their performance to that of an opponent or to reference others such as teammates. Such a focus triggers higher stress because failing to beat others implies inability (Covington, 2000) and can directly challenge athletes' self-worth (Halbesleben & Buckley, 2006). Empirically, performance climate is positively related to emotional and physical exhaustion (Lemyre et al., 2008; Reinboth & Duda, 2004).

**The interaction effect of motivational climates: Two perspectives**

As coaches play a significant role in shaping team climates via their coaching style and practices (Seifriz et al., 1992), teams can vary in the degrees of mastery and performance climates when coaches employ different practices to motivate athletes. The different degrees of mastery and performance climates in teams could have a joint effect in shaping athletes' emotional and physical exhaustion. Their joint effect can be understood from two different perspectives regarding whether mastery climate can mitigate or intensify the effect of performance climate on emotional and physical exhaustion.

The multiple goal perspective (Harackiewicz et al., 2002) suggests that athletes have flexible attention to observe environmental cues and can focus on cues that are beneficial for them to define and develop a sense of competence. Accordingly, a higher mastery climate will help mitigate the positive association between performance climate and emotional and physical exhaustion because having strong mastery and performance climates allows athletes to expand their perspectives in defining success by appreciating success in learning or and winning if they achieve any success. Such a mechanism is likely because motivational climates reflect the perceived salience of mastery and performance cues emanating from the achievement context (Lemyre et al., 2008), and athletes rely on those cues to verify their perception of their ability and success. If athletes see that self-improvement is as valued as outperforming others, they can

employ a selective strategy to focus on what they have achieved (learning, outperforming or both) to regulate their stress experiences and social interactions with others. In short, this perspective suggests that mastery climate can mitigate the positive association between performance climate and emotional and physical exhaustion.

The motivational ambivalence perspective (Grant et al., 2011), however, offers a different view. This suggests that presenting multiple cues simultaneously distracts the self-regulatory process and results in poor performance and stressful experiences. For example, while mastery climate concerns self-referencing, performance climate is interested in comparisons to others. These two motivational climates shape different directions of motivational regulatory processes. Thus, having both higher mastery and performance climates is likely to create experiences of conflicting goals and push-pull contradictions, which can not only reduce psychological resources to take following actions after failure (Kanfer & Ackerman, 1989) but can also create psychological distress and tension. As such, the motivational ambivalence perspective suggests that mastery climate can further intensify the positive association between performance climate and emotional and physical exhaustion.

While recognizing the two potential different interaction effects between mastery and performance climate on athletes' emotional and physical exhaustion, we argue that the interaction effect can be contingent upon athletes' personal characteristics, which renders an interactionist approach to study human behavior as "a function of a continuous multidirectional process of person-by-situation interactions" (Endler, 1983, p. 160). In the next section, we elaborate on how athletes' gratitude can determine the interaction effect between the two climates on emotional and physical exhaustion.

**The moderating role of athletes' gratitude**

Grateful individuals tend to notice and appreciate positivity in the world and tend to perceive that someone has acted in the interest of their welfare and tend to recognize and respond to such benevolence with positive emotion (McCullough et al., 2002). Being grateful helps broaden individuals' momentary thought–action repertoire and resources (Fredrickson, 2001, 2004), enabling flexibility in thinking (i.e., thinking about things in a different way) and actions (i.e., using multiple approaches to cope with adversity). For example, grateful individuals have a positive reinterpretation tendency (Wood et al., 2007). They are likely to see the hardship as challenge but not threat, preventing them from experiencing stress (Hsu et al., 2020; McCullough et al., 2002). They are also like to take different coping strategies, such as seeking emotional and instrumental social support, active coping (i.e., taking problems directly), and planning (i.e., coming up with a strategy before actions), to overcome challenges (Wood et al., 2007). Besides, grateful individuals are also likely to develop positive relationships with others because they tend not only to appreciate others' input but also to provide benefits in return. Such a reciprocity in social exchange helps develop relationships with others (McCullough et al., 2001).

Due to the characteristics of gratitude, we expect that for athletes high in gratitude, a higher mastery climate will mitigate the positive effect of performance climate on emotional and physical exhaustion (i.e., the interaction effect suggested by the multiple goal perspective). Due to their flexible cognition, when athletes high in gratitude perceived both higher mastery and performance climate in their teams, they are likely to appreciate different views of achievement (i.e., self-improvement or interpersonal comparisons) and recognize any they have achieved. In addition, grateful individuals are likely to establish strong social relationships with others (Chang et al., 2012) and access support from others (e.g., coaches) when facing obstacles (Chen & Wu, 2016). Because of this, athletes high in gratitude will be more responsive to mastery climate

practices, as they can solicit support and resources from others to help them improve their skills, abilities and performance. As such, when experiencing demands and distress from performance-focused practices, grateful athletes can avoid feeling defeated if practices promoting mastery climate are available for them to think of achievement in a different way and to build resources for improvement.

We expect that for athletes low in gratitude, a higher mastery climate will intensify the positive effect of performance climate on emotional and physical exhaustion (i.e., the interaction effect suggested by the motivational ambivalence perspective). Due to their fixed cognition (Fredrickson, 2004), athletes low in gratitude are likely to see self-improvement and perform better than others as two different goals and may experience tensions in allocating their attention to achieving different goals when practices for both mastery goals and performance goals are applied. Additionally, they may experience difficulty in interacting with others when practices for both mastery goals and performance goals are applied, as the former practices encourage interpersonal cooperation for self-improvement while the latter encourage interpersonal competition for outperforming others. In addition, individuals low in gratitude tend to take benefits from others for granted and be less likely to develop and accumulate resources from their social ties (Bartlett et al., 2012). Even if practices for mastery goals have encouraged them to collaborate with coaches or teammates to facilitate their learning and improvement, because of the lack of reciprocity in social interactions, athletes low in gratitude are less likely to build solid social relationships, preventing them from accessing resources from others to cope with stressful events, such as losing competition. Thus, for less grateful athletes, a higher mastery climate can strengthen the positive effect of performance climate on emotional and physical exhaustion

because it brings goal conflicts and confusion in interacting with others, especially with peers in teams, making interpersonal competition even more stressful and effortful.

Based on the above reasoning, we expected a three-way interaction effect of perceived performance climate, mastery climate and athletes' gratitude on emotional and physical exhaustion. When examining our hypothesis, we also control for the effects of gender, age, sport tenure, daily training hours, weekly training days, and competition level (from local to international), as training load and experience in sports might influence athlete exhaustion experiences (Gould et al., 1996; Gustafsson et al., 2008).

## Method

### Participants and procedures

The data for this study were collected in the context of a larger project supervised by the first author. Neither the analyses nor the findings reported in the present research have been reported in any previous studies. Our study was approved by the Institutional Review Board. A research assistant helped collect data before athlete training in the classroom. Athletes were instructed to read the information sheet, and an informed consent form was signed before they began the survey, thus, their confidentiality and anonymity were ensured. To increase the response rate, athletes were offered NTD (New Taiwan dollar) 100 gift vouchers (roughly equal to 3 USD) at the time of each data collection.

Three hundred fifty-five adolescent athletes were initially recruited from diverse sports (archery, badminton, baseball, basketball, billiards, cheerleading, dance, fencing, golf, handball, judo, kendo, korfball, martial arts, modern pentathlon, rhythmic gymnastics, rowing, shooting, soccer, softball, swimming, table tennis, taekwondo, tennis, track and field, tug of war, volleyball, weightlifting, woodball). Overall, 293 athletes from 49 teams provided complete data.

The respondents consisted of 199 male athletes and 94 female athletes, with a mean age of 17.04 years ($SD$ = 0.61). The average sport tenure was 5.92 years ($SD$ = 2.36), and the average training time was 4.67 hours ($SD$ = 1.54) per day and 5.62 days ($SD$ = 0.76) per week. Most participants reported their highest level of competition to be at the national level (68.3%, $N$ = 200), while 15.4% ($N$ = 45) competed at the regional level, 9.9% ($N$ = 29) at the international level, and 5.8% ($N$ = 17) at the Asian level; 0.7% ($N$ = 2) did not compete at any level of competition.

**Measurement**

Using a time-lagged design, the survey was conducted at three time points. First, they provided their demographic information and completed a general gratitude questionnaire (control variables at Time 1). Three months later, they completed scales for performance climate, mastery climate, and sports-specific gratitude questionnaire (independent variable and moderator at Time 2). Six months after Time 1, we asked respondents to rate their emotional and physical exhaustion (dependent variable at Time 3). The time interval was chosen because we were asked to accommodate the athletes' schedules.

***Motivational climate***

A motivational climate questionnaire at work questionnaire (MCWQ; Nerstad et al., 2013) was adopted in the current study, which contained six items for mastery climate and eight items for performance climate. This scale was developed to assess constructs in the work environment, and we modified the wording of the items to capture mastery and performance climates in the context of sports. Example items are "In my team, one is encouraged to cooperate and exchange thoughts and ideas mutually" and "In my team, rivalry between players is encouraged." Participants rated the items on a scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Cronbach's alpha for mastery and performance climates were .92 and .80, respectively.

***Sports-specific gratitude***

The six-item Gratitude Questionnaire-Sport (GQ-S; Chen & Kee, 2008) was used in the current study. Derived from a general gratitude scale (McCullough et al., 2002), the GQ-S is used to assess athletes' gratitude in the context of sports. This measure contains a single factor, and the scale's reliability and incremental validity are supported by prior research. Specifically, Chen and Chang (2017) conducted two independent studies and demonstrated that the GQ-S accounted for increased explained variance in team satisfaction and burnout among athletes after controlling for domain-general gratitude. A sample item is "I have so much in my entire sport experience or endeavor to be thankful for." The response scale for all items ranged from 1 (*strongly disagree*) to 7 (*strongly agree*). Cronbach's alpha for this measure was .86.

***Emotional*** and ***Physical Exhaustion***

Emotional and physical exhaustion was assessed using items from the Athlete Burnout Questionnaire (Raedeke & Smith, 2001). While the original ABQ contains five items for emotional and physical exhaustion, when those items were translated into Chinese (Lu et al., 2006), only 4 items performed better in a factor analysis. The validity and reliability of the four-item Chinese ABQ version have been demonstrated in samples of Taiwanese athletes (e.g., Chang et al., 2018; Chen & Chang, 2014). We use the four items version. Items include "I feel overly tired from my sport participation," "I feel wiped out from my sport," "I feel physically worn out from my sport," and "I feel like I don't have any energy for my sport". Participants rate each item on a scale from 1 (*almost never*) to 6 (*almost always*). Cronbach's alpha for this measure in the current sample was .92.

***General gratitude***

General gratitude was included as a control variable because general gratitude has a high correlation with sports-specific gratitude (Chen & Chang, 2017), and controlling the shared variance helped us gauge the effect of sports-specific gratitude. General gratitude was measured by the Gratitude Questionnaire-Taiwan version (GQ-T; Chen et al., 2009b), which was initially developed by McCullough et al. (2002). The GQ-T has demonstrated satisfactory reliability and validity (see Chen, 2013; Chen & Chang, 2017; Chen et al., 2009a). Participants rated the items on a scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Cronbach's alpha for this measure was .87.

***Control variables***

Gender (1 = male, 2 = female), age (in years), sport tenure (in years), daily training hours, weekly training days, and competition level (1 = the regional level; 2 = the national level; 3 = at the Asian level; 4 = the international level) were included as control variables.

**Preliminary analysis**

The descriptive statistics of and correlations among all variables are presented in Table 1. As athletes are nested in a team, we applied multilevel modeling using the mixed model in SPSS (Heck et al., 2014) with maximum likelihood estimation to examine our research hypotheses. Prior to hypothesis testing, we first calculated the ICC(1) values for each construct and found that the ICC(1) was 0.08 for emotional and physical exhaustion, 0.11 for performance climate, 0.18 for mastery climate, and 0.07 for sports-specific gratitude. These values ranged from 0.07 to 0.18, indicating a nonindependent data structure (Dyer et al., 2005).

We conducted a two-level random intercept model to test our hypotheses. In this model, we followed the suggestion of Hofmann and Gavin (1998) to grand the mean center of our research variables. By considering that athletes from different teams may vary in their emotional

and physical exhaustion level, a random effect was introduced for the Level-2 intercept to control the team effects (Bryk & Raudenbush, 1992). Furthermore, we included team-level predictors, including team performance climate (i.e., the mean of performance climate for each team), team mastery climate (i.e., the mean of mastery climate for each team), and team sports-specific gratitude (i.e., the mean of sports-specific gratitude for each team), as control variables in our models when testing the interaction effects (Aguinis et al., 2013).

## Results

### Multilevel Regression Modeling

We performed a series of multilevel regression models (i.e., two-level random intercept models) to examine our hypotheses (see Table 2). In Model 1, gender, age, sport tenure, daily training hours, weekly training days, competition level, and general gratitude (all at the individual level) as well as three team-level predictors (team performance climate, team mastery climate, and team sports-specific gratitude) were entered as control variables. Model 2 included the main effects of performance climate, mastery climate, and sports-specific gratitude at the individual level on emotional and physical exhaustion. Model 3 contained the three two-way interaction terms among performance climate, mastery climate, and sports-specific gratitude, and Model 4 included their three-way interaction term. As presented in Table 2, the residual variance of emotional and physical exhaustion decreased (also indicated by the pseudo R-squared in Models 2, 3 and 4) when we included more predictors from Models 1 to 4.

The results of Model 4 show a positive association between performance climate and emotional and physical exhaustion ($b$ = 40, $p$ = .001), a significant two-way interaction effect between performance climate and sports-specific gratitude ($b$ = -.24, $p$ = .013) and a significant three-way interaction effect on emotional and physical exhaustion ($b$ = -.24, $p$ = .006). Figure 1

depicts the pattern of this three-way interaction plot with high and low regression lines (+ 1 and -1 *SD* from the mean).

We then conducted a series of additional analyses to further interpret the significant interaction effects. First, we tested the conditional two-way interaction effect of performance climate and mastery climate at various sports-specific gratitude levels. We did not find a significant interaction effect between performance climate and mastery climate on emotional and physical exhaustion when sports-specific gratitude was high ($b$ = -.20, $p$ = .171) but did find a positive two-way interaction effect between performance climate and mastery climate on emotional and physical exhaustion when sports-specific gratitude was low ($b$ = .31, $p$ = .032). We conducted simple slope analysis to further explain the interaction effect (Dawson & Richter, 2006). We found that for athletes low in sports-specific gratitude, performance climate had a positive association with emotional and physical exhaustion in a low mastery climate ($b$ = .42, $t$ = 3.09, $p$ = .002), and this positive association was stronger in a high mastery climate ($b$ = .90, $t$ = 3.77, $p$ = .001). For athletes high in sports-specific gratitude, there was no significant association between performance climate and emotional and physical exhaustion in either low ($b$ = .31, $t$ = 1.53, $p$ = .127) or high ($b$ = -.01, $t$ = -.02, $p$ = .982) mastery climates.

We have also additionally conducted a series of conventional regression analysis to test the significance of $R^2$ changes when including more predictors from Models A1 to A4. As presented in Table A1, the results indicated that the $R^2$ change between Model A1 ($R^2$ = .06) and Model A2 ($R^2$ = .11) was significant ($\Delta R^2$ = .05; $F$(3, 279) = 5.08, $p$ < .05), suggesting that the three key variables, mastery climate, performance climate and sports-specific gratitude explain more variances of emotional and physical exhaustion beyond the control variables. The $R^2$ change between Model A2 ($R^2$ = .11) and Model A3 ($R^2$ = .13) was non-significant ($\Delta R^2$ = .02; $F$(3, 276)

= 1.94, *ns*), suggesting that adding the three two-way interaction effects among mastery climate, performance climate and sports-specific gratitude does not help account for variances of emotional and physical exhaustion. Finally, the $R^2$ change between Model 3 ($R^2 = .13$) and Model 4 ($R^2 = .15$) was significant ($\Delta R^2 = .02$; $F(1, 275) = 5.38$, $p < .05$), suggesting the importance to examine the three-way interaction effect among mastery climate, performance climate and sports-specific gratitude on emotional and physical exhaustion. In addition to results of $R^2$ changes, effects obtained in the conventional regression analysis are consistent with the results obtained from a multilevel regression analysis.

## Discussion

In this study, we propose that mastery climate can shape the effect of performance climate on emotional and physical exhaustion differently contingent upon individual differences in athletes' gratitude. Results from the multilevel regression analysis, which has taken the nested data structure into account, and the supplementary conventional regression analysis both support our hypothesis. Specifically, we found that mastery climate intensified the positive association between performance climate and emotional and physical exhaustion for athletes low in gratitude.

In addition to the key findings, we obtained findings worth our attention. Firstly, regarding the main effect of motivational climate, we found that performance climate was significantly and positively related to emotional and physical exhaustion ($\beta$ ranged from .24 to .40 in different models reported in Table 2), but we did not find that mastery climate can negatively predict emotional and physical exhaustion. While mastery climate has been demonstrated to be negatively associated with a plenty of maladaptive indicators (see a review, Harwood et al., 2015), not all studies have found the same effects. Like ours, Reinboth and Duda (2004) found a null association of mastery climate with emotional and physical exhaustion in a cross-sectional

study with youth male soccer and cricket players. Lemyre et al. (2008) used a time-lagged design with Olympic team members or junior elite athletes and did not find a negative association of mastery climate with emotional and physical exhaustion either. These findings suggest that mastery climate does not always protect athletes from being emotional and physical exhausted. In fact, in our examination of the three interaction effect among mastery climate, performance climate and gratitude, we found that a strong mastery climate can have negative implications for athletes low in gratitude if their teams have a strong performance climate, which supports the motivational ambivalence perspective (Grant et al., 2011). We did not find that mastery climate can ameliorate emotional and physical exhaustion for athletes high in gratitude, especially when they also experience strong performance climate in teams, which fails to support the multiple goal perspective (Harackiewicz et al., 2002). To our knowledge, our finding is the first one indicating the negative implications of mastery climate on athletes, albeit under a specific condition (low gratitude and high performance climate), rendering the need to do more research to understand when mastery climate could attenuate or accentuate athletes' emotional and physical exhaustion.

Secondly, our findings suggest that athletes' gratitude is the factor that can determine athletes' experiences of emotional and physical exhaustion in responding to performance climate. As reported earlier, we found that those low in gratitude, regardless the levels of mastery climate, tend to experience higher emotional and physical exhaustion when performance climate is stronger. But for those high in gratitude, higher performance climate does not contribute to higher emotional and physical exhaustion, regardless the levels of mastery climate. The finding suggests that cultivating athletes' gratitude (Gabana et al., 2019; Salim & Wadey, in press) can be a way to help athletes be resistant to the detrimental effect of performance climate. Such a

finding also highlights our contribution to the motivational climates studies by taking individual differences into account. As people can vary in their responses to the same situations, it may not easy to understand effects of motivational climates on athletes without considering athletes' characteristics. In addition to gratitude, future studies are encouraged to identify other factors that can shape the interaction effect between the two motional climates on athletes' emotional and physical exhaustion, or well-being broadly. For example, trait mindfulness, definition of trait mindfulness (Brown & Ryan, 2003), can a potential boundary condition that can determine how the two motivational climates can jointly affect athletes. As mindfulness prevents athletes from connecting their self-worth with failure (Ryan & Brown, 2003), those high in trait mindfulness could be more resistant to the detrimental effect of performance climate than those low in trait mindfulness. At the same time, because mindfulness helps individuals focus on their own skills and learning process (Galla et al., 2020), those high in trait mindfulness could be more appreciated and responsive to mastery climate than those low in trait mindfulness in coping with stress and failure in training and competitions. Trait mindfulness could therefore play a role in shaping the joint effect of the two climates on athletes' emotional and physical exhaustion or wellbeing, which can be examined in future studies.

In addition to the implications to motivational climates studies as we discussed above, our study advances research on gratitude in sports. Rather than focusing on the main effect of athletes' gratitude on different outcomes (e.g., Chen & Chang, 2017; Chen et al., 2017; Gabana et al., 2017), our study focuses on its moderating role in determining the interaction effect between the two motivational climates on emotional and physical exhaustion. Our findings suggest that gratitude may influence how athletes interpret and react to motivational cues in the environment. In addition, we found that general gratitude did not predict athlete emotional and

physical exhaustion ($\beta$ = -.11), and its effect even decreased after we controlled for sport-specific gratitude in regression models ($\beta$ ranged from -.02 to -.05). This suggests that the significant correlation between general gratitude and athlete emotional and physical exhaustion ($r$ = -.12, $p$ < .05) may be due to the shared variance between general gratitude and sport-specific gratitude. Consistent with our observation, Chen and Chang (2017) reported that sport-specific gratitude is better at predicting sport-specific concepts such as athlete burnout (a global burnout index is computed as the mean of the three subscales) and that general gratitude is better at predicting generic concepts such as life satisfaction and self-esteem. As such, to capture the effects of gratitude in a specific domain such as sports, researchers are advised to focus on domain-specific gratitude instead of general gratitude. Our study once again highlights the importance of developing sport-specific measurements to precisely monitor athletes' psychological status (Dunn et al., 2006).

Our study has several limitations. First, although using self-reported data might inflate the relationship among our research variables due to common method variance (Simmering et al., 2015), we adopted a time-lagged design to reduce common method variance. We are also confident that our findings are not seriously affected by common method variance because having higher common method variance would have prevented us from observing interaction effects between variables (Li et al., 2013). Second, we focused on the coach-created climate in the current study. Research might be able to further explore the effect of different sources of climate on athlete burnout (Ntoumanis et al., 2012) and how athletes' gratitude plays a moderating role. Third, we did not find demographic variables significantly related to emotional and physical exhaustion, which might result from the homogeneity of our sample, as our participants have similar age, sport tenure, daily training hours, weekly training days, and

443 competition level. However, these findings should thus be interpreted with caution, as previous
444 studies did find a significant relationship of those demographic variables on burnout athletes
445 (Gould et al., 1996; Gustafsson et al., 2008). Finally, we only focus on emotional and physical
446 exhaustion in this study but not the other two dimensions of burnout (i.e., reduced sense of
447 accomplishment and sport devaluation). Whether the same findings will be observed on other
448 dimensions of burnout is unknown. For example, Martinent et al. (2020) found that the three
449 dimensions of burnout are different in their developmental pattern. It is thus likely that we could
450 observe different interaction effects of the two climates and gratitude on reduced sense of
451 accomplishment and sport devaluation, which needs further examination.

452 In conclusion, our study offers an interactionist approach to help further understand how the
453 two motivational climates in teams and gratitude can jointly shape athletes' emotional and
454 physical exhaustion. The findings in our study suggest that the role of motivational climates in
455 shaping athletes' emotional and physical exhaustion is more complex than what we have known.
456 To better understand how motivational climates can shape the development of athletes'
457 emotional and physical exhaustion, we encourage future studies to take the same approach to
458 identify individual differences factors and understand how the two motivational climates would
459 interact differently across different athletes.

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*Table 1*

Descriptive statistics of variables

| | | *M* | *SD* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | Gender | -- | -- | -- | | | | | | | | | | | | |
| 2. | Age (year) | 17.04 | 0.61 | -.18** | | | | | | | | | | | | |
| 3. | Sport tenure (year) | 5.92 | 2.36 | -.01 | -.06 | | | | | | | | | | | |
| 4. | Daily training hours | 4.67 | 1.54 | -.01 | -.10 | -.05 | | | | | | | | | | |
| 5. | Weekly training days | 5.62 | 0.76 | .02 | -.09 | .10 | .16** | | | | | | | | | |
| 6. | Competition level | -- | -- | -.09 | -.03 | -.20** | -.06 | -.02 | | | | | | | | |
| 7. | Team PC | 3.54 | 0.37 | -.24** | .11 | .12 | .10 | .14* | -.01 | | | | | | | |
| 8. | Team MC | 4.12 | 0.43 | .18** | -.09 | .04 | .09 | .05 | -.01 | -.07 | | | | | | |
| 9. | Team GQ-S | 5.63 | 0.50 | .22** | -.12* | .15** | .06 | .15** | .01 | .03 | .60** | | | | | |
| 10. | GQ | 5.91 | 0.95 | .12* | -.05 | .10 | -.06 | -.01 | -.14* | .02 | .16** | .25** | | | | |
| 11. | PC | 3.52 | 0.72 | -.24** | .08 | .06 | .12 | .05 | .09 | .52* | -.03 | .01 | .07 | | | |
| 12. | MC | 4.05 | 0.79 | .10 | -.10 | .08 | .10 | -.01 | -.06 | -.04 | .54** | .30** | .35* | .15** | | |
| 13. | GQ-S | 5.58 | 1.04 | .18** | -.08 | .08 | .02 | .09 | -.15** | .01 | .28** | .46** | .54** | .03 | .54** | |
| 14. | EPE | 2.99 | 0.97 | .05 | -.02 | .10 | .12* | .04 | .07 | -.07 | -.01 | -.05 | -.12* | .07 | -.10 | -.20** |

*$p < .05$. **$p < .01$.

*Note*. $N = 293$. GQ = domain-general gratitude questionnaire, GQ-S = sports-specific gratitude, MC = mastery climate, PC = performance climate, EPE = emotional/physical exhaustion.

*Table 2*

Results of fixed effect in a two-level random intercept model for athlete's emotional/physical exhaustion

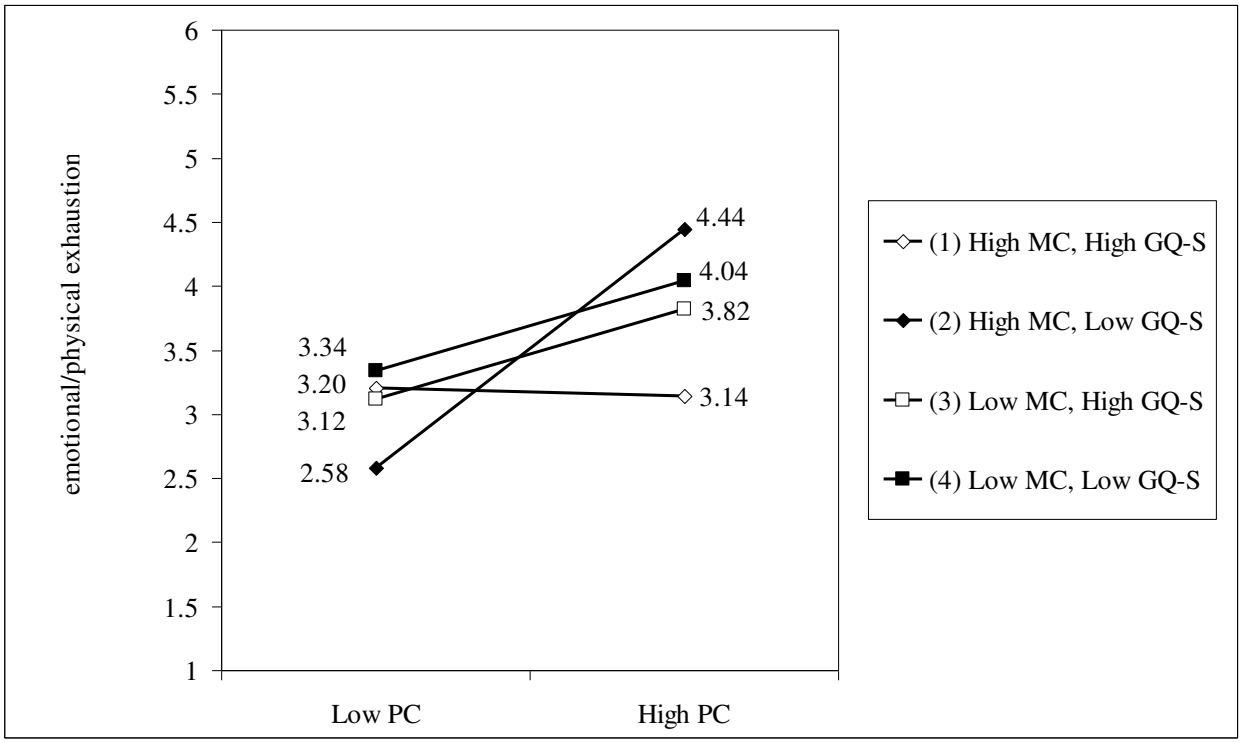
| | Emotional and physical exhaustion | | | |
|---|---|---|---|---|
| | M1 | M2 | M3 | M4 |
| Constant | 3.52 | 3.26 | 3.26 | 3.46 |
| Gender | .13 | .20 | .18 | .16 |
| Age | .02 | -.01 | -.01 | -.01 |
| Sport tenure | .06* | .06* | .05* | .04 |
| Daily training hours | .08* | .08 | .07 | .07 |
| Weekly training days | .03 | .05 | .06 | .06 |
| Competition level | .12 | .07 | .08 | .08 |
| GQ | -.11 | -.02 | -.04 | -.05 |
| Team PC | -.23 | -.46* | -.44* | -.44* |
| Team MC | .03 | .12 | .12 | .07 |
| Team GQ-S | -.18 | -.07 | -.05 | -.02 |
| PC | | .24** | .28** | .40** |
| MC | | -.10 | -.15 | -.12 |
| GQ-S | | -.16* | -.15* | -.14 |
| PC*MC | | | .06 | .05 |
| PC*GQ-S | | | -.20* | -.24* |
| MC*GQ-S | | | -.04 | -.03 |
| PC* MC*GQ-S | | | | -.24** |
| *-2 restricted Loglikelihood* | 792.70 | 776.91 | 771.20 | 763.70 |
| *Residual* | .82*** | .77*** | .75*** | .72*** |
| *Intercept F* | 2.93 | 2.41 | 2.46 | 2.75 |
| *Pseudo R-squared* | | .06 | .03 | .04 |

*$p < .05$; **$p < .01$; ***$p < .001$

*Note:* Unstandardized coefficients are reported.

## Figure Captions

*Figure 1. Plot of the three-way interaction for emotional/physical exhaustion on performance climate at high and low value of mastery climate and sports-specific gratitude*



## Appendix A

*Table A1*

Hierarchical Regression in predicting emotional exhaustion

| | Emotional and physical exhaustion | | | |
|---|---|---|---|---|
| | M1 | M2 | M3 | M4 |
| Constant | 3.17 | 2.65 | 2.66 | 2.81 |
| Gender | .15 | .21 | .19 | .18 |
| Age | .02 | .01 | .01 | -.01 |
| Sport tenure | .06* | .06* | .06* | .05* |
| Daily training hours | .09* | .09* | .08* | .08* |
| Weekly training days | .03 | .04 | .05 | .05 |
| Competition level | .12 | .08 | .08 | .08 |
| GQ | -.11 | -.02 | -.03 | -.04 |
| Team PC | -.22 | -.45* | -.43* | -.44* |
| Team MC | .07 | .18 | .18 | .14 |
| Team GQS | -.17 | -.07 | -.04 | -.01 |
| PC | | .24* | .28** | .38** |
| MC | | -.12 | -.17 | -.15 |
| GQ-S | | -.16* | -.16* | -.15 |
| PC*MC | | | .03 | .02 |
| PC*GQ-S | | | -.14 | -.16* |
| MC*GQ-S | | | -.06 | -.06 |
| PC* MC*GQ-S | | | | -.12* |
| *F* test | 1.94* | 2.73** | 2.60** | 2.81** |
| $R^2$ | .06 | .11 | .13 | .15 |
| $\Delta F$ | 1.94* | 5.08** | 1.94 | 5.38* |
| $\Delta R^2$ | -- | .05 | .02 | .02 |

*$p < .05$; **$p < .01$

*Note.* GQ = domain-general gratitude questionnaire, GQ-S = sports-specific gratitude, MC = mastery climate, PC = performance climate.

*Note.* Unstandardized coefficients are reported.