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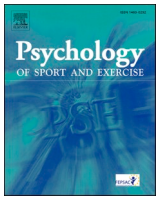

A conditional process model of perfectionism, goal-realization, and post-competition mood

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ABSTRACT

Research has recently begun to examine the relationship between multidimensional perfectionism and athletes' post-competition mood. However, to date, there have been few attempts to examine the interaction between dimensions of perfectionism or model possible explanatory processes. To address these limitations, in the current study we tested a novel conditional process model whereby the relationship between perfectionistic strivings and post-competition affect was mediated by the degree to which goals were considered to have been met (goal-realization) and that this indirect effect was, in turn, moderated by levels of perfectionistic concerns. We tested this model in a sample of 251 athletes who took part in a "Runmageddon" event - a cross-country obstacle race. Athletes completed measures of perfectionism (perfectionistic strivings and perfectionistic concerns) before the race and measures of goal-realization and mood (tense arousal, energetic arousal, and hedonic tone) between 24 and 48 h after the race. Analyses revealed that perfectionistic strivings were indirectly linked to a more unpleasant post-competition mood (higher tense arousal and lower hedonic tone) via perceptions of lower goal-realization. In addition, these two indirect effects were statistically significant only when perfectionistic concerns were medium and high. The results support the proposed conditional model and suggest the interplay between dimensions of perfectionism is important for athletes' post-competition mood, and the level of perfectionistic concerns, especially.

1. Introduction

Athletes can experience a range of emotions and moods following competition. Common post-competition feelings include, on one hand, joy and satisfaction and, on the other hand, tension and disappointment. These experiences are central to ongoing motivation, subjective well-being, and whether, overall, sport is experienced in a positive or negative manner (Lundqvist, 2011). More pleasant post-competition moods can energize future participation and can be an important buffer against the difficulties athletes can face, particularly when things go awry or not as planned (Baldwin et al., 2013; Kwan & Bryan, 2010; Schneider et al., 2009). However, more unpleasant post-competition moods can do the opposite, and colour the experiences of athletes in a way that makes future participation less likely, undertaken more begrudgingly, and make disengagement or alternative activities more attractive (see Beni et al., 2017; Crane & Temple, 2015; Zhang et al., 2022). In this way, long-term and rewarding participation in competitive sport, for most people, will likely involve more pleasant, and less unpleasant, experiences and post-competition moods.

Differences in post-competition moods are related to the degree to which athletes were successful or unsuccessful in achieving their goals - whether they won or lost, placed where they aimed to or achieved personal bests (Pellizzari et al., 2011). However, this evaluation is itself subject to a wide range of influences - responses to successes and failures are personal and subjective, and similar outcomes (e.g., falling short of personal goals) may lead to different post-competition moods depending on other individual factors. In this regard, some athletes may be more predisposed to unpleasant or pleasant moods than others, and more vulnerable to motivation, well-being, and later performance issues as a result. One factor that affects both performance expectations and performance evaluations is perfectionism. In the current study we sought to extend previous research examining perfectionism and post-competition

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mood by examining, for the first time, how different dimensions of perfectionism might interact to predict mood after a running competition via perceptions of goal-realization.

1.1. Multidimensional perfectionism

Perfectionism is a multidimensional personality trait characterized by excessively high standards combined with overly harsh evaluation (Frost et al., 1990). In measuring these features, two higher-order dimensions of perfectionism can be differentiated: perfectionistic strivings and perfectionistic concerns (Stoeber & Otto, 2006). Perfectionistic strivings primarily include the pursuit of exacting and high self-imposed standards with, to a lesser degree, self-critical tendencies. Perfectionistic concerns, by contrast, primarily include perceptions of imposed high standards from others, negative evaluation from others, and ongoing discrepancy between expectations and performance (Stoeber & Madigan, 2016). This higher-order approach is a popular way of studying perfectionism and has been used in sport and exercise psychology and other domains to integrate different models and measures, and understand the wide-ranging effects of perfectionism.

Research to date has typically found perfectionistic concerns to be problematic for athletes in regards to their motivation and well-being (see Hill et al., 2018). The effects of perfectionistic strivings, though, are more complex. On one hand, perfectionistic strivings have, for example, been found to be positively related to sport performance such as finishing times in triathlon (Stoeber et al., 2009) and running competitions (Waleriańczyk & Stolarski, 2021). However, on the other hand, there is also other evidence that has found them to be positively related to performance difficulties and general well-being issues, especially under conditions of achievement difficulty, adversity, or when accompanied by higher perfectionistic concerns. This has been illustrated in sport using lab-based golf putting tasks (Lizmore et al., 2019) and cycling tasks (Curran & Hill, 2018). As such, while the effects of perfectionistic concerns are more straightforward, the effects of perfectionistic strivings have been described as ambiguous (Hill et al., 2018).

1.2. Perfectionism and post-competition mood

The fact that sport performances are affected by how athletes feel before competing is not only intuitive but also well-established (Nicholls, et al., 2014). Most researchers and practitioners would agree that controlling and optimizing these experiences are key to performance. However, far less attention is devoted to investigating how athletes feel after competition. This is despite evidence that these experiences are central to motivational processes, reflect ongoing sense and meaning-making on the part of athletes, and are a key part of the overall sport experience (Lundqvist, 2011). More broadly, post-competition moods and moods generally can be viewed as a component of an important positive psychology concept – subjective well-being (Diener et al., 2018). As such, studying post-competition mood can provide important insight into athletes' well-being, and sit alongside other experiences such as athlete burnout and athletic engagement as indicative features of sport experiences.

Moods are affective states that are constantly present and fluctuate in type and intensity over time (Matthews et al., 2009). They are the result of various integrative processes - physiological responses, cognitive appraisals, and self-regulation strategies (Matthews et al., 2002). Similar to emotions, moods contain elementary states, such as activation and pleasure (Russell & Barrett, 1999). However, compared to emotions, moods are longer lasting, less intense, and are not necessarily triggered by specific objects or events (Watson & Gray, 2007). Studying mood quite often involves differentiating between general positive or negative affective experiences (Watson et al., 1988). However, as shown by Schimmack and Grob (2000), a more precise assessment of different mood states can be reached by employing more multifaceted models such as the three-dimensional model of mood (Matthews et al., 1990).

The three-dimensional model of mood includes three dimensions (Matthews et al., 1990): Arousal accompanied by feeling of tension (tense arousal) or energy (energetic arousal), and a contentment-dissatisfaction dimension (hedonic tone). Tense arousal is an aspect of unpleasant mood corresponding with nervousness and anxiety. In contrast, the two latter dimensions reflect aspects of pleasant mood. Energetic arousal corresponds with motivation and the urge to excel and hedonic tone, reflects satisfaction with accomplishments. The inclusion of three as opposed to two facets, and the introduction of hedonic tone, in particular, is thought to be advantageous because it has shown to explain additional variance in overall mood (Schimmack & Grob, 2000). In addition, for studying post-competition mood in sport, being able to distinguish between moods that include arousal that may or may not be accompanied by feelings of contentment provides greater scope to understanding experiences that follow failure and success (e.g., being satisfied but tired versus being satisfied and energized).

A small number of studies have examined how perfectionism relates to mood after performance and competition. In these studies, there is evidence that perfectionistic concerns are related to higher negative affect following competition, generally (Crocker et al., 2014), after imagined failure (Sagar & Stoeber, 2009), and after negative post-performance feedback (Anshel & Mansouri, 2005). Notably for the current study, these findings include a recent link between perfectionistic concerns and an unpleasant mood profile (higher tense arousal, lower energetic arousal, and lower hedonic tone) after a running competition (Waleriańczyk et al., 2022b). By contrast, perfectionistic strivings have been found to be related to higher positive affect after competition, generally (Crocker et al., 2014), and after imagined success (Sagar & Stoeber, 2009). This again includes higher post-competition energetic arousal in the study examining mood after a running competition (Waleriańczyk et al., 2022b). Perfectionistic strivings have, at least on one occasion, though, been found to be related to higher negative affect following negative post-performance feedback (Anshel & Mansouri, 2005).

1.3. Perceived goal-realization as mediating factor

In reviewing previous research in this area, few studies have examined possible mediating processes that explain the relationship between perfectionism and post-competition mood. In this regard, we believe the way in which dimensions of perfectionism influence evaluative processes – and perceived goal-realization - is important. The tendency to have high, exceptionally high, and excessively high standards means athletes higher in perfectionistic strivings should be more prone to falling short of their expectations, for example (Waleriańczyk & Stolarski, 2021). In addition, the way in which perfectionistic concerns create more stringent self-evaluation, and an acute focus on mistakes and inadequacy, means even objectively successful experiences are quite likely to be later reappraised more negatively (Shafran et al., 2002). As such, both dimensions of perfectionism appear to have the potential to erode perceived goal-realization and, in turn, negatively influence post-competition mood.

There is at least some evidence in sport that perfectionism may negatively impact mood indirectly via perceived goal-realization in the way we describe. Notably, the relationship between mood and goal attainment is well-established with more pleasant mood associated with greater goal attainment (e.g., Plemmons & Weiss, 2013), including post-competition mood (e.g., Waleriańczyk et al., 2022b). In addition, perfectionistic concerns are typically related to indicators of lower goal-realization. This is evident in work examining their relationship with performance satisfaction (e.g., Gotwals et al., 2003) and satisfaction with progress (e.g., Appleton et al., 2009). Findings for perfectionistic strivings, though, mirror broader research and are more mixed. There is evidence that they can be both positively related to indicators of goal-realization (e.g., perceived goal progress; Crocker et al., 2014) and

unrelated (e.g., perceived goal attainment; Gaudreau & Antl, 2008). Based on these and other equivocal findings, we suspect that the direct effect of perfectionistic strivings on post-competition mood, as well as its indirect effect via goal-realization, may be moderated, or be conditional, on other factors such as levels of perfectionistic concerns.

1.4. Perfectionistic concerns as a moderating factor

In regards to the possible moderating effects of perfectionistic concerns in this process, we note two important conceptual touchstones in this area. First, important insights for testing the effects of the interactions between dimensions of perfectionism have been offered by the 2 × 2 model of perfectionism (Gaudreau & Thompson, 2010). This model focuses on the interplay between perfectionistic strivings and perfectionistic concerns in determining the comparative effects of within-person combinations of perfectionism. Four combinations are differentiated between based on the presence of high and low levels of the two dimensions. Differences in the effects of the four combinations reflect etiological and motivational processes; namely, the degree to which perfectionistic pressures are internalized. The greater the internalization (i.e., level of strivings relative to the level of concerns), the greater propensities for more functional or healthier outcomes (Deci & Ryan, 2008). The tenets of this model have largely been supported in sport research with different combinations of perfectionism typically associated with varying outcomes in the expected manner (see Hill & Madigan, 2017, for a review).

Second, more recently, researchers have begun to focus on the concept of perfectionistic tipping points to examine the effects of perfectionistic strivings across all values of perfectionistic concerns. Perfectionistic tipping points occur when the effects of perfectionistic strivings become more problematic or less problematic at a particular level of perfectionistic concerns (Hill, 2021). They are described as points of conceptual, statistical, and practical interest because of their potential to help identify for whom perfectionism is likely to be a problem. Research on perfectionistic tipping points have already provided novel insights into several important outcomes in sport including athlete burnout and engagement (see Hill, 2021; Waleriańczyk et al., 2022a). This also includes research that showed that among sports coaches the relationship between perfectionistic strivings and the use of undesirable emotional regulation strategies, in this case, the use of expressive suppression, was statistically significant only at higher levels of perfectionistic concerns (Hill, 2021).

Perfectionistic tipping points have also been identified in the only previous study on the interplay between perfectionism, goal-realization, and post-competition mood. Waleriańczyk et al. (2022b) measured objective goal-realization (the ratio between the anticipated result and the final result) and mood 3–5 days after running competition. They showed that perfectionistic concerns were related to a more unpleasant mood profile after competition (higher tension, lower energy, and lower pleasure), and perfectionistic strivings were associated with higher energy. However, a more in-depth analysis, with both perfectionistic concerns and objective goal-realization tested as moderators of the perfectionistic strivings–mood relationship, showed that the positive combined effect of perfectionistic strivings and goal-realization on post-competition mood (in this case, lower tense arousal) was evident only when perfectionistic concerns were low (below the mean). As such, this study provided the strongest indication yet that the level of perfectionistic concerns may be a key moderating factor in determining post-competition mood.

1.5. Perfectionism, perceived goal-realization and post-competition mood

In the context of the current study, we hypothesize two key interaction effects as part of a conditional process model of perfectionism, goal-realization, and mood. The first is that the *direct effect* of perfectionistic strivings on post-competition mood is moderated by perfectionistic concerns. The second is that the *indirect effect* of perfectionistic strivings on mood via perceived goal-realization is also moderated by perfectionistic concerns. The proposed conditional process model is presented in Figure 1 panel A. In regards to the conditional direct effect (path c), our hypothesis is based on the notion that different within-person combinations of dimensions of perfectionism will have distinct effects that reflect their particular configurations (high versus low strivings and concerns) and motivational underpinnings (internal versus external pressures). In addition, the greater the presence of perfectionistic concerns, in particular, the more thoughts, feelings, and behaviours are regulated by subversive external pressures to be perfect (Gaudreau & Thompson, 2010). In this case, as perfectionistic concerns increase, the more likely perfectionistic strivings will result in more unpleasant (and less pleasant) post-competition mood as was found by Waleriańczyk et al. (2022b).

In regards to the conditional indirect effect (path a*b), our hypothesis is based on a similar notion of the subversive influence of perfectionistic concerns. In this case, perfectionistic concerns may influence the relationship between perfectionistic strivings and goal-realization by increasing the prominence of external and uncontrollable expectations in performance appraisal. Ultimately, as perfectionistic concerns increase, we believe it is less likely that perfectionistic strivings will result in perceptions that goals have been met. We also hypothesize the indirect effect to be conditional on perfectionistic concerns because they will influence the relationship between goal-realization and post-competition mood, too. In this relationship we expect the increasing presence of perfectionistic concerns to result in downward reappraisal of performances (Flett & Hewitt, 2016). Overall, we anticipate higher levels of perfectionistic concerns to erode the experiences of athletes in a way that makes deriving a sense of accomplishment and more pleasant post-competition mood less likely.

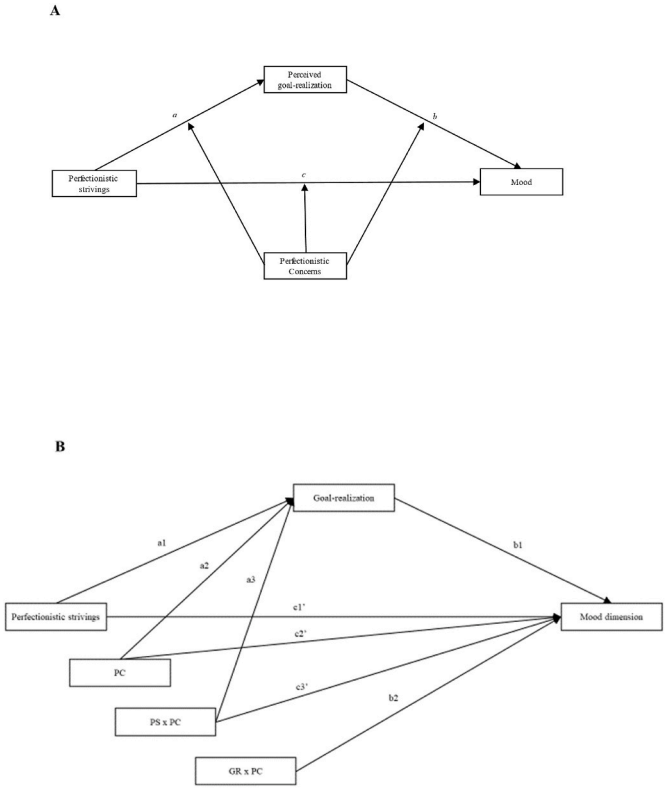

Fig. 1. Conceptual model (panel A) and the statistical model (panel B) of the conditional relationship of perfectionism, goal-realization, and post-competition mood.Note. PC – perfectionistic concerns, PS – perfectionistic strivings, GR – goal-realization.

1.6. The present study

The aim of the present study was to test the conditional process model presented in Figure 1 panel A. Based on this model we have two main hypotheses: 1) perfectionistic strivings are related to post-competition mood both directly and indirectly via perceived goal-realization, and 2) both the direct and indirect effects of perfectionistic strivings on post-competition mood are conditional on the level of perfectionistic concerns.

2. Method

2.1. Participants and procedure

After gaining ethical approval for the present study, we recruited participants of "Runmageddon" – an event described by the organizers as "a ferocious race at an extreme obstacle course" (Runmageddon, 2023) – via an advert on the official event website and through event organizer's official social media profile. The data collection consisted of two phases: one before the race and one after the race. Qualtrics platform was used to collect data in both phases and included a participant information sheet, consent form, and measures of interest. In the week before the event, participants completed measures of perfectionism. Those who took part in first phase of data collection and in Runmageddon were then invited to complete measures of goal-realization and mood within 24–48 h following the race. A total of 314 athletes took part in the first phase of data collection and completed measures of perfectionism. Of these participants, 267 athletes then took part in the second phase of data collection and completed measures of post-competition mood after taking part in the race. After preliminary analyses (described in the Results section), the final sample was 251 athletes (82 females, 169 males) aged 18 to 50 (M = 30.05, SD = 7.12) from various levels (63 recreational, 153 amateur, 33 semi-professional, and 2 professional). Three participants were randomly selected from those who completed both phases of data collection and were awarded a voucher for the Runmageddon event of their choosing (value equivalent of 259 Polish Zloty or 60 US Dollars). No a priori power analysis was conducted for the study. The sample size was determined by response to the advert and subsequent participation in the event and completion of study questionnaires. By way of benchmarking the current sample size in regards to the mediation and moderation parts of the study, for mediation, others have noted that indirect effects of perfectionism in sport range from $\alpha^* \beta = 0.06$ to 0.17 (Hill et al., 2008; Stoeber et al., 2009; Jowett et al., 2016). Based on Fritz and MacKinnon (2007), a sample size of 148 would be sufficient to detect small-to-medium effects for the bias-corrected bootstrap test of mediation ($\alpha^* \beta = 0.07$, α and β paths = .26, $\alpha = 0.05$, power = .80). For moderation, others have noted that interaction effects of perfectionism in sport range from $\Delta R^2 < 0.01$ to 0.05 (e.g., Crocker et al., 2014; Gaudreau & Verner-Filion, 2012; Hill et al., 2020), including the study examining interactions between perfectionism and anticipated performance (Waleriańczyk & Stolarski, 2021). Thus, a sample between 152 and 256 participants would detect typical interaction effects in this area (ΔR^2 0.03 to 0.05; $\alpha = 0.05$, power = .80; Hill et al., 2021). Estimates of sample size requirements for moderated mediation are more difficult to derive, particularly for fully moderated mediation models like in the current study as they depend on a large number of paths (see Figure 1). However, in one simulation study, Preacher et al. (2007) showed that for small and medium effects (all paths = .14 to .39) power of >. 80 is typically achieved for samples between 200 and 500. In these regards, we consider the current sample size reasonable for providing the first test of the proposed model.

2.2. Main measures

2.2.1. Perfectionism

Perfectionism was measured using multiple scales pre-competition. We used Polish translations of the Performance Perfectionism Scale–-Sport (PPS–S; Hill et al., 2016) and the Sport-Multidimensional Perfectionism Scale-2 (S-MPS-2; Gotwals & Dunn, 2009). These versions have been used in previous research with evidence provided to support their validity and reliability (e.g., Waleriańczyk et al., 2022a). We assessed the factor structures of these two instruments in the current study using exploratory-structural equation modelling (ESEM), maximum likelihood estimation and conventional criteria for assessing fit (Marsh et al., 2004). The results provided support for the hypothesized three-factor structure of PPS-S (Self-oriented performance perfectionism, other-oriented performance perfectionism, and socially prescribed performance perfectionism) and the three-factor structure of S-MPS-2 (concern over mistakes, doubts about actions and high personal standards) with all items loading significantly on the target subscales ($p <$ .05). PPS-S: χ^2 (33) = 132.24, $p < .001$, RMSEA [90% CI] = 0.11 [0.09, 0.13], CFI = 0.90, TLI = 0.81, SRMR = 0.04 and S-MPS-2: χ^2 (150) = 255.93, $p < .001$, RMSEA [90% CI] = 0.05 [0.04, 0.06], CFI = 0.94, TLI = 0.92, SRMR = 0.04. Overall, we considered these values to provide evidence of satisfactory fit. Nevertheless, it should be noted that RMSEA and TLI for the PPS-S are slightly outside the conventional criteria of assessing fit (Marsh et al., 2004). The Polish versions of the PPS-S and SMPS-2 used in the current study are provided in supplementary materials. To create indicators of perfectionistic strivings and perfectionistic concerns, we combined subscales from the two instruments. We created an indicator of perfectionistic strivings by summing the standardized values of the self-oriented performance perfectionism subscale (4 items; e.g., "I put pressure on myself to perform perfectly") from the PPS-S and the high personal standards subscale (7 items; e.g., "I have extremely high goals for myself in my sport") from S-MPS-2. Similarly, we created an indicator of perfectionistic concerns by summing the standardized values of the socially prescribed performance perfectionism subscale (4 items; e.g., "People always expect my performances to be perfect") from PPS-S, and the concern over mistakes (8 items; e.g. "If I fail in competition, I feel like a failure as a person") and doubts about actions subscales (6 items; e.g. "I usually feel unsure about the adequacy of my pre-competition practices") from S-MPS-2. The multi-measure approach is recommended to capture perfectionistic standards and concerns (Stoeber & Madigan, 2016) and has been adopted by others in sport (e.g., Jowett et al., 2016; Lizmore et al., 2019; Waleriańczyk & Stolarski, 2022). We have tested the hierarchical structure of perfectionism first using ESEM and then confirmatory factor analysis (CFA) (and maximum likelihood estimation with oblique target rotation) with subscales as indicators of two latent factors representing perfectionistic strivings and perfectionistic concerns. ESEM provided evidence of "overfit" (i.e., fit indices exceeding 1.00, that stemmed from having only 1 df) and the CFA provided evidence of adequate fit: χ^2 (4) = 13.38, $p < .01$, RMSEA [90% CI] = 0.07 [0.04, 0.16], CFI = 0.97, TLI = 0.93, SRMR = 0.03.

2.2.2. Post-competition mood

UWIST Mood Adjective Check List (UMACL, Matthews et al., 1990), in the Polish adaptation by Goryńska (2005) was used to assess mood post-competition. It comprises 24 items and three subscales: Tense Arousal (7 items, e.g., "Anxious"), Energetic Arousal (9 items, e.g., "Active"), and Hedonic Tone (8 items, e.g., "Happy"). Participants rate the degree to which the items describe their current mood on a 4-point Likert-type scale (1 = strongly agree to 4 = strongly disagree). Previous studies have provided evidence to support the reliability and validity of the Polish adaptation including adequate internal consistency and factor structure (e.g., Goryńska, 2005). Assessment of factor structure in the current study (ESEM, maximum likelihood estimation, oblique target rotation) provided evidence of adequate fit: χ^2 (207) = 426.43, $p < .001$, RMSEA [90% CI] = 0.07 [0.06, 0.07], CFI = 0.92, TLI = 0.90, SRMR = 0.04.

2.2.3. Goal-realization

Goal-realization was measured post-competition with a question which read as follows: "Assess how well you have realized your goal for the competition". Participants answered on a 12-point Likert-type scale (0% is the lowest score and "over 100%" is the highest score with increments of 10% in between). Single-item measures such as this one have been shown to be useful, reliable, and valid in other areas (e.g., Ang & Eisend, 2018; Gogol et al., 2014; Tenenbaum et al., 2001). It was considered appropriate here as our construct of interest (goal realization) is clearly defined, narrow in scope, and unidimensional (see Allen et al., 2022). As part of measuring goal-realization, we also measured the extent to which external factors were perceived to have impeded goal-realization ("To what extent have factors outside your control (e.g., injury, weather, obstacles during the race) impeded your goal--realization") with responses on a 10-point Likert-type scale (1 = not at all to 10 = completely). We considered this necessary so to take into account the nature of the event and to ascertain a measure of goal-realization that controlled for factors other than personal effort and ability.

2.2.4. Analytical strategy

We conducted preliminary analyses, which included attention checks, screening for multivariate and univariate outliers, and assessing reliability of measures (McDonald's Omega). Next, we calculated descriptive statistics and bivariate correlations between dimensions of perfectionism, goal-realization, and three dimensions of mood. We then conducted our primary analyses which were a series of moderated mediation analyses to test our conditional process model (a total effect moderation model; Edwards & Lambert, 2007). Whereas the conceptual model is presented in Figure 1 panel A, we provide the equivalent statistical model in Figure 1 panel B. This estimates direct and indirect effects of perfectionistic strivings on dimensions of mood and interactive effects with perfectionistic concerns moderating these effects. We conducted three separate analyses – one for each dimension of mood. In all models, perfectionistic strivings were a focal predictor, goal-realization was treated as a mediator, and one of the dimensions of mood was the outcome variable. Perfectionistic concerns were stipulated as a moderator of all three paths: (1) between perfectionistic strivings and goal-realization, (2) perfectionistic strivings and mood, (3) as well as goal-realization and mood. We included age, gender and competitive/level as covariates in the moderated mediation model, as well as a measure of the perceived influence of external obstacles on goal-realization (e.g., injuries, weather, obstacles during the race). Bootstrap procedure with 5000 iterations was used to calculate standard errors and 95% confidence intervals (Hayes, 2017). Statistically significant interactions were probed by estimating effects at high (+1SD) and low (-1SD) levels of the perfectionistic concerns and using the Johnson-Neyman technique (Spiller et al., 2013) to graph conditional effects. ESEM and CFA were conducted using Mplus 8.1. All other statistical analyses were conducted using IBM SPSS 26.0.0.1 for Windows and PROCESS macro version 3.5 (Hayes, 2017). Figures were created using Python 3.9.1 software based on the output from PROCESS.

3. Results

3.1. Preliminary analyses

Before the main analyses, we excluded all entries from participants who did not finish the survey or failed the attention check (e.g., "In this question select 'I strongly disagree'.") which resulted in removing six participants. Next, we screened the data for missing values and none were found. In screening for univariate outliers, we removed five participants (absolute value of z-score higher than 3.29) and, in screening for multivariate outliers, we removed five participants (Mahalanobis distance higher than the critical value of χ^2 [9] = 27.88, $p < .001$; Tabachnick & Fidell, 2007). Finally, we used McDonald's Omega to assess internal reliabilities of scales and all were satisfactory (see Table 1).

3.2. Descriptive statistics and correlations

Descriptive statistics and bivariate correlations are presented in Table 1. Perfectionistic concerns were significantly related to all three dimensions of mood – negatively to energetic arousal and hedonic tone, and positively to tense arousal. Perfectionistic strivings were negatively related to hedonic tone and positively to tense arousal, while its correlation with energetic arousal was nonsignificant. Perfectionistic strivings and concerns were also both negatively related to goal-realization. Finally, goal-realization was negatively related to tense arousal and positively related to hedonic tone and energetic arousal. Based on common guidelines (e.g., Cohen, 1992), the relationships were typically small-to-moderate ($r = 0.10$ to 0.30) and moderate-to-large ($r = 0.30$ to 0.50).

3.3. Test of the conditional process model

The results of the three moderated mediation models are presented in Table 2.

3.3.1. Energetic arousal

Perfectionistic strivings did not directly predict energetic arousal (c1). In addition, while perfectionistic strivings were a negative predictor of goal-realization (a1), which in turn was a positive predictor of energetic arousal (b1), the indirect effect of perfectionistic strivings on energetic arousal via goal-realization was not significant (indirect effect = −0.01, 95% CI = −0.019; 0.001).

In assessing the hypothesized moderation of the direct and indirect effects, the interaction between goal-realization and perfectionistic concerns in predicting energetic arousal was not statistically significant (b2), nor was the interaction between perfectionistic strivings and perfectionistic concerns in predicting energetic arousal (c3), and in predicting goal-realization (a3).

3.3.2. Tense arousal

Perfectionistic strivings did not directly predict tense arousal (c1). However, in this case, the indirect effect of perfectionistic strivings on tense arousal via goal-realization was significant (indirect effect = 0.01, 95% CI = 0.000; 0.016).

In assessing the hypothesized moderation of the direct and indirect effects, the interaction between perfectionistic concerns and goal-realization was a significant predictor of tense arousal (b2). However, the interaction between perfectionistic strivings and perfectionistic concerns was not significant in predicting goal-realization (a3) or tense arousal (c3).

In probing the significant interaction, goal-realization was not a significant predictor of tense arousal at low perfectionistic concerns (B = −0.01, 95% CI = −0.006; 0.039) but was a significant negative predictor at medium (B = 0.04, 95% CI = −0.070; −0.007), and high perfectionistic concerns (B = −0.07, 95% CI = −0.104; −0.032). The conditional effect of goal-realization on tense arousal is displayed in Figure 2 (panel A). This shows that goal-realization was a significant negative predictor of tense arousal only when perfectionistic concerns exceeded the value of −0.37 (in standardized units which corresponds to the 46th percentile). In probing the influence of this significant interaction on the indirect effect, the indirect effect of perfectionistic strivings on tense arousal was not significant at low perfectionistic concerns (indirect effect = −0.01, 95% CI = −0.005; 0.008) but was significant at medium (indirect effect = 0.01, 95% CI = 0.000; 0.016), and high perfectionistic concerns (indirect effect = 0.02, 95% CI = 0.003; 0.034). The conditional indirect effect of perfectionistic strivings on tense arousal via goal-realization is displayed in Figure 3, panel A. This shows that the indirect effect of perfectionistic strivings on tense arousal via

Table 1
Descriptive statistics, bivariate correlations, and Macdonald's Omega.

Variable	M	SD	ω	1	2	3	4	5
1. Perfectionistic strivings	0.00	1.73	.84	–				
2. Perfectionistic concerns	0.00	2.08	.81	.59*	–			
3. Goal-realization	9.07	1.73	–	−.30*	−.34*	–		
4. Energetic arousal	3.14	0.46	.80	−.08	−.23*	.22*	–	
5. Tense arousal	1.66	0.43	.80	.21*	.44*	−.33*	−.47*	–
6. Hedonic tone	3.47	0.50	.91	−.24*	−.42*	.50*	.62*	−.73*

Note. *$p < .001$; two-tailed. Perfectionistic strivings and perfectionistic concerns display a mean of zero as they are composed of multiple standardized scores. Unstandardized these means and SD are personal standards M = 2.71, SD = 0.69, concern over mistakes M = 1.90, SD = 0.64, doubts about actions M = 2.79, SD = 0.75, self-oriented perfectionism M = 3.73, SD = 1.19, socially prescribed perfectionism M = 2.37, SD = 0.89.

Table 2
Path coefficients, standard errors and confidence intervals for statistical model.

	Energetic Arousal			Tense Arousal			Hedonic Tone		
Paths	B	*SE*	95% CI	B	*SE*	95% CI	B	*SE*	95% CI
a1 (PS- > GR)	**−.17***	.08	(-.321, −.024)	**−.17***	.08	(-.321, −.024)	**−.17***	.08	(-.321, −.024)
a2 (PC- > GR)	**−.15***	.06	(-.267, −.028)	**−.15***	.06	(-.267, −.028)	**−.15***	.06	(-.267, −.028)
a3 (PSxPC - > GR)	−.04	.02	(-.083, .006)	−.04	.02	(-.083, .006)	−.04	.02	(-.083, .006)
b1 (GR- > DV)	**.04***	.02	(.002, .078)	**−.04***	.02	(-.070, −.007)	**.10*****	.02	(.064, .133)
b2 (GRxPC- > DV)	.01	.01	(-.010, .021)	**−.01***	.01	(-.027, −.001)	**.02***	.01	(.002, .030)
c1' (PS- > DV)	.04	.02	(-.003, .084)	−.03	.02	(-.065, .008)	.03	.02	(-.001, .070)
c2' (PC- > DV)	**−.06****	.02	(-.090, −.020)	**.09*****	.02	(.057, .115)	**- .08*****	.02	(-.109, −.045)
c3' (PSxPC- > DV)	.01	.01	(-.005, .026)	−.01	.01	(-.017, .008)	.00	.01	(-.012, .016)
Covariates									
Gender	−.06	.06	(-.185, .066)	−.09	.05	(-.191, .018)	−.02	.06	(-.138, .090)
Age	.00	.00	(-.004, .012)	−.00	.00	(-.010, .003)	−.00	.00	(-.008, .007)
Obstacles	−.02	.01	(-.047, .002)	.01	.01	(-.007, .034)	−.02	.01	(-.042, .002)
Sport level	.00	.05	(-.089, .094)	.05	.04	(-.029, .124)	−.06	.04	(-.146, .020)

Note. *B* = unstandardized beta coefficient. *SE* = standard error of *B*. 95% CI = 95% confidence interval.
***$p < .001$, **$p < .01$ *$p < .05$, two-tailed.

goal-realization was significant when perfectionistic concerns exceeded the value of 0.01 (in standardized units which corresponds to the 55th percentile).

3.3.3. Hedonic tone

Perfectionistic strivings did not directly predictor of hedonic tone (c1). However, perfectionistic strivings were a negative predictor of goal-realization (a1), which in turn was a positive predictor of hedonic tone. In addition, the indirect effect of perfectionistic strivings on hedonic tone via goal-realization was significant (indirect effect = −0.02, 95% CI = −0.033; −0.003).

In assessing the hypothesized moderation of the direct and indirect effects, the interaction between goal-realization and perfectionistic concerns was a significant positive predictor of hedonic tone (b2). However, the interaction between perfectionistic strivings and perfectionistic concerns was not significant in predicting goal-realization (a3) or hedonic tone (c3).

In probing the significant interaction, goal-realization was a significant positive predictor of hedonic tone at low (B = 0.07, 95% CI = 0.014; 0.116), medium (B = 0.10, 95% CI = 0.064; 0.133), and high perfectionistic concerns (B = 0.13, 95% CI = 0.093; 0.171). The conditional effect of goal-realization on hedonic tone is displayed in Figure 2 (panel B). This shows that goal-realization was a significant positive predictor of hedonic tone only when perfectionistic concerns exceeded the value of −2.60 (in standardized units which corresponds to the 10th percentile).

In probing the influence of this significant interaction on the indirect effect, the indirect effect of perfectionistic strivings on hedonic tone was not significant at low levels (indirect effect = −0.01, 95% CI = −0.020; 0.005), but was significant at medium (indirect effect = −0.02, 95% CI = −0.033; −0.003) and high levels of perfectionistic concerns (indirect effect = −0.03, 95% CI = −0.059; −0.010). The conditional indirect effect of perfectionistic strivings on hedonic tone via goal-realization is displayed in Figure 3 (panel B). This shows that the indirect effect of perfectionistic strivings on hedonic tone via goal-realization was significant when perfectionistic concerns exceeded the value of −0.57 (in standardized units which corresponds to the 42nd percentile).

4. Discussion

The aim of the study was to test a conditional process model of perfectionism, goal-realization, and post-competition mood. Based on the model, we hypothesized: 1) perfectionistic strivings are related to post-competition mood both directly and indirectly via perceived goal-realization, and 2) both the direct and indirect effects of perfectionistic strivings on post-competition mood are conditional on the level of perfectionistic concerns. We found that perfectionistic strivings were not directly related to post-competition mood, but were indirectly related to tense arousal and hedonic tone (but not energetic arousal) via goal-realization. In addition, the direct effect of perfectionistic strivings on mood was not conditional on perfectionistic concerns, but the indirect effect of perfectionistic strivings on tense arousal and hedonic tone (but not energetic arousal) was conditional on perfectionistic concerns.

4.1. Conditional process model

In the current study we tested a conditional process model whereby the direct and indirect effects of perfectionistic strivings on mood were moderated by perfectionistic concerns. In doing so, we identified goal-realization as a key mediating factor and the level of perfectionistic concerns as a key moderating factor for all effects in the model. In terms of the moderation, we argued that perfectionistic concerns have a subversive effect on both perfectionistic strivings and goal-realization. We found some support for elements of the model. Goal-realization did mediate the effects of perfectionistic strivings for two of the three dimensions of mood. That is, we found that perfectionistic strivings were related to more unpleasant mood (i.e., higher tense arousal and lower hedonic tone) because, as this dimension of perfectionism increased, it

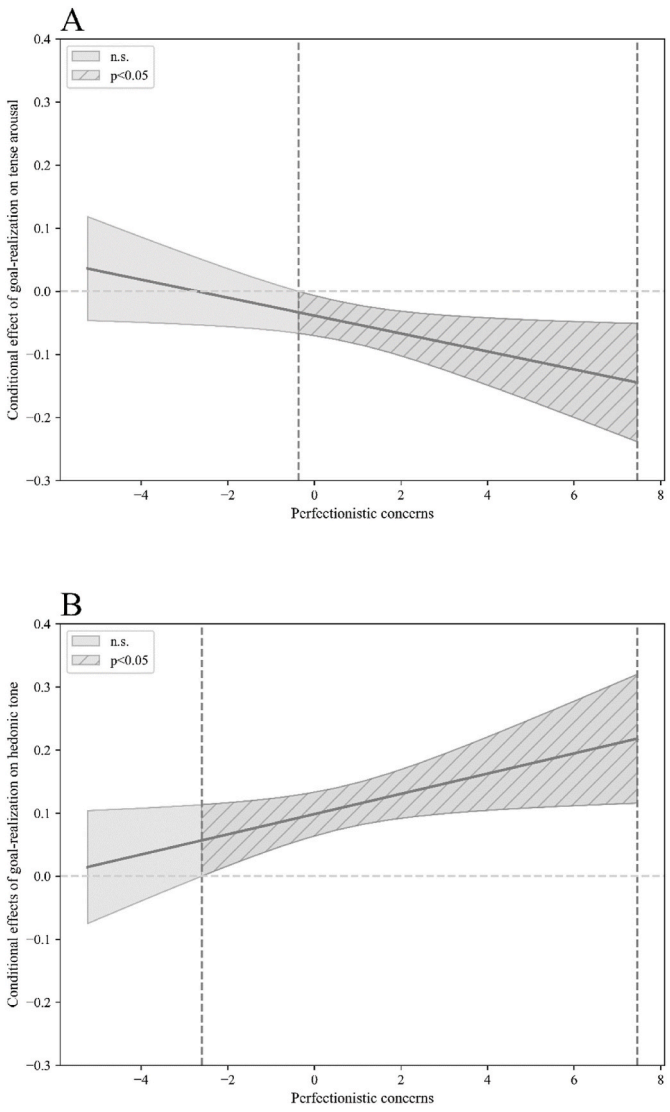

Fig. 2. The Johnson-Neyman graph of regions of statistical significance for the indirect effects of perfectionistic strivings on tense arousal (panel A) and on hedonic tone (panel B) via goal realization at different levels of perfectionistic concerns. Note. Perfectionistic concerns are a sum of standardized scores on the concern over mistakes, doubts about actions, and socially-prescribed performance perfectionism subscales.

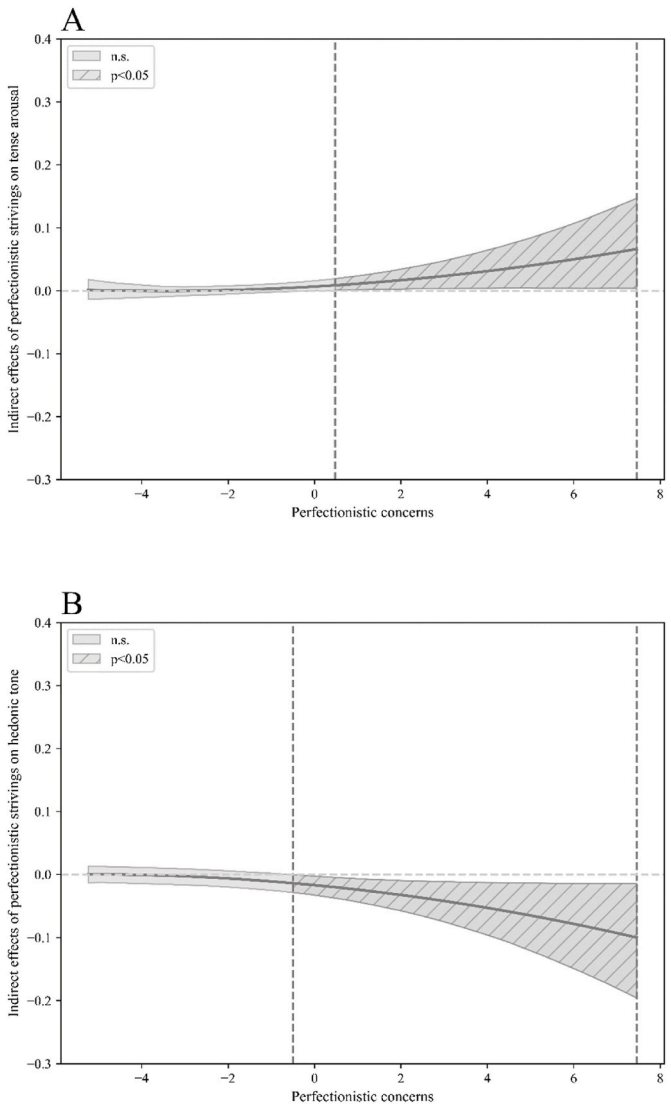

Fig. 3. Conditional indirect effects of perfectionistic strivings on tense arousal (panel A) and on hedonic tone (panel B) via goal-realization on different levels of perfectionistic concerns. Note. Perfectionistic concerns are a sum of standardized scores on the concern over mistakes, doubts about actions, and socially-prescribed performance perfectionism subscales.

was less likely that athletes perceived their goals to have been met. Although effects of perfectionistic strivings are often ambiguous, and can be positively related to indicators of coal realization, this finding aligns well with views of perfectionistic strivings that emphasize its undesirable and problematic features (see Flett & Hewitt, 2014).

In major support for the model, perfectionistic strivings were related to higher tense arousal and lower hedonic tone via goal-realization only when perfectionistic concerns were evident to at least a medium degree (approximately mean levels). This moderated-mediation provides further evidence of the importance of perfectionistic concerns in determining the effects of perfectionism. It may also explain why perfectionistic strivings are often ambiguous – the effects of perfectionistic strivings for athletes may be difficult to fully discern without taking into account levels of perfectionistic concerns. Here the level of perfectionistic concerns was instrumental in instigating the negative indirect impact of perfectionistic strivings on mood. Other research adopting interactive approaches, such as the 2 × 2 model, have found similar evidence for direct effects (see Hill & Madigan, 2017, for a review). However, this is the first-time research has shown this may also be the case for indirect effects in sport, too.

In disaggregating the two relationships that make up the indirect effect, it is evident that this overall effect was because perfectionistic concerns moderated the relationship between goal-realization and mood, rather than perfectionistic strivings and goal-realization. As would be expected, higher goal-realization was related to lower tense arousal and higher hedonic tone post-competition. The more athletes felt they had met their goals, the more pleasant and less unpleasant they felt. However, we observed that perfectionistic concerns increased this effect. That is, as perfectionistic concerns increased, the affective consequences of goal realization intensified. It has been much more common to focus on the notion that perfectionism is associated with stronger affective responses to failure with research showing this typically to be the case (e.g., Sagar & Stoeber, 2009). However, here, we have illustrated that just as the "lows are low," it appears that the "highs are high" too. Perhaps this reflects the increased irrational stock placed in success or a stronger sense of relief that follows when external pressures to be perfect become more prominent.

We note a number of interesting issues relating to the notion of perfectionistic tipping points. First, the current study adds to the

growing evidence that key outcomes associated with perfectionistic strivings are related to the corresponding level of perfectionistic concerns that athletes exhibit (see Hill, 2021). What was observed in the current study was not, though, strictly equivalent to the tipping points found in previous research. This is because it pertained to an indirect effect, rather than a direct effect, and moderation was due to an interaction between perfectionistic concerns and goal realization, not perfectionistic strivings. Second, even though this is the case, there are notable similarities in this study and examination of perfectionistic tipping points so far. In particular, in the case of both hedonic tone and tense arousal, the indirect effect of perfectionistic strivings became problematic when perfectionistic concerns were near the mean (~50th percentile). This is very similar to previous research in that even lower amounts of perfectionistic concerns appear influential in determining the effects of perfectionistic strivings.

Why support for the model was not evident for the direct effect of perfectionistic strivings on mood or its moderation is not clear. In regards to the former, the direct effect of perfectionistic strivings was not significant for any of the dimensions of mood. As relationships were evidenced for some of them at bivariate level, we might infer that these relationships are likely to be largely indirect and explained by other factors (i.e., goal-realization). Also of note to explaining the absence of these effects is the mixed evidence of interactive effects of perfectionistic concerns and perfectionistic strivings from previous research when predicting positive and negative affect in athletes. Effects are found on some occasions but not others (e.g., Crocker et al., 2014; Gaudreau & Verner-Filion, 2012; Mallinson-Howard et al., 2019). Based on this mixed emerging picture, these effects warrant further examination in future research with a particular focus on additional moderating factors.

We also found no effects in the model pertaining to energetic arousal. These findings could be partly explained by the particular nature of this dimension of mood. Energetic arousal, compared to tense arousal and hedonic tone, is the least indicative of valence of mood and more a marker of general arousal (Matthews et al., 1990). As such, it may itself be less affected by external factors and simply vary along with other aspects of mood. In support of this notion, there is also evidence in other studies that it may be less important, or revealing, in regards to differentiating between experiences associated with personality and external events (see Matthews et al., 2009). However, this is not to say that studying energetic arousal and perfectionism is not warranted. Studying this relationship, for example, particularly over the long-term, may be revealing in regards to preconditions of more specific moods and sensitivity to mood changes. As such, to fully understand perfectionism and mood, general markers of arousal as well specific markers of unpleasant and pleasant mood are likely to be needed.

5. Research and practical implications

This work has important implications for both research and practice in sport psychology. For research, the findings reiterate the importance of including both dimensions of perfectionism and their interaction when investigating their effects. So far, a focus on within-person combinations of perfectionism and, more recently, identification of possible perfectionistic tipping points have provided conceptual and analytical approaches to do so. However, as illustrated in the current study, more sophisticated conceptual and statistical models may be required to extend these approaches further. There are examples of models that combine different approaches outside of sport that do so (e.g., mediated moderation; Gaudreau et al., 2016). In a similar way, here, we have demonstrated how a pseudo-Johnson-Neyman technique, central to the concept of perfectionistic tipping points, can be used in context of a fully moderated mediation model to examine how indirect effects change as a function of perfectionistic concerns. We recommend researchers consider this and other approaches when designing future studies to better capture the psychological mechanisms that explain the varying effects of perfectionism for athletes.

For practice, although more tentative, the present findings indicate that monitoring perfectionism, and perfectionistic concerns, in particular, may be an important part of assessing the degree to which athletes may be prone to issues relating to mood. One hand, even low scores may signal the potential for more negative experiences following success and failure. However, on the other hand, the current study suggests that just small decreases could be beneficial and decisive. Interventions targeted at lowering athletes' doubts about their actions, preoccupation with mistakes, and perceptions of external pressure may not only lower the negative effects of perfectionistic concerns, but also help ensure the effects of perfectionistic strivings do not become problematic. In testing possible interventions, we recommend that practitioners monitor post-competition mood as part of assessing the effectiveness of interventions, and retain a focus on the way in which perfectionism influences appraisals of performance. This mechanism – as captured in the current model – is likely central to athlete mood, motivation, and well-being.

6. Limitations and future studies

There are several limitations of the current study that need to be considered. First, caution is needed when generalizing the results to samples drawn from other contexts, cultures, and competitive levels (Hill et al., 2018). It may be that some of the effects are specific to the character of the Runmageddon races, for example, in which people compete with each other but careers, sponsorships, and livelihoods are not dependent on performances. Second, we measured mood at a single time-point so were unable to examine change in mood or control for participants' typical mood. In addition, as we measured mood from 24 to 48 h after the run, it is important to highlight that findings could differ for immediate post-performance mood. Future studies could focus on immediate post-performance mood but also include baseline measurement and multiple measurement points to do so. If multiple measurement points were included, post-competition mood could be examined over a longer period and how enduring the effects of perfectionism are could be examined. Third, retesting the current model with a larger sample will improve the precision of estimates, the robustness of findings, and ease any concerns regarding power to detect potentially important effects in this and other moderated-mediation models. Fourth, goal-realization was operationalized using a single item measure. There are advantages to this type of approach including brevity and ecological validity (see Allen et al., 2022). However, beyond face validity, it is more difficult to establish reliability and validity for these types of measures. We note that others have used similar items to good effect when measuring similar constructs (e.g., Ang & Eisend, 2018; Gogol et al., 2014; Tenenbaum et al., 2001). Finally, future studies could also seek to re-examine the effects using objective and subjective measures of goal-realization to compare the influence of the two different operationalisations.

7. Conclusion

In the current study we tested a conditional process model of perfectionism, goal-realization, and post-competition mood. In support of the model, we found that the indirect effect of perfectionistic strivings on hedonic tone and tense arousal was mediated by goal-realization, and that this indirect effect was moderated by perfectionistic concerns. The effects were such that the more athletes reported perfectionistic strivings the more they perceived that they had not met their goals and experienced less hedonic tone and more tense arousal post-competition, but this was only the case for athletes with medium or high perfectionistic concerns. As such, the level of perfectionistic concerns reported by athletes appears to be a determining factor in whether the negative effects of perfectionistic strivings on post-competition mood emerge.

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CRediT authorship contribution statement

Wojciech Waleriańczyk: Conceptualization, Methodology, Funding acquisition, Formal analysis, Investigation, Writing – original draft, Writing – review & editing, Visualization, Project administration. **Andrew P. Hill:** Conceptualization, Methodology, Formal analysis, Writing – review & editing, Supervision. **Maciej Stolarski:** Writing – review & editing, Supervision.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.psychsport.2023.102511.

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