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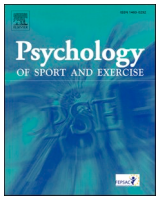

A multi-sample examination of the relationship between athlete burnout and sport performance

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ABSTRACT

Athlete burnout potentially has negative consequences for sport performance. However, to the best of our knowledge, empirical studies have yet to examine the relationship between athlete burnout and objective sport performance. Consequently, we aimed to provide a first such examination. To do so, we recruited three samples. We used Sample 1 (n = 106: track and field athletes) to examine the predictive utility of athlete burnout on a single performance, Sample 2 (n = 181: swimmers) to examine whether the findings from Sample 1 can be replicated in a different sport, and Sample 3 (n = 169: track and field athletes) to examine the predictive utility of athlete burnout on peak performance in a three-month period. Finally, having captured three samples each assessing the athlete burnout-performance relationship, we also sought to quantify the combined effect across these samples using a relatively new analytical technique – mini meta-analysis. Results from regression analyses showed that in at least two of the three samples total burnout, reduced sense of accomplishment, and sport devaluation each negatively predicted performance, whereas emotional and physical exhaustion was unrelated to performance. When we combined the samples, mini meta-analysis showed that total burnout, reduced sense of accomplishment, and sport devaluation each displayed a small-to-medium negative and significant meta-correlation with performance. The findings suggest that certain athlete burnout symptoms may indeed have negative consequences for sport performance, and that this is the case when considering a single performance and peak performance.

1. Introduction

Sport psychology has highlighted that a vast array of factors are related to sport performance (see Lochbaum et al., 2022). Given the growing interest in understanding athletes' mental health problems within the field of sport psychology (e.g., Vella et al., 2021), research is needed to determine the consequence of specific mental health problems for sport performance. The present study seeks to contribute to this literature by examining a specific mental health problem – athlete burnout – and determining its predictive utility in context of objective sport performance. To do so, we recruited three samples to quantify the extent to which athlete burnout predicts a single performance (Sample 1 and Sample 2) and peak performance in a three-month period (Sample 3).

1.1. Athlete burnout

Athlete burnout is a mental health problem that is widely studied in sport. It is defined as a psychological syndrome consisting of three symptoms, termed emotional and physical exhaustion, reduced sense of accomplishment, and sport devaluation (Raedeke, 1997; Raedeke & Smith, 2001). Emotional and physical exhaustion entails the feeling of being overextended and depleted of one's emotional and physical resources. Reduced sense of accomplishment encompasses feelings of

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incompetence and lack of achievement and productivity in sport. Lastly, sport devaluation refers to a negative, callous, and excessively detached response to sport. Understanding these symptoms is important due to evidence suggesting that, on average, they have increased over the past 20 years (Madigan et al., 2022).

Several theoretical models are commonly employed to help understand athlete burnout (see Eklund & DeFreese, 2020 for an overview). These models often borrow ideas that were generated in general and occupational psychology (see Maslach & Leiter, 2017 for an overview). For the most part, the commonly adopted models grounded in sport (Raedeke, 1997; Ryan & Deci, 2002; Smith, 1986) and associated tests of these propositions focus on the developmental antecedents of athlete burnout (e.g., Li et al., 2013; Lin et al., 2022; Woods et al., 2023), with fewer studies having examined the consequences. However, the limited studies that do exist have shown that higher levels of athlete burnout are related to the desire to dropout from sport (Isoard-Gautheur et al., 2016), decreased motivation (Lonsdale & Hodge, 2011), and poorer mental health (Glandorf et al., 2024). In acknowledgment of the limited evidence base for athlete burnout consequences, researchers have called for further work in this area (e.g., Eklund & DeFreese, 2015; Gould & Whitley, 2009; Madigan et al., 2021). The present study therefore seeks to contribute to this evidence base by focusing on sport performance as a theoretically and practically meaningful consequence of athlete burnout (Gustafsson et al., 2011).

1.2. The burnout-performance relationship

Athlete burnout may lead to impaired performance for several reasons. In recognition that there is no theoretical explanation for the link within the sport burnout literature, we borrow the ideas put forward from organisational and educational domains. In doing so, the reasons for higher levels of athlete burnout leading to poorer performance may depend on which burnout symptom is examined. For example, emotional and physical exhaustion is likely to undermine an athlete's *capacity* to exert effort when performing, due to athletes feeling run down and having depleted resources, which will undoubtedly negatively impact their performance (Corbeanu et al., 2023). Sport devaluation, on the other hand, is likely to make athletes *unwilling* to expend effort during training and competitions (see Madigan & Curran, 2021; Schaufeli & Taris, 2005). Intuitively, then, reduced effort during competitions as a function of these symptoms will directly impair competition performance. Finally, a reduced sense of accomplishment may influence performance through other means –Bandura's (1997) self-efficacy theory provides one such explanation. Although there is likely some overlap between burnout and self-efficacy (Shirom & Melamed, 2006), from this perspective, changes in an athlete's interpretation of previous performances expressed by a reduced sense of accomplishment will affect how they think about their personal abilities in future situations (i.e., their self-efficacy). In accordance with previous research, resultant reductions in self-efficacy can hamper performance (e.g., Lochbaum et al., 2023; Moritz et a., 2000). Consequently, competitive performance is likely to suffer because of an athlete's perceived reduced sense of accomplishment.

Research outside of sport has shown support for a link between burnout and performance. For example, in the organisational literature, meta-analyses have found that burnout was related to poorer employee performance and does so via several different performance indicators including productivity, customer satisfaction, and absenteeism (Corbeanu et al., 2023; Taris, 2006). Similarly, Madigan and Curran (2021) meta-analytically summarised the relationships between burnout and performance in students. They found that burnout was related to worse academic achievement, again across a range of performance indicators (exams, grades, and grade point averages). A substantial amount of evidence, then, points to the existence of a relationship between burnout and performance outside of sport.

Researchers have often claimed that athlete burnout can negatively influence sport performance (e.g., Appleby et al., 2022; Gustafsson et al., 2018; Nicholls et al., 2022). However, for over a decade now it has been highlighted that the evidence examining the athlete burnout-performance relationship inside sport is scant at best (Goodger & Jones, 2012). Of what does exist, qualitative research has noted that athletes believe their own burnout to be linked to poor performance (Cresswell & Eklund, 2006a Cresswell & Eklund, 2007; Gustafsson et al., 2008). In addition, quantitative studies have found a relationship between burnout and athlete's self-reported performance (e.g., Květon et al., 2021; Moen et al., 2019; Yildirim & Koruç, 2021). As a consequence of these approaches, however, the evidence base examining the burnout-performance relationship could be viewed as having a shared method variance issue (Podsakoff et al., 2003; Podsakoff et al., 2012; Richardson et al., 2009). Given that performance is the fundamental objective outcome of sporting competition, and readily recorded, there is an opportunity to go beyond self-reported measures of performance and their associated methodological issues. Currently, then, it would appear that existing evidence for the role of athlete burnout in shaping sport performance is limited and, therefore, requires further attention.

1.3. The present study

It is against this background that the present study aimed to provide the first examination of the relationship between athlete burnout and objective sport performance. In doing so, the present study sought to test the proposition that athlete burnout impairs performance, both in the short- (a single competition performance within a 7-day window) and longer-term (peak competition performance in a 3-month window). To do so, we recruited three samples whereby we used Sample 1 (track and field athletes) to examine the predictive utility of athlete burnout on a single performance, Sample 2 (swimmers) to examine whether the findings from Sample 1 can be replicated in a different sport, and Sample 3 (track and field athletes) to examine the predictive utility of athlete burnout on peak performance in a three-month period. In each sample, we hypothesised that total burnout and all three burnout symptoms would negatively predict performance. In acknowledgment that we captured three samples, each assessing the athlete burnout-performance relationship, we also sought to quantify the effects across these samples and used a relatively new analytical technique – mini meta-analysis (Goh et al., 2016). This analytical approach provides a more accurate estimation of effect sizes by combining (and weighting) effects from multiple samples.

2. Method

2.1. Participants

2.1.1. Power analyses

For Sample 1 and 2, prior to data collection, we carried out several power analyses that estimated the minimum required sample size to lay between 82 and 107 participants. The power analyses were based on a simple linear regression model (alpha = .05; power = [.80, .90]). The effect size (f^2 = .10) was based on previous research examining the relationship between exhaustion and performance in the occupational context (Taris, 2006) and the lowest effect size detected between perceived performance and burnout symptoms in a study within the sport context (Moen et al., 2019).

For Sample 3, because data were collected after Sample 1 and 2, we updated our power analyses using the observed effects for the lowest effect size detected where significant prediction was shown (f^2 = .05). Based on these power analyses (alpha = .05; power = [.80, .90]), the minimum required sample size fell between 159 and 212 participants for Sample 3.

2.1.2. Demographics

The samples described below are based on those that met the

inclusion/exclusion criteria.[1]

Sample 1: A sample of 106 track and field athletes (49 males; 57 females; Mean age = 21.85 years, *SD* = 3.65, range = 18–43) was recruited. Athletes competed across track and field events (e.g., 200 m, long jump, shot put) and, on average, athletes had been competing in their sport for 9 years (*SD* = 3.21) and trained for 12.69 (*SD* = 6.56) hours per week. The sample consisted of athletes competing at university (*n* = 13), local club (*n* = 5), county (*n* = 2), regional (*n* = 8), national (*n* = 26), and international level (*n* = 52).

Sample 2: A sample of 181 adult swimmers (84 male, 96 females, 1 prefer not to say; Mean age = 19.67, *SD* = 1.56 years, range = 18–27) was recruited. Athletes participated in various events (e.g., 50 m butterfly, 100 m freestyle, 1500 m freestyle) and trained on average for 9.55 (*SD* = 7.16) hours per week. The sample consisted of athletes competing at university (*n* = 91), local club (*n* = 2), county (*n* = 10), national (*n* = 68), and international level (*n* = 10).

Sample 3: A sample of 169 track and field athletes (89 males; 80 females; Mean age = 25.30 years, *SD* = 8.33, range = 18–62) was recruited. Athletes competed across track and field events (e.g., 200 m, long jump, shot put) and, on average, athletes had been competing in their sport for 12.35 years (*SD* = 8.18) and trained for 13.41 (*SD* = 5.79) hours per week. Athletes had an average of 2.67 (*SD* = 2.08) performances over the three-month period, with a total of 454 performances in their main event across all participants. The sample consisted of athletes competing at university (*n* = 7), local club (*n* = 5), county (*n* = 7), regional (*n* = 8), national (*n* = 55), and international level (*n* = 87).

2.2. Procedure

The study was approved by an institutional research ethics committee. All athletes provided informed consent to participate in the research. We used Sample 1 and 2 to capture data from participants based on their age (18 years old or over), participation in one of two sports (track and field athletics or swimming) and competing in the UK within seven days of completing the questionnaire. This time frame was chosen primarily because athlete burnout symptoms have been shown to be stable up to a three-month period (DeFreese & Smith, 2014; Gerber et al., 2018). Consequently, the timeframe of seven days provided sufficient accuracy for examining the predictive ability of burnout on performance, while negating any significant interference with athletes' competition preparation and performance execution. In Sample 1, participants took part in different indoor track and field competitions at an early point in the season, whereas the participants in Sample 2 all took part at the same indoor swimming competition during mid-season. We used Sample 3 to capture data from participants based on their age (18 years old or over) and their participation in track and field competitions over a three-month period (mid to end of season) following the completion of the burnout questionnaire. This timeframe provided the opportunity to address the research question by inferring that burnout scores may remain stable within a three-month period. In addition to the above criteria, participants were required to have previously competed in their main event (e.g., 100m, long jump, 50m freestyle) and have a previous personal best within 5 years for Sample 1 (mean time = 1.89, *SD* = 1.55 years ago) and Sample 2 (date not recorded, but confirmation of 5 years was provided by each participant), and within 3 years for Sample 3 (mean time = 1.76, *SD* = 0.92 years ago). The decision to adopt a personal best cut off timeframe for each sample attempted to mitigate against sampling athletes who last obtained a personal best beyond the timeframe, as they would be unlikely to achieve their personal best (or close to) in any recent competition, making any performance comparison less valid.

2.3. Measures

2.3.1. Athlete burnout

To measure athlete burnout, we used the Athlete Burnout Questionnaire (ABQ; Raedeke & Smith, 2001). The ABQ contains 15 items comprising the three symptoms: emotional and physical exhaustion (e.g., "I feel overly tired from my sport participation"), reduced sense of accomplishment (e.g., "I am not achieving much in my sport"), and sport devaluation (e.g., "I don't care as much about my sport performance as I used to"). These three subscales can be combined to provide a measure of total burnout (e.g., Pacewicz & Smith, 2023). Athletes were instructed to respond to items using a 5-point Likert scale (1 = *Almost Never* to 5 = *Almost Always*). Psychometric support for the ABQ is evident with respect to aspects of validity and reliability (Cresswell & Eklund, 2006b; Grugan et al., 2024; Raedeke & Smith, 2001, 2009).

2.3.2. Performance

The measurement of performance was operationalised as the difference between an athlete's competition performance and their competition personal best performance. To allow for a comparison, this was expressed as a percentage above or below their personal best, with higher values indicating performance better than the personal best (e.g., competition performance for 100 m = 10.10 s, personal best performance for 100 m = 10.00, percentage from personal best = −1.00 %). Given that both track and field athletics and swimming athletes can be involved in different events at a competition (100 m, 200 m, etc.), each athlete was asked to report their most important event, with performance data only taken in this event. The competition performance value was taken from the furthest point they went in the event, with previous rounds (heat, semifinal) ignored accordingly. This decision attempted to mitigate against athletes' coasting through the earlier rounds, which if taken, would not provide an accurate representation of their current performance level. For Sample 1, competition performance and competition personal best were taken from a publicly available website. For Sample 2, competition personal best was self-reported whereas competition performance was taken from a publicly available website.

Sample 3 went beyond examining a single sport performance and involved identifying the peak competition performance in their most important event type (e.g., 100m, 1500m, 400m hurdles) in a three-month period post-questionnaire completion. We believe that assessing peak performance within a competition season provides an effective applied marker of longer-term performance. This is because a single peak performance within a season can enable an athlete to meet a qualification standard for a competition invitation to national events (British Athletics, 2023) or selection on international teams (United Kingdom Athletics, 2023). Moreover, capturing their peak performance also provides flexibility given that participants undertake different schedules in terms of competition dates and the number of competitions in the period. As such, sport performance involved selecting the best performance for each athlete relative to their personal best (i.e., competition performance #1 = −3.15 %; competition performance #2 = −1.25 %, competition performance #3 = −2.75 % would lead to selecting competition performance #2 [−1.25 %]). Like Sample 1, Sample 3 used a publicly available website to verify both competition performance and competition personal best.

2.4. Data analysis strategy

In line with the recommendations of Tabachnick and Fidell (2007), we undertook a screening of the data. This first involved examining missing values, with any participant above 5 % missing data being removed from the study. Next, we examined the data for univariate and

[1] Twenty-six participants were ineligible from Sample 1, due to either not competing in the 7-day window, being disqualified, or not having a PB within the previous 5 years. All participants were eligible from Sample 2. Finally, thirty-one participants were ineligible from Sample 3. This was because they had either not competed in the relevant timeframe or did not have a PB within the previous 5 years.

multivariate outliers on athlete burnout symptoms and total burnout. Any univariate outliers were identified based on a standardized score that was greater than $z = \pm$ 3.29 and would be removed accordingly. Multivariate outliers were identified based on a Mahalanobis distance larger than the critical value of $\chi 2$ [4] = 18.47, $p < .001$. Then, we investigated the reliability of athlete burnout symptoms and total burnout by calculating internal consistency using McDonald's (1999) omega. Next, we checked the assumptions of linear regression including normal distribution, linearity, and homoscedasticity across all data via visual inspection of histograms and bivariate scatterplots respectively. Following this, descriptive statistics and bivariate correlations were calculated between athlete burnout and performance. The size of each correlation was interpreted based on Cohen's (1992) recommendations for small (.10–.29), medium (30–.49), and large (.50–1.00).

Prior to the main analysis, we undertook a series of preliminary analyses testing the role of several variables with respect to performance and then, depending on the findings, incorporated these in the main analyses. This included participant competition level (e.g., regional, national, international: relevant to all samples), data collection time gap (relevant to Sample 3 only and measured by number of days between the baseline measurement and the competition where the performance measurement was taken), age (relevant to all samples), and personal best date (relevant to Sample 1 and 3 only). The need to control for participant competition level with respect to performance was determined by a one-way ANOVA. The role of the data collection time gap and the interaction between the time gap and athlete burnout were explored in Sample 3 using regression analysis. Lastly, the potential need to control for age and the personal best date in a regression was determined by the presence of a significant correlation with performance in the respective samples.

For the main analysis, a series of linear regression models were conducted to identify whether athlete burnout predicted performance. In samples where no control variables were required based on the preliminary analysis, separate regression models were run using the three athlete burnout symptoms and total burnout as predictors. In samples where control variables were shown to be necessary, hierarchical regression models were run to determine whether athlete burnout predicted performance beyond the effect of a given control variable (e.g., personal best date, age). In Step 1, the control variable was the only predictor. In Step 2, in separate models, the three athlete burnout symptoms and total burnout were evaluated as predictors as a way to determine whether the addition of burnout in Step 2 explained additional variance in performance. The effect size of each model alone and each burnout variable (via model comparisons) was evaluated based on Cohen's (1988) f^2 descriptors for small (.02–.14), medium (.15–.34), and large (.35 and above) effects.

Finally, to determine the size of burnout-performance correlations across the three samples, we conducted mini meta-analyses (Goh et al., 2016). To do so, we followed Goh et al.'s recommendations and used fixed effects models and the software they provide. This analysis computes the inverse variance weighted mean correlation coefficients across our samples. We calculated separate effects for each athlete burnout symptom and for total burnout.

3. Results

3.1. Data screening

In all samples, no participant had missing data above 5 %. When considering univariate outliers, no participant had a standardized score for athlete burnout that was greater than z = 3.29 in the three samples. Similarly, no participant showed a Mahalanobis distance larger than the critical value in each of the samples. Internal consistency scores are presented in Table 1, with the three burnout symptoms and total burnout all demonstrating a value above the necessary threshold (McDonald's $\omega \geq .70$). Via visual inspection, we were able to confirm the

Table 1
Descriptive statistics, McDonald's omega, and bivariate correlations for sample 1, 2 and 3.

Variable	Sample 1							Sample 2							Sample 3						
	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
1. Total Burnout															.72**						
2. Emotional and Physical Exhaustion	.65**							.64**													
3. Reduced Sense of Accomplishment	.68**	.11						.70**	.15*						.72**	.20**					
4. Sport Devaluation	.77**	.19*	.43**					.79**	.14	.49**					.81**	.30**	.54**				
5. Sport Performance	−.25**	.05	−.38**	−.24*				−.29**	−.05	−.23**	−.35**				−.23**	−.06	−.24**	−.25**			
6. Age	−.07*	−.12	−.10	.06	−.06			−.08	−.09	−.04	−.04	−.12			−.10	−.20**	−.06	.05	−.18*		
7. Personal best date	.28**	.01	.20**	.38**	−.41**	.16									.27**	.12	.18*	.31**	−.14	.04	
M	2.26	2.43	2.54	1.80	−0.71	21.85	1.89	2.68	2.68	2.85	2.51	−2.03	19.67	1.76	2.31	2.43	2.53	1.99	−1.04	25.30	1.76
SD	0.55	0.85	0.69	0.82	2.02	3.65	1.55	0.58	0.89	0.61	0.94	3.74	1.56	0.92	0.62	0.95	0.68	0.85	4.83	8.33	0.92
McDonald's ω	.79	.87	.77	.87				.72	.90	.75	.86				.81	.91	.75	.81			

Note. Sample 1 N = 106; Sample 2 N = 181; Sample 3 N = 169; *$p < .05$. **$p < .01$; two-tailed.

data from each sample was approximately normally distributed in addition to linearly related and homoscedastic.

3.2. Bivariate correlations

Bivariate correlations can be found in Table 1. Across all three samples, total burnout and performance showed a significant small and negative correlation. In Sample 2 and 3, a reduced sense of accomplishment and performance showed a significant small and negative correlation, with Sample 1 showing a significant negative medium-sized relationship. For Sample 1 and 3, sport devaluation showed a significant small negative correlation with performance, with Sample 2 showing a significant negative medium-sized relationship. Lastly, across all three samples, emotional and physical exhaustion and performance showed nonsignificant correlations.

3.3. Preliminary analysis

Using a one-way ANOVA, we found no significant differences in performance across the various participant competition levels. Consequently, all further analyses were collapsed across competition level in all three samples. For Sample 3, the data collection time gap itself nor the interaction (data collection time gap x burnout variable) were significant predictors in any of the examined models. These findings suggest that it was not necessary to control for the time gap within our main analyses. Full details of the competition level and data collection time gap analyses can be found in the supplementary material. Due to the significant correlations with performance, personal best date (Sample 1 only; see Table 1) and age (Sample 3 only; see Table 1) were included in Step 1 of the main regression analysis for the appropriate samples. Doing so provided a way to determine whether athlete burnout symptoms and total burnout were potential predictors of performance after controlling for age and personal best date respectively.

3.4. Regression analyses

Results of the regression analyses for the three samples can be found in Table 2 (Sample 1), Table 3 (Sample 2), and Table 4 (Sample 3).

3.4.1. Single performance (Sample 1: Track and field athletics)

In Step 1 of the regression models, personal best date was a significant negative predictor and explained 17% of the variance in performance (f^2 = .21, medium effect). In Step 2, total burnout was a non-significant predictor and explained an additional 2% of the variance in performance. Reduced sense of accomplishment was a significant negative predictor and explained an additional 9% of the variance in performance (f^2 = .12, small effect). In contrast, sport devaluation was a non-significant predictor and explained only an additional 1% of the variance in performance. Similarly, emotional and physical exhaustion was a non-significant predictor and explained no additional variance in performance.

3.4.2. Single performance (Sample 2: Swimming)

Total burnout was a significant negative predictor and explained 8% of the variance in performance (f^2 = .07, small effect). Reduced sense of accomplishment was a significant negative predictor and explained 5% of the variance in performance (f^2 = .05, small effect). Similarly, sport devaluation was a significant negative predictor and explained 12% of the variance in performance (f^2 = .11, small effect). In contrast, emotional and physical exhaustion was a non-significant predictor and explained no additional variance in performance.

3.4.3. Peak performance (Sample 3: Track and field athletics)

In Step 1 of the regression models, age was a significant negative predictor and explained 3% of the variance in performance (f^2 = .03, small effect). In Step 2, total burnout was a significant negative predictor and explained an additional 7% of the variance in peak performance (f^2 = .08, small effect). Similarly, reduced sense of accomplishment was a significant predictor and explained an additional 7% variance in peak performance (f^2 = .08, small effect). Sport devaluation was also a significant negative predictor and explained an additional 6% variance in peak performance (f^2 = .07, small effect). In contrast, emotional and physical exhaustion was a non-significant predictor and explained an additional 1% of the variance.

Table 2
Summary of linear regression analyses for sample 1.

DV = Single Sport Performance	R^2	f^2	β	B	95 % CI	p-value
Model 1 = Total Burnout						
Step 1: $F(1, 104) = 20.75$[a]	.17	.21				
Personal best date			−.41	−.53[a]	[-0.77 to −0.30]	<.001
Step 2: $F(2, 103) = 11.87$[a]	.19	.24				
Personal best date			−.37	−.48[a]	[-0.72 to −0.24]	<.001
Total Burnout			−.15	−.55	[-1.22 to 0.12]	.107
Model comparison: $F(1, 103) = 2.65$	.02	.03				
Model 2 = Reduced Sense of Accomplishment						
Step 1: $F(1, 104) = 20.75$[a]	.17	.21				
Personal best date			−.41	−.53[a]	[-0.77 to −0.30]	<.001
Step 2: $F(2, 103) = 17.83$[a]	.26	.35				
Personal best date			−.35	−.45[a]	[-0.68 to −0.23]	<.001
Reduced Sense of Accomplishment			−.31	−.90[a]	[-1.40 to −0.40]	<.001
Model comparison: $F(1, 103) = 12.60$[a]	.09	.12				
Model 3 = Sport Devaluation						
Step 1: $F(1, 104) = 20.75$[a]	.17	.21				
Personal best date			−.41	−.53[a]	[-0.77 to −0.30]	<.001
Step 2: $F(2, 103) = 10.92$[a]	.18	.22				
Personal best date			−.37	−.49[a]	[-0.74 to −0.23]	<.001
Sport Devaluation			−.10	−.25	[-0.72 to 0.23]	.302
Model comparison: $F(1, 103) = 1.08$	.01	.01				
Model 4 = Emotional and Physical Exhaustion						
Step 1: $F(1, 104) = 20.75$[a]	.17	.21				<.001
Personal best date			−.41	−.53[a]	[-0.77 to −0.30]	<.001
Step 2: $F(2, 103) = 10.48$[a]	.17	.21				
Personal best date			−.41	−.53[a]	[-0.77 to −0.30]	<.001
Emotional and Physical Exhaustion			.05	.12	[-0.30 to 0.54]	.567
Model comparison: $F(1, 103) = 0.33$	.00	.00				

Note. Sample 1 = 106. DV = dependent variable. R^2 = R-squared value. f^2 = Cohen's f-squared value. B = unstandardized regression weight. β = standardized regression weight. 95%CI = 95 % confidence intervals. R^2 and f^2 with respect to the model comparison refer to improvements in these effect sizes by including burnout in step 2.

[a] $p < .05$.

3.5. Mini meta-analysis

Results of the mini meta-analyses can be found in Table 5. Total burnout showed a small-to-medium negative and significant meta-correlation with performance (r^+ = −.26 [95 % CI = −.35 to −.17]). Similarly, both reduced sense of accomplishment (r^+ = −.27 [95 % CI = −.36 to −.19]) and sport devaluation (r^+ = −.29 [95 % CI = −.38 to

Table 3
Summary of linear regression analyses for sample 2.

DV = Single Sport Performance	R^2	f^2	β	*B*	95 % CI	*p*-value
Model 1 = Total Burnout: *F* (1, 179) = 16.44[a]	.08	.07	−.29	−1.88[a]	[-2.80 to −0.97]	<.001
Model 2 = Reduced Sense of Accomplishment: *F* (1, 179) = 9.71[a]	.05	.05	−.23	−1.39[a]	[-2.27 to −0.51]	.002
Model 3 = Sport Devaluation: *F* (1, 179) = 24.56[a]	.12	.11	−.35	−1.39[a]	[-1.94 to −0.83]	<.001
Model 4 = Emotional and Physical Exhaustion: *F* (1, 179) = 0.33	.00	.00	−.04	−0.18	[-0.80 to 0.44]	.566

Note. Sample 2 = 181; DV = dependent variable. R^2 = R-squared value. f^2 = Cohen's f-squared value. *B* = unstandardized regression weight. β = standardized regression weight. 95%CI = 95 % confidence intervals.
[a] p < .05.

−.21]) showed a small-to-medium negative and significant meta-correlation with performance. Emotional and physical exhaustion showed a nonsignificant meta-correlation with performance (r^+ = −.03 [95 % CI = −.12 to .06]).

4. Discussion

The aim of the present study was to provide the first examination of the relationship between athlete burnout and objective sport performance. To do so, we recruited three samples to examine the predictive utility of athlete burnout on a single competition performance and peak competition performance in a three-month period. In each sample, we hypothesised that total burnout and all three burnout symptoms would each negatively predict performance. Across the samples, we found partial support for our hypotheses. In all samples, reduced sense of accomplishment was shown to predict worse sport performance. Both total burnout and sport devaluation were shown to predict worse performance in Sample 2 and 3, but not in Sample 1. Contrary to our expectations, emotional and physical exhaustion was unrelated to performance in all samples. Finally, mini meta-analysis indicated that a reduced sense of accomplishment, sport devaluation, and total burnout showed significant negative meta-correlations with performance. However, emotional and physical exhaustion showed no significant meta-correlation with performance.

4.1. Burnout and sport performance

Research in other domains has shown burnout to inhibit work and educational performance (Corbeanu et al., 2023; Madigan & Curran, 2021; Taris, 2006). For the first time, we find evidence that this finding extends to sport and note that the strength of the association and effect sizes were largely similar to that of research outside of sport. The fact that objective sport performance had not previously been considered an outcome of burnout is somewhat surprising given that a possible relationship has been put forward by the integrated model of athlete burnout (Gustafsson et al., 2011). Our findings support the assertion of this theoretical model and align with existing work that was suggestive of a relationship including qualitative and self-report quantitative research (Cresswell & Eklund, 2006a; Květon et al., 2021; Yildirim & Koruç, 2021). However, our study extends the empirical evidence base by overcoming the reliance of collecting data on burnout and performance via self-report. The findings also contribute to the broader literature examining psychological factors that are associated with sport performance (Lochbaum et at., 2022). Burnout, then, should be considered amongst those factors likely to be detrimental for sport performance.

We found that higher levels of sport devaluation and reduced sense of accomplishment predicted worse sport performance. For the most part, this applied to single performance across two sports and to peak performance in a three-month period. Here, we borrow an explanation that has been used to explain similar findings in other domains (see Madigan & Curran, 2021; Schaufeli & Taris, 2005). That is, higher levels of sport devaluation may fuel an unwillingness to expend effort in sporting activities (training and competitions), which in turn will inevitably have a detrimental influence for reaching or exceeding one's personal best performance. With respect to reduced sense of accomplishment, we believe that higher levels of this symptom will lead to negative self-perceptions (i.e., feeling unsuccessful) which will affect how they think about their personal abilities in a particular situation. Athletes experiencing higher levels of this symptom of burnout may therefore produce worse objective performance as they are less likely to set challenging goals, invest less effort, and display less perseverance in relation to competition performance (Bandura & Locke, 2003; Feltz

Table 4
Summary of linear regression analyses for sample 3.

DV = Peak Sport Performance	R^2	f^2	β	B	95 % CI	p-value
Model 1 = Total Burnout						
Step 1: *F* (1, 167) = 5.87[a]	.03	.03				
Age			−.18	−0.11[a]	[-0.19 to −0.02]	.017
Step 2: *F* (2, 166) = 8.78[a]	.10	.11				
Age			−.21	−0.12[a]	[-0.21 to −0.04]	.005
Total Burnout			−.25	−1.94[a]	[-3.08 to −0.80]	< .001
Model comparison: *F* (1, 166) = 11.34[a]	.07	.08				
Model 2 = Reduced Sense of Accomplishment						
Step 1: *F* (1, 167) = 5.87[a]	.03	.03				
Age			−.18	−0.11[a]	[-0.19 to −0.02]	.017
Step 2: *F* (2, 166) = 8.73[a]	.10	.11				
Age			−.20	−0.12[a]	[-0.20 to −0.03]	.008
Reduced Sense of Accomplishment			−.25	−1.75[a]	[-2.78 to −0.72]	<.001
Model comparison: *F* (1, 166) = 11.23[a]	.07	.08				
Model 3 = Sport Devaluation						
Step 1: *F* (1, 167) = 5.87[a]	.03	.03				
Age			−.18	−0.11[a]	[-0.19 to −0.02]	.017
Step 2: *F* (2, 166) = 8.25[a]	.09	.10				
Age			−.17	−0.10[a]	[-0.18 to −0.02]	.022
Sport Devaluation			−.24	−1.35[a]	[-2.18 to −0.52]	.002
Model comparison: *F* (1, 166) = 10.31[a]	.06	.07				
Model 4 = Emotional and Physical Exhaustion						
Step 1: *F* (1, 167) = 5.87[a]	.03	.03				
Age			−.18	−0.11[a]	[-0.19 to −0.02]	.017
Step 2: *F* (2, 166) = 3.75[a]	.04	.04				
Age			−.20	−0.12[a]	[-0.21 to −0.03]	.009
Emotional and Physical Exhaustion			−.10	−0.50	[-1.28 to 0.28]	.206
Model comparison: *F* (1, 166) = 1.62	.01	.01				

Note. N = 168; DV = dependent variable. R^2 = R-squared value. f^2 = Cohen's f-squared value. B = unstandardized regression weight. β = standardized regression weight. 95%CI = 95 % confidence intervals. R^2 and f^2 with respect to the model comparison refer to improvements in these effect sizes by including burnout in step 2.
[a] *p* < .05.

Table 5
Results of the mini meta-analysis.

Coefficients	DV: Sport Performance			
	Total Burnout	Reduced Sense of Accomplishment	Sport Devaluation	Emotional and Physical Exhaustion
Sample 1 (N = 106)	−.25	−.38	−.24	.05
Sample 2 (N = 181)	−.29	−.23	−.35	−.05
Sample 3 (N = 169)	−.23	−.24	−.25	−.06
r^+	−.26[a]	−.27[a]	−.29[a]	−.03
SE	.05	.05	.05	.05
Z	−5.63	−5.88	−6.31	−0.65
95 % CI LL	−.35	−.36	−.38	−.12
95 % CI UL	−.17	−.19	−.21	.06

Note. N = sample size; $r+$ = inverse variance weighted mean correlation; SE = standard error of the inverse variance weighted mean correlation; Z = standard normal deviate of the inverse variance weighted mean correlation; 95 % CI LL = lower limit of the 95 % confidence interval for the inverse variance weighted mean correlation; 95 % CI UP = upper limit of the 95 % confidence interval for the inverse variance weighted mean correlation.
[a] $p < .05$.

et al., 2008; Tenenbaum & Hutchinson, 2007). In Sample 3, we also found evidence that these relationships persist when controlling for athlete age, confirming the potential generalisability of the findings to peak performance in a three-month period. In sum, for the first time, we find that those athletes that report higher levels of disillusionment towards their sport and their performances appear to be at risk of delivering sub-optimal performance relative to their previous best.

An intriguing finding was the lack of a relationship between emotional and physical exhaustion and performance. This finding was contradictory to our expectation and the substantial empirical evidence suggesting that exhaustion is negatively related to performance in domains outside of sport, including literature from occupational and education domains (Corbeanu et al., 2023; Madigan & Curran, 2021). One possible reason for the lack of predictive ability could relate to the unique aspects of sport compared to other domains. That is, competition between individuals is likely more salient in sport as well as the associated rewards (selection, sponsorship, prize money). As such, sport may provide a context that leads athletes to perform irrespective of their level of exhaustion. We advocate for replication of this particular finding in future research and if apparent, further investigation as to why emotional and physical exhaustion is unrelated to sport performance.

4.1.1. Applied implications

It appears that certain athlete burnout symptoms are associated with worse objective sport performance, albeit with small effect sizes. By providing an outcome that holds strong ecological validity (objective competition performance), these findings could in-turn have implications for athlete performance, which ultimately contribute to an athlete's career prospects and longevity. As such, we hope that our findings solidify the need to consider athlete burnout as a performance issue in applied settings. In conjunction with existing consequences of athlete burnout (i.e., willingness to dropout, loss of motivation, poorer health), the present study adds to the array of problems for those athletes who are exhibiting higher levels of burnout. We therefore believe that the findings will be useful for practitioners, coaches, and athletes and further underscore the importance for pre-emptive monitoring, and depending on the situation, a need for intervention.

One effective way to attempt to mitigate the negative consequences is for practitioners to routinely monitor athlete burnout. This can be done via simple self-report questionnaires (e.g., the ABQ). This would provide practitioners with an indication of when it may be necessary to intervene (e.g., increasing burnout scores). In terms of identifying specific intervention strategies aimed at directly addressing burnout, there is currently limited empirical evidence in sport (see Madigan, 2021). This has led researchers to consider the relevance of strategies from outside of sport and particularly the occupational literature. This work suggests that stress-based interventions and organisational-level strategies may be most effective (Madigan et al., 2023). However, it is unclear whether these strategies will transfer to sport and the unique experiences of athletes. Against a backdrop of increasing athlete burnout levels (Madigan et al., 2022), it seems necessary for effective intervention to be the highest priority for research in this area.

4.1.2. Limitations and future directions

Notwithstanding the present study's contribution to existing evidence, there were several limitations. First, our samples tested the extent that a one-off measurement of athlete burnout predicted sport performance. Future longitudinal studies should therefore seek to quantify athlete burnout throughout the season (e.g., beginning, middle, and end of season) and track objective performances in-between these points. Doing so, would provide stronger evidence for a causal relationship. Second, we acknowledge that athletes' overall personal best (up to 5 years in Sample 1 and 2 and up to 3 years in Sample 3) may not always accurately reflect their current ability. When focusing on the choice of performance comparison (performance relative to overall personal best), future work may wish to consider a more proximal marker of an athlete's current capability (e.g., best performance the last season). In addition, because periodization and tapering occur in some sports, it could be important to know when the best performance occurred. Third, we analysed the athlete burnout-performance relationship in a linear manner. However, researchers have detected non-linear relationships between psychological factors and performance (e.g., Nordin-Bates at el., 2024). Future work may therefore benefit from testing the potential presence of non-linear effects in context of burnout and performance. Finally, our samples focused on adult athletes competing in two specific sports (track and field athletics and swimming) and at different levels. While each sample could be classified as relatively homogenous, there is opportunity to further understand the role of event type within a sport (track vs field events or sprint vs endurance events in swimming) or competition level (e.g., national vs international). Therefore, with respect to the burnout-performance relationship, future research should seek to collect an even more homogenous group or compare groups of athletes across various demographic factors.

5. Conclusion

The present study provides the first empirical examination of the relationship between athlete burnout and objective sport performance. The findings show that certain athlete burnout symptoms can be related to worse sport performance relative to one's personal best. Consequently, it is necessary to consider burnout among other factors likely to be detrimental to sport performance and efforts are required to help avoid its development.

CRediT authorship contribution statement

Luke F. Olsson: Writing – review & editing, Writing – original draft, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Hanna L. Glandorf:** Writing – review & editing, Writing – original draft, Investigation, Formal analysis, Data curation. **James F. Black:** Writing – review & editing, Methodology, Investigation, Data curation, Conceptualization. **Rebecca E.K. Jeggo:** Writing – review & editing, Investigation, Data curation. **Joseph R. Stanford:** Writing – review & editing, Investigation, Data curation. **Karla L. Drew:** Writing – review & editing, Investigation. **Daniel J. Madigan:** Writing – review & editing, Writing – original draft, Formal analysis.

Declaration of competing interest

None.

Data availability

The authors do not have permission to share data.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.psychsport.2024.102747.

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