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Olsson, LF, Grugan, MC, Martin, JN and Madigan, DJ (2021) Perfectionism and Burnout in Athletes: The Mediating Role of Perceived Stress. Journal of Clinical Sport Psychology, 16 (1). pp. 55-74. ISSN 1932-9261

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Perfectionism and Burnout in Athletes:
The Mediating Role of Perceived Stress

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Olsson, L.F., Grugan, M. C., Martin, J. N., & Madigan, D. M. (in press). Perfectionism and burnout in athletes: the mediating role of perceived stress. *Journal of Clinical Sport Psychology*. Accepted 27/09/2021.

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Introduction

Athletes are required to cope with numerous personal, social, and performance demands in sport (Sarkar & Fletcher, 2014). However, when they are unable to cope with these demands, athletes will experience stress (Nicholls et al., 2016). While a singular experience of stress may not be problematic in itself, the experience of chronic stress can lead to detrimental outcomes for athletes such as burnout (Smith, 1986). In acknowledging the negative consequences of burnout for athletes, many researchers have sought to determine what may underpin its development in sport (e.g., Larson et al., 2019). In this regard, the personality trait of perfectionism has been shown to be a particularly prominent developmental factor (Hill & Curran, 2016). In the present study, our aim is to extend previous research by examining whether stress helps to explain why perfectionism is linked to burnout in athletes.

Athlete Burnout

Athlete burnout is a multidimensional psychosocial syndrome that consists of three symptoms (Raedeke & Smith, 2001). These symptoms are emotional and physical exhaustion (perceived depletion of emotional and physical resources resulting from sport participation), reduced sense of athletic accomplishment (negative evaluation of one’s sporting abilities and achievements), and sport devaluation (the development of a cynical attitude towards sports participation). It is possible that a significant proportion of athletes regularly experience moderate levels of burnout symptoms (Gustafsson et al., 2007). These athletes will therefore be at risk of the consequences of burnout. These consequences can include reduced performance, motivational disturbances, and more serious mental health issues such as depression (see Goodger et al., 2007; Kamimura, et al., 2020).

Several theoretical models have been proposed to explain the development of athlete burnout (see Gustafsson et al., 2017). In the present study, we focus on Smith’s (1986) cognitive

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1 affective stress model. This model proposes that burnout develops as a response to chronic stress.
2 More specifically, the model posits that stress is experienced when athletes appraise an imbalance
3 between the demands of a situation and their ability and resources to cope with that situation. If
4 perpetuated over time, an imbalance between the perceived demands of sport and an athlete's
5 resources to manage such challenges will result in chronic stress and ultimately burnout
6 development. Importantly for the present study, the model posits that the central appraisal
7 processes underpinning the development of athlete burnout are influenced by individual
8 differences in personality. Therefore, certain personality characteristics may leave athletes at an
9 increased risk of stress and eventual burnout.

10 Smith's (1986) model has received considerable research attention and support in sport.
11 For instance, perceptions of stress have consistently been shown to positively predict burnout in
12 athletes. This has been demonstrated in both cross-sectional (e.g., Gustafsson & Skoog, 2012)
13 and longitudinal research (e.g., DeFreese & Smith, 2014). Researchers have also considered
14 Smith's (1986) assertion that personality can influence the development of stress and burnout.
15 Several personality characteristics such as Type D, conscientiousness, and neuroticism have been
16 found to predict burnout in athletes via stress (e.g., Dunker et al., 2020; Polman et al., 2010). One
17 personality trait that is considered to render athletes especially vulnerable to burnout because of a
18 heightened vulnerability to stress is perfectionism (Crocker et al., 2014).

19 **Perfectionism**

20 Perfectionism is a personality trait which entails excessively high standards accompanied
21 by overly critical evaluations (Frost et al., 1990). Over the last three decades, perfectionism has
22 been conceptualised and measured in several ways. Some researchers suggest that perfectionism
23 constitutes a variety of primarily intrapersonal dimensions (e.g., Frost et al., 1990), whereas
24 others suggest that the characteristic contains both intra- and interpersonal dimensions (e.g.,

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1 Hewitt & Flett, 1991). Importantly, however, factor-analytical evidence suggests that the various
2 measures and associated perfectionism dimensions can be integrated into a higher-order model of
3 perfectionism (also known as the two-factor model; see Stoeber & Madigan, 2016). The higher-
4 order model consists of two broad dimensions of perfectionism labelled perfectionistic strivings
5 and perfectionistic concerns (Stoeber & Otto, 2006). Perfectionistic strivings are characterised by
6 aspects of perfectionism associated with striving for perfection and the setting of high personal
7 standards. In contrast, perfectionistic concerns are characterised by concerns over making
8 mistakes, negative reactions to imperfection, socially prescribed pressures, and discrepancies
9 between one's expectations and performance (Gotwals et al., 2012).

10 A large amount of research has examined the consequences of perfectionism for athletes'
11 thoughts, feelings, and behaviours in sport (see Hill et al., 2018). One line of enquiry that has
12 received considerable attention is the perfectionism-burnout relationship. This began 13 years ago
13 when researchers provided initial empirical evidence linking perfectionism and athlete burnout
14 (e.g., Hill et al., 2008; Lemyre et al., 2008). Since this time, many more empirical studies have
15 been conducted. These findings were recently summarised in a meta-analysis. Specifically, across
16 17 studies, Hill and Curran (2016) found that perfectionistic strivings had a small negative
17 relationship with athlete burnout. By contrast, perfectionistic concerns had a medium-to-large
18 positive relationship with burnout. This same pattern of relationships has also been found over
19 time (Madigan et al., 2015, 2016a, 2016b). Overall, then, the evidence suggests that
20 perfectionism, and perfectionistic concerns in particular, is a pertinent characteristic linked to
21 burnout in athletes.

22 **Perfectionism, Stress, and Burnout**

23 Researchers have examined several psychological mechanisms that may help explain why
24 perfectionism renders athletes vulnerable to burnout. These studies have included factors such as

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1 motivation (Appleton & Hill, 2012), need satisfaction (Jowett et al., 2016), and coping strategies
2 (Hill, Hall, & Appleton, 2010). Many researchers have also suggested that stress may in fact
3 underpin the perfectionism-athlete burnout relationship (e.g., Hill et al., 2010). From a theoretical
4 perspective, perfectionism may lead to stress because of a tendency to create, maintain, magnify,
5 and even anticipate stressful events. This is because highly perfectionistic athletes pursue goals
6 that are irrational and unrealistic, engage in ineffective coping strategies, experience self-
7 defeating thoughts, and worry about the future (Hewitt & Flett, 2002). As such, perfectionism
8 may engender stress in athletes and leave them vulnerable to psychological difficulties (Flett &
9 Hewitt, 2005).

10 In line with theoretical assertions, there is some initial evidence in sport for the relevance
11 of stress for highly perfectionistic athletes. For example, while perfectionistic strivings has been
12 shown to be negatively related to perfectionistic stress triggers (e.g., pessimism and self-
13 compassion), perfectionistic concerns has been found to be positively related to stress triggers
14 (e.g., rumination and pre-competition worry: Dunn et al., 2020; Lizmore et al., 2017). In context
15 of athlete burnout, only one study has examined the relationships between perfectionism, stress,
16 and burnout (Garinger et al., 2018). These authors showed that perfectionistic concerns was
17 positively related to stress, and that, in line with Smith's (1986) model, stress was positively
18 related to burnout. In contrast, while perfectionistic strivings was inversely related to burnout
19 directly, it shared a non-significant relationship with stress. Together, these findings provide
20 initial support for both the notion that perfectionistic concerns may give rise to elevated stress
21 and that elevated stress may result in an increased likelihood of experiencing burnout.

22 In the present study, we seek to build on the work of Garinger et al. (2018) in two key
23 ways. First, while Garinger et al. measured perfectionism, stress, and burnout, they did not
24 provide an explicit test of whether stress mediated the relationship between perfectionism and

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1 burnout. To do so, an examination of indirect effects is necessary (Hayes, 2009). Second,
2 Garinger et al. did not examine possible differential relationships between perfectionism, stress,
3 and the three symptoms of burnout. Instead, they examined only a composite burnout score.
4 Burnout researchers argue that a composite burnout score should not be the exclusive focus of
5 research because burnout is a multidimensional syndrome (Eklund & Defreese, 2020). Moreover,
6 modelling burnout as a total score may mask underlying differences pertaining to each individual
7 symptom (Raedeke & Smith, 2004). This is especially noteworthy given evidence that burnout
8 symptoms may not develop uniformly and have different antecedents (Defreese & Smith, 2020).

9 In the context of the present study, we suggest that differential mediation effects may
10 exist. In particular, we note that theoretical and accompanying empirical work outside of sport
11 suggests that exhaustion is more strongly linked to stress than the other burnout dimensions
12 (Leiter & Maslach, 1988; Lee & Ashforth, 1993). Within sport research, a different pattern of
13 findings has emerged previously also. In particular, researchers have found that stress shares a
14 stronger relationship with reduced accomplishment than the other dimensions (e.g., Gustafsson &
15 Skoog, 2012). In addition, perfectionistic concerns has also been found to predict some athlete
16 burnout symptoms but not others and may be most important for reduced accomplishment and
17 emotional and physical exhaustion (e.g., Gotwals, 2011). Collectively, this research suggests that
18 athlete perfectionism, and in particular perfectionistic concerns, may be a greater vulnerability
19 factor for exhaustion and reduced accomplishment than sport devaluation (e.g., Lemyre et al.,
20 2008). Despite this, researchers have yet to investigate whether perfectionism dimensions provide
21 differential effects across the three burnout symptoms via stress.

22 **The Present Study**

23 To address these limitations, in the present study, we provide tests of the size and
24 significance of indirect effects of perfectionism on burnout via stress, and do so for a composite

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1 score and all three burnout symptoms. In this manner, we aimed to provide the first explicit
2 examination of whether stress mediates the perfectionism-athlete burnout relationship. We
3 expected that stress would show larger mediation effects for perfectionistic concerns and that
4 these would be positive, while the indirect effects for perfectionistic strivings would be small and
5 negative (see Figure 1). When considering the three dimensions simultaneously, we expected that
6 perfectionistic concerns would share a positive indirect effect with all three burnout symptoms
7 via stress, with the stronger effects attributed to emotional and physical exhaustion and a reduced
8 sense of accomplishment compared to sport devaluation (see Figure 2).

Method

10 Participants

11 A sample of 256 athletes (125 males; 129 females; two participants did not report gender;
12 $M_{\text{age}} = 21.26$ years, $SD = 4.73$) was recruited for the present study. Athletes competed across
13 various individual ($n = 207$; e.g., athletics, golf, and weightlifting) and team sports ($n = 49$; e.g.,
14 soccer, netball, and hockey) and at various levels of competition: university ($n = 10$), club ($n =$
15 44), county ($n = 35$), national ($n = 97$), international ($n = 67$), and unclassified ($n = 3$). On
16 average, athletes had been competing in their sport for 8.38 years ($SD = 4.56$).

17 Procedure

18 The study was approved by an institutional research ethics committee. All athletes were
19 recruited while participating at training or competitions in the UK, where they were provided
20 with information outlining the purpose and procedures of the research. Upon gaining informed
21 consent, athletes were asked to complete a questionnaire which captured participant
22 characteristics and measures of the variables of interest.

23 Measures

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1 **Perfectionism.** To measure perfectionism, we used two subscales from the
2 Multidimensional Inventory of Perfectionism in Sport (MIPS; Stoeber et al., 2007). For
3 perfectionistic strivings, we used the subscale capturing striving for perfection (SP: 5 items, e.g.
4 “I strive to be as perfect as possible”). For perfectionistic concerns, we used the subscale
5 capturing negative reactions to imperfection (NRI: 5 items, e.g., “If something does not go
6 perfectly, I am dissatisfied with the whole competition”). Athletes were instructed to indicate how
7 they usually felt during sport. Athletes were instructed to respond to items using a 5-point Likert
8 scale (1 = *never* to 5 = *always*). Madigan (2016) provided evidence for the factorial validity and
9 internal consistency of the measure. Previous studies have also shown that both subscales are
10 valid and reliable indicators of perfectionistic strivings and perfectionistic concerns (see Stoeber
11 & Madigan, 2016). In the present sample, both dimensions demonstrated good internal
12 consistency (SP $\alpha = .82$ and NRI $\alpha = .77$).

13 **Perceived Stress.** To measure athlete perceived stress, we used the Perceived Stress
14 Scale (PSS; Cohen et al., 1983). The PSS is a unidimensional scale measuring self-appraised
15 stress within the last month and consists of 10 items (e.g., “In the last month, how often have you
16 been angered because of things that were outside your control”). In-line with previous research,
17 we captured stress in context of sport (e.g., Raedeke & Smith, 2004). We did so by altering the
18 stem (“The questions in this scale ask you about your feelings and thoughts in sport during the
19 last month”). Athletes were instructed to respond using a 5-point Likert scale ranging from (0 =
20 *never* to 4 = *very often*). Previous research in sport has found the scale to provide acceptable
21 factorial validity and internal consistency (e.g., Gustafsson & Skoog, 2012). The present study
22 also found good internal consistency ($\alpha = .85$).

23 **Burnout.** To measure burnout, we used the Athlete Burnout Questionnaire (ABQ:
24 Raedeke & Smith, 2001). The ABQ is a 15-item measure with three 5-item subscales capturing

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1 reduced sense of accomplishment (RSA; e.g., “I am not performing up to my ability in sport.”),
2 emotional and physical exhaustion (EPE; e.g., “I am exhausted by the mental and physical
3 demands of sport.”) and sport devaluation (SD; e.g., “The effort spent in my sport would be better
4 spent doing other things.”). The three subscales can be examined individually or combined to
5 provide a measure of total burnout (e.g., Lemyre et al., 2008). Athletes were instructed to respond
6 to items using a 5-point Likert scale ranging from (1 = *almost never* to 5 = *almost always*).
7 Previous evidence supports the factorial validity and internal consistency of this instrument (e.g.,
8 Gerber et al., 2018). The present sample displayed good internal consistency (RSA $\alpha = .77$, EPE
9 $\alpha = .92$, SD $\alpha = .84$, and total burnout $\alpha = .85$).

10 **Data Screening**

11 Data were screened following the protocol outlined by Tabachnick and Fidell (2014)
12 using IBM Statistics SPSS 25.0. The missing value analysis indicated that there were 245
13 complete cases and 11 cases with at least one item non-response. Cases with item non-response
14 that exceeded the 5% threshold were removed from any further analyses ($n = 3$). The remaining
15 cases with missing data were missing one item only. Little’s missing completely at random
16 (MCAR) test revealed that the remaining missing data could be characterised as MCAR ($\chi^2 =$
17 222.43 , $df = 238$, $p = .76$). In terms of scale reliability estimates, all variables were found to be
18 above the acceptable level (Cronbach’s alpha $> .70$; Nunnally & Bernstein, 1994). As the amount
19 of missing data was low and the scales adopted have demonstrated acceptable internal
20 consistency, the remaining missing values were replaced using the mean of non-missing items
21 from relevant subscales (Graham et al., 2003).

22 Subscales were then computed and screened for univariate and multivariate outliers.
23 Standardized Z-scores greater than ± 3.29 ($p < .001$, two-tailed) served as the indicator for
24 univariate outliers, whereas a Mahalanobis distance greater than $\chi^2(6) = 22.46$ ($p < .001$) was

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1 used as the criteria to identify multivariate outliers. These assessments did not result in any
2 further cases being removed from the study (final $N = 253$; $M_{\text{age}} = 21.25$; $SD = 4.76$). The
3 skewness and kurtosis values indicated that all variables could be considered approximately
4 univariate normal (absolute skewness values = .05 to .44; absolute kurtosis values = .23 to .78).
5 Mardia's normalised coefficient for multivariate kurtosis was 1.11, indicating that the data used to
6 test the hypothesised models satisfies the assumption of multivariate normality (Byrne, 2016).

7 **Analytical Strategy**

8 To analyse the data, we first computed descriptive statistics and bivariate correlations for
9 all variables. The next stage involved testing each hypothesised model using structural equation
10 modelling with latent variables¹. This was carried out in Mplus 8.2 (Muthén & Muthén, 1998-
11 2018). The first model focussed on the relationships between perfectionism, perceived stress, and
12 total burnout (see Figure 1). The two exogenous perfectionism variables were modelled using
13 item-level indicators (perfectionistic strivings, $n = 5$; perfectionistic concerns, $n = 5$), the
14 mediating perceived stress variable was modelled using random parcels of paired items ($n = 5$),
15 and the endogenous total burnout variable was modelled using subscale-level indicators ($n = 3$).
16 The second model focussed on the relationships between perfectionism, perceived stress, and the

¹ To determine whether any of the demographic variables need to be controlled for, we ran a series of Box's M tests. These tests provide an examination of whether variance-covariance matrices differ depending on demographic factors. These tests revealed no significant differences across all measured variables for gender ($p = .44$), level of competition ($p = .42$), and sport type ($p = .12$). In addition, age was not significantly correlated with any of the study variables. These findings suggest that it is not necessary to control for these factors within our analyses.

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1 three burnout symptoms (see Figure 2). In this model, the two exogenous perfectionism variables
2 and the mediating perceived stress variable were modelled using the same approach as the
3 previous model, while the endogenous burnout symptom variables were modelled using item
4 level indicators (reduced sense of accomplishment, $n = 5$; emotional and physical exhaustion, $n =$
5 5; sport devaluation, $n = 5$).

6 We used the following fit indices to evaluate the overall model fit of each structural
7 equation model: chi-square statistic (χ^2), comparative fit index (CFI), root mean square error of
8 approximation (RMSEA), and standardised root-mean-square residual (SRMR). To aid our
9 evaluation of each model, we used Marsh, Hau, and Wen's (2004) guidelines for acceptable
10 ($\chi^2/df \leq 3$, $CFI \geq .90$, $SRMR \leq .10$, $RMSEA \leq .10$) and good model fit ($\chi^2/df \leq 2$, $CFI \geq .95$,
11 $SRMR \leq .06$, $RMSEA \leq .06$)².

12 Finally, to test mediation, we examined indirect effects in the hypothesised models using
13 bias-corrected bootstrapping with 5,000 iterations. Indirect effects were deemed significant if
14 their bootstrapped 95% confidence interval (95% CI) excluded zero (Hayes, 2009). In line with
15 Preacher and Kelly (2011), the effect size of each specific indirect was evaluated based on
16 Cohen's (1988) descriptors for small (.01), medium (.09), and large (.25) squared correlation
17 coefficients. The lower and upper limit of each corresponding 95% CI were also considered when
18 making effect size evaluations.

19 Results

20 Descriptive Statistics and Bivariate Correlations

² Since the structural models include paths between all exogenous and endogenous variables, it is equivalent to the measurement model.

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1 Descriptive statistics, bivariate correlations, and internal consistency estimates are
2 reported in Table 1. The correlations show that perfectionistic strivings and perfectionistic
3 concerns shared a strong positive relationship. We also found that perfectionism shared divergent
4 relationships with perceived stress and athlete burnout. Specifically, perfectionistic concerns
5 shared small-to-medium significant positive relationships with perceived stress, athlete total
6 burnout, and two out of three burnout symptoms (reduced sense of accomplishment and
7 emotional and physical exhaustion). However, the relationship with sport devaluation was non-
8 significant. By contrast, perfectionistic strivings was unrelated to perceived stress and shared
9 either non-significant (total burnout, reduced sense of accomplishment, and emotional and
10 physical exhaustion) or small negative (sport devaluation) relationships with the athlete burnout
11 variables. Notably, perceived stress shared a positive relationship with all athlete burnout
12 variables.

13 **Structural Equation Modelling**

14 The two structural equation models provided good fit to the data (see Table 2). In these
15 models, perfectionism accounted for 21% of the variance in perceived stress. A combination of
16 perfectionism and perceived stress accounted for between 12% and 39% of the variance in
17 burnout, with the highest percentage applying to total burnout (39%). For the three symptoms, the
18 highest variance explained was for reduced sense of accomplishment (24%), followed by sport
19 devaluation (13%), and then emotional and physical exhaustion (12%). Parameter estimates can
20 be found in Table 3. In terms of direct effects, perfectionistic strivings was negatively related to
21 total burnout, reduced sense of accomplishment, and sport devaluation, but unrelated to
22 emotional and physical exhaustion. Perfectionistic concerns was unrelated to total burnout and
23 the three burnout symptoms. Perfectionistic concerns was, however, positively related to

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1 perceived stress. By contrast, perfectionistic strivings was unrelated to perceived stress. Finally,
2 perceived stress was positively related to total burnout and each of the burnout symptoms.

3 **Indirect Effects.**

4 **Total Burnout.** Assessment of the bootstrapped indirect effects indicated that
5 perfectionistic strivings shared a non-significant indirect effect with total burnout via perceived
6 stress (indirect effect = $-.06$; 95% CI = $-.18$ to $.04$). Perfectionistic concerns shared a medium-to-
7 large significant indirect effect with total burnout via perceived stress (indirect effect = $.27$; 95%
8 CI = $.16$ to $.45$).

9 **Burnout Symptoms.** Perfectionistic strivings shared a non-significant indirect effect with
10 reduced sense of accomplishment via perceived stress (indirect effect = $-.04$; 95% CI = $-.13$ to
11 $.03$). Perfectionistic concerns demonstrated a medium-to-large indirect effects with reduced sense
12 of athletic accomplishment via perceived stress (indirect effect = $.19$; 95% CI = $.10$ to $.32$).
13 Perfectionistic strivings shared a non-significant indirect effect with emotional and physical
14 exhaustion via perceived stress (indirect effect = $-.03$; 95% CI = $-.12$ to $.02$). Perfectionistic
15 concerns demonstrated a medium-to-large significant indirect effect with emotional and physical
16 exhaustion via perceived stress (indirect effect = $.14$; 95% CI = $.06$ to $.27$). Perfectionistic
17 strivings shared a non-significant indirect effect with sport devaluation via perceived stress
18 (indirect effect = $-.04$; 95% CI = $-.12$ to $.02$). Perfectionistic concerns shared a medium-to-large
19 significant positive indirect effects with sport devaluation via perceived stress (indirect
20 effect = $.17$; 95% CI = $.09$ to $.30$).

21 **Discussion**

22 The present study aimed to examine whether stress mediates the relationship between
23 perfectionism and burnout in athletes. To achieve this, we tested the size and significance of
24 indirect effects and examined a composite burnout score as well as all three burnout symptoms.

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1 In line with our hypotheses, we found that perfectionistic concerns showed a medium- to large-
2 sized positive indirect effect on total burnout and each symptom of athlete burnout via perceived
3 stress. In addition, we found that perfectionistic strivings showed small negative, but non-
4 significant, indirect effects with total burnout and each of the burnout symptoms via stress.

5 **Perfectionism and Burnout**

6 Perfectionism has long been tied to burnout. This is not surprising given that seeking
7 perfection is linked to mental health difficulties and poor psychological adjustment (see Hill et
8 al., 2018). In terms of the bivariate correlations, our findings are largely consistent with meta-
9 analytical evidence pertaining to the perfectionism–burnout relationship. Specifically, we found
10 that perfectionistic concerns is the dimension that best accounts for this relationship in athletes.
11 Perfectionistic concerns typically encapsulate the perception of external demands along with an
12 extreme preoccupation with, and negative reaction to, performance mistakes. It is these
13 tendencies that appear to be strongly and consistently related to burnout in athletes (Hill &
14 Curran, 2016). Our findings therefore reiterate the necessity for perfectionistic concerns, and in
15 particular negative reactions to imperfection, to be high on the list of personal factors considered
16 to explain burnout development in sport.

17 **The Mediating Role of Stress**

18 Building on the work of Garinger et al. (2018), we provide clear evidence that stress is
19 likely key in explaining why perfectionism may lead to higher levels of burnout. In this regard,
20 and in line with Smith's (1986) model, stress accounted for the indirect relationship between
21 perfectionistic concerns and burnout. Based on theory, perfectionistic concerns are thought to
22 engender stress because the dimension imbues a tendency to generate stressful events (Flett,
23 Hewitt, & Nepon, 2020). Moreover, the self-defeating thoughts that accompany perfectionistic
24 concerns may also help to explain why this relationship exists (e.g., Dunn et al., 2020; Lizmore et

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1 al., 2017). This is because an athlete who fixates on mistakes, no matter how small, will not only
2 experience stress during and after competition, but also view upcoming performances as
3 excessively demanding, threatening, and stressful. Subsequently, it seems apparent that stress is
4 the fuel for perfectionistic concerns–based burnout.

5 It would appear that stress is less important in the perfectionistic strivings–burnout
6 relationship. In fact, we found no evidence for any indirect effects through this pathway. It is
7 therefore possible that other mechanisms explain the potential for a negative relationship between
8 these variables. In this regard, previous studies have found that autonomous motivation may be a
9 key mechanism in this relationship (e.g., Madigan et al., 2016a). This is not to say, however, that
10 stress is unimportant. According to Flett and Hewitt (2005), the facets of perfectionism captured
11 by perfectionistic strivings underpin a vulnerability to stress. That is, in certain circumstances,
12 such as when perfectionistic standards are not met (e.g., following perceived or objective failure),
13 perfectionistic strivings result in heightened perceptions of stress. Given that we did not
14 manipulate success and failure in the present study, future work is necessary to determine
15 whether this is indeed the case, and if so, which circumstances are most important. Recent
16 research in context of performance may provide a guide for this work (e.g., Lizmore et al., 2019).

17 Burnout is a multidimensional syndrome and therefore should be examined as such
18 (Eklund & DeFreese, 2020). In the present study, we followed this recommendation and
19 anticipated differential mediation effects depending on which burnout symptom was examined.
20 However, based on the size and similarity of confidence intervals for significant effects, this was
21 not the case. It appears that stress has a similar explanatory role for all burnout symptoms (e.g.,
22 Defreese & Smith, 2014). While at odds with some theoretical explanations outside of sport (e.g.,
23 Leiter & Maslach, 1988), it is in line with sport-specific models of burnout which do not
24 differentiate between symptoms (e.g., Smith, 1986). Because personality is thought to frame the

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1 appraisal process, and subsequent experiences of stress, our findings suggest that perfectionistic
2 concerns will result in increases in all burnout symptoms via stress.

3 **Applied Implications**

4 The findings have a number of implications for practice. First and foremost, reducing
5 perfectionism, and in particular perfectionistic concerns, could mean that athletes become less
6 vulnerable to burnout. Previous research (within and outside of sport) has shown that strategies
7 attached to cognitive behavioral therapy are effective in this regard (e.g., Donachie & Hill, 2020;
8 Rozenhal et al., 2017; Shafran et al., 2017). Beyond a cognitive behavioral approach, initial
9 evidence suggests that athlete perfectionistic concerns can be lowered through mindfulness and
10 self-compassion interventions (De Petrillo et al., 2009; Mosewich et al., 2013). The effectiveness
11 of mindfulness has also been echoed in students (James & Rimes, 2018), with the caveat that it
12 could be difficult for perfectionistic individuals to implement (Flett et al., 2020). In the context of
13 the present study, the development of a mindfulness state could allow athletes to become more
14 present minded and less ruminative following a mistake, which could avoid triggering or
15 perpetuating stress, and ultimately reduce the risk of burnout.

16 There is also a need to consider interventions that reduce stress directly. One such approach
17 is stress resistance training (SRT; Sallen et al., 2018). Such training focuses on identifying
18 stressors, developing coping strategies, and planning solutions for anticipated problems. When
19 packaged together, the training has been found to reduce chronic stress, stress reactivity, and
20 stress symptoms. Furthermore, there is evidence that undertaking training for emotional and
21 problem focused coping can be effective (Reeves et al., 2011). Based on the present findings, in
22 both cases, there is a need for similar interventions that specifically target perfectionistic athletes.

23 While addressing the antecedents of burnout could provide effective prevention, under
24 certain circumstances, there could be a need for targeting and reducing athlete burnout directly.

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1 However, there is a dearth of evidence pertaining to burnout intervention outside of sport (Ahola,
2 Toppinen-Tanner, & Seppänen, 2017). Likewise, intervention research in sport is in its infancy,
3 with initial evidence suggesting that the use of mindful recovery, self-regulation, or gratitude
4 could be effective for burnt-out athletes (see Madigan, 2021). To this end, advocate the need for
5 burnout researchers to provide well-designed interventions that tackle the three burnout
6 symptoms as a matter of urgency.

7 **Limitations and Future research**

8 The present study has several limitations. First, the present findings were based on cross-
9 sectional data. It was therefore not possible to test any temporal relationships between the
10 variables. Future work should examine our model longitudinally to confirm the theoretical
11 ordering of variables. Second, we examined the independent effects of perfectionistic strivings
12 and perfectionistic concerns on athlete burnout via perceived stress. This approach neglects the
13 within-person combinations of perfectionistic strivings and perfectionistic concerns in athletes
14 (see Hill et al., 2019). Subsequently, future research may want to adopt a person-oriented
15 approach to examining the relationships between perfectionism, stress, and athlete burnout (e.g.,
16 Pacewicz et al., 2018). Third, the study examined perfectionism using a single subscale for both
17 perfectionistic strivings and perfectionistic concerns. This is noteworthy as researchers have
18 highlighted that each higher-order dimension may be best measured using multiple subscales
19 (e.g., Stoeber & Madigan, 2016). While these underlying dimensions typically share similar
20 relationships with important outcome variables (i.e., demonstrate evidence of functional
21 homogeneity), the individual subscales represent unique aspects of perfectionistic strivings or
22 perfectionistic concerns. Therefore, it may be important for future research to examine whether
23 any meaningful differences between perfectionism, stress, and burnout are found when using
24 different measures of perfectionistic strivings and perfectionistic concerns. Notably, we suggest

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1 that such research should consider the interpersonal dimensions captured within Hewitt and
2 Flett's conceptualisation of perfectionism (e.g., Hill et al., 2020). In particular, researchers should
3 examine the extent to which socially prescribed (perception that others expect demand perfection
4 from them) and other-oriented perfectionism (demanding perfection from others) can influence
5 burnout symptoms via stress.

6 **Conclusion**

7 Guided by Smith's (1986) cognitive affective model, in present study we aimed to
8 examine whether stress mediated the relationship between perfectionism and burnout in athletes.
9 We found that this was indeed the case for perfectionistic concerns. It appears that athletes high
10 in perfectionistic concerns are likely to experience heightened levels of stress in sport which may
11 in turn render them more vulnerable to burnout.

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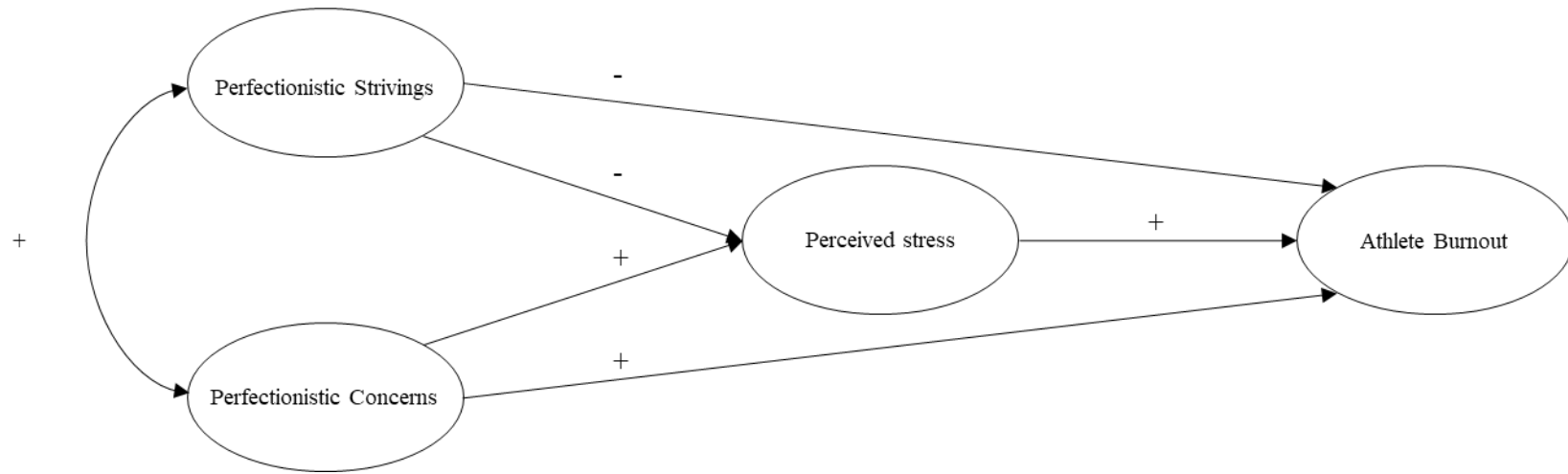
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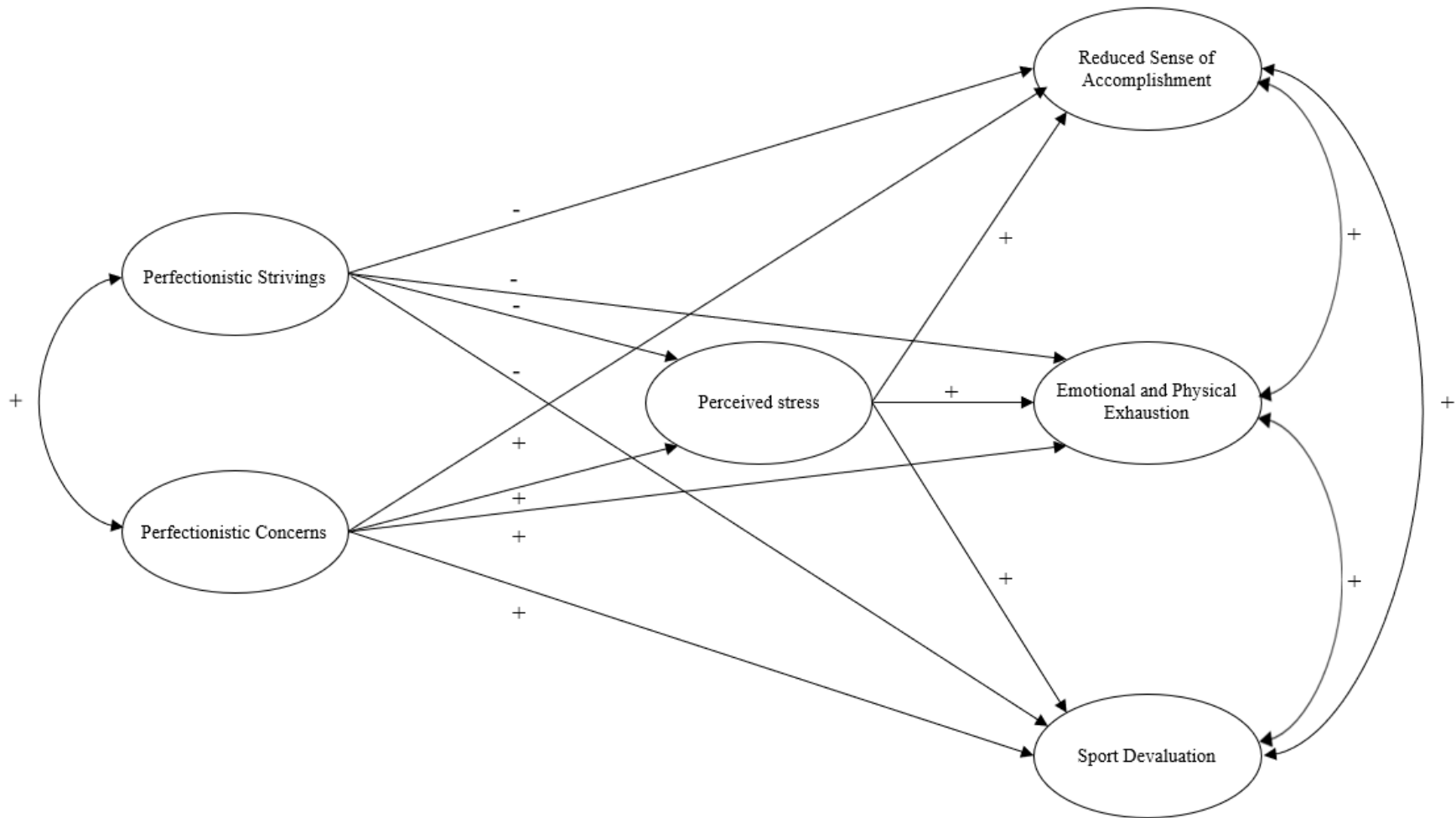
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1 *Figure 1.* Model of the hypothesised relationships between perfectionistic strivings, perfectionistic concerns, perceived stress, and total
2 burnout.

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1 *Figure 2.* Model of the hypothesised relationships between perfectionistic strivings, perfectionistic concerns, perceived stress, and burnout
2 symptoms.

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Table 1. *Descriptive Statistics, Cronbach's Alphas, and Bivariate Correlations*

Variable	1	2	3	4	5	6	7
1. Perfectionistic Strivings							
2. Perfectionistic Concerns	.41***						
3. Perceived Stress	.11	.35***					
4. Total burnout	-.06	.20**	.43***				
5. Reduced sense of accomplishment	-.05	.23***	.36***	.66***			
6. Emotional and physical exhaustion	.04	.20**	.31***	.68***	.12		
7. Sport devaluation	-.13*	.02	.27***	.80***	.45***	.24***	
<i>M</i>	3.60	3.08	1.89	2.51	2.71	2.51	2.29
<i>SD</i>	0.73	0.73	0.62	0.65	0.74	1.00	0.99
Cronbach's alpha (α)	.82	.77	.85	.85	.77	.92	.84

Note. $N = 253$. * $p < .05$. ** $p < .01$. *** $p < .001$; two-tailed.

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Table 2. *Goodness of Fit Statistics and Information Criteria for the structural equation models*

	χ^2	<i>df</i>	CFI	RMSEA	RMSEA 90% CI	SRMR
<i>Total Burnout</i>						
Structural Model	187.88***	129	.96	.04	[.03, .06]	.06
<i>Burnout Symptoms</i>						
Structural Model	687.11***	390	.92	.06	[.05, .06]	.08

Note. $N = 253$; *** $p < .001$.

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Table 3. *Standardised direct and indirect pathway coefficients from the structural equation models*

Model	Endogenous Variable	Path	R ²		Direct pathways	Indirect Pathways	
			PS + PC on Stress	PS + PC + Stress on Burnout	Standardised coefficient (SE)	Indirect effect (SE)	95% CI
1	Total Burnout		.21	.39			
		PS → Total Burnout			-.28** (.10)		
		PC → Total Burnout			.18 (.13)		
		PS → Stress			-.12 (.10)		
		PC → Stress			.51*** (.09)		
		Stress → Total Burnout			.54*** (.11)		
		PS → Stress → Total Burnout				-.06 (.06)	-.18 to .04
		PC → Stress → Total Burnout				.27 (.07)	.16 to .45 ^a
2	Burnout Symptoms		.21	RSA = .24 EPE = .12 SD = .13			
		PS → RSA			-.24*(.11)		
		PC → RSA			.22 (.12)		
		PS → EPE			-.06 (.10)		
		PC → EPE			.14 (.12)		
		PS → SD			-.18* (.09)		
		PC → SD			-.11 (.11)		
		PS → Stress			-.12 (.10)		
		PC → Stress			.51*** (.09)		
		Stress → RSA			.37*** (.09)		
		Stress → EPE			.28** (.09)		
		Stress → SD			.34** (.08)		
		PS → Stress → RSA				-.04 (.04)	-.13 to .03
		PC → Stress → RSA				.19 (.05)	.10 to .32 ^a

PERFECTIONISM, STRESS, AND BURNOUT

PS → Stress → EPE	-0.03 (.03)	-.12 to .02
PC → Stress → EPE	.14 (.05)	.06 to .27 ^a
PS → Stress → SD	-.04 (.04)	-.12 to .02
PC → Stress → SD	.17 (.05)	.09 to .30 ^a

Note. PS = Perfectionistic strivings; PC = Perfectionistic concerns; RSA = Reduced Sense of accomplishment; EPE = Emotional and physical exhaustion; SD = Sport devaluation $N = 253$; * $p < .05$, ** $p < .01$, *** $p < .001$; ^a = significant indirect effect.