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Perfectionistic Concerns Cognitions Predict Burnout in College Athletes: A Three-Month Longitudinal Study

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Abstract

The majority of research examining the relationship between perfectionism and athlete burnout has focused on trait perfectionism, while overlooking the importance of the cognitive elements of perfectionism. Perfectionistic cognitions represent an influential cognitive bias driving perfectionistic behavior. Although perfectionistic cognitions have been shown to correlate with burnout symptoms in athletes, this body of work is very limited and does not include college athletes. In addition, it is currently unclear whether perfectionistic cognitions also predict changes in athlete burnout over time. To address these issues, we conducted a two-wave, three-month longitudinal study and measured perfectionistic cognitions and burnout in a sample of 170 college athletes both at the start and end of a competitive season. In doing so, we also sought to empirically test the different models of perfectionistic cognitions that have been proposed (original, short, and multidimensional). Using cross-lagged panel models, we found that perfectionistic concerns cognitions predicted increases in burnout. The findings provide initial evidence that perfectionistic cognitions predict changes in athlete burnout over time in college athletes. Consequently, the findings have important implications for our understanding of both athlete burnout and perfectionistic cognitions.

Keywords: burnout, college athletes, mental health, perfectionism, longitudinal study

Introduction

Stress is a physical and psychological response to both internal and external demands (Dos Santos et al., 2020). How an individual copes with stress continues to remain an important area of research in the sport sciences. Athletes are required to cope with both acute and chronic stressors resulting from the physical, cognitive, and environmental demands they face throughout their athletic career (Abedalhafiz et al., 2010; Dos Santos et al., 2020). One particularly relevant outcome of ineffective coping with chronic stress is burnout (Maslach & Leiter, 2016) which has been shown to be common among athletes (Gustafsson et al., 2018). A large number of athletes participate in competitive sport supported by the college which they attend. These college athletes are confronted with a variety of stressors which include training for competition, academic demands, injuries, team conflict, insufficient rest, financial challenges, and expectations from the institution, fans, and family (Holden et al., 2019; Surujlal et al., 2013; Valdez & Juan, 2020). These demands will contribute to chronic stress which increases the likelihood that these athletes will experience symptoms of burnout at some point during their college career.

A number of studies indicate that burnout does exist among college athletes (e.g., Chyi et al., 2019; Dubuc-Charbonneau et al., 2014; Holmberg & Sheridan, 2013; Judge et al., 2012; Schellenberg et al., 2013). This is a concern for the college athlete because burnout will not only negatively impact their performance (Jouper & Gustafsson, 2013; Main & Landers, 2012), but it could lead them to withdraw from their sport altogether (Goodger et al., 2010; Gustafsson et al., 2008). Other negative consequences of burnout include depression (DeFrancisco et al., 2016; Nixdorf et al., 2020), isolating behaviors (Goodger et al., 2007), decreased self-regulation (Dubuc-Charbonneau & Durand-Bush, 2015), and poor quality of life (Bozorghi et al., 2014).

Athlete Burnout

The prevalence of burnout in college athletes has not been established; however, researchers estimate that approximately 10% of competitive athletes experience burnout at some point during their athletic career, with 1-2% experiencing high levels of burnout (Gustafsson et al., 2017, Madigan et al., 2019). Athlete burnout is a multidimensional construct characterized by a reduced sense of accomplishment, devaluation or cynicism directed at sport, and physical and emotional exhaustion (Raedeke & Smith, 2001). These characteristics are typically assessed using the Athlete Burnout Questionnaire (ABQ; Raedeke & Smith, 2001), which is the most widely used measurement tool for burnout in athletes (Gustafsson et al., 2014).

Prominent models suggest that burnout has its roots in stress (Gustafsson et al., 2011; Maslach & Leiter, 2016; Smith, 1986). Smith formalised this idea for the sport domain in his 1986 cognitive-affective model of athlete burnout (Smith, 1986). Smith (1986) argued that stress was the result of the imbalance between external/internal demands and the resources for coping with those demands. Although these demands are related to situational, cognitive, behavioral, and personality factors, Smith (1986) contended that physiological stress was largely influenced by the cognitive appraisals that the athlete made. Interestingly, Smith (1986) also suggested that cognitions aside from the appraisal process appear to play a key role in the development of burnout. He also highlighted that coping skills directed at modifying those cognitions may help reduce burnout (Smith, 1986). The importance of a cognitive component in mediating the stress-burnout relationship has been confirmed in recent studies (Chang et al., 2017; Moen et al., 2019).

Gustafsson et al.'s (2011) integrated model for athlete burnout incorporates aspects of Smith's model while also identifying several factors that increase the athlete's vulnerability to stress, thereby elevating their risk for burnout. Physiological factors include training load and volume (Gustafsson et al., 2017; Main & Landers, 2010). Psychosocial factors include the

motivational climate (Lemyre et al., 2006), a high level of sport investment (Gustafsson et al., 2011; Raedeke, 1997; Schmidt & Stein, 1991), high athletic identity exclusivity (Black & Smith, 2007; Coakley, 1992; Gould et al., 1996), low autonomy (Lonsdale et al., 2009), and perfectionism (Aghdasi, 2014; Appleton & Hill, 2012; Gotwals, 2011; Gould et al., 1996; Hill et al., 2010; Hill & Appleton, 2011; Jowett et al., 2013; Madigan et al., 2015, 2016). Although perfectionism represents one of the most investigated personality factors with regards to burnout (Hill & Curran, 2016), there is a limited amount of research examining the relationship between perfectionism and burnout in college athletes (Chen et al., 2008; Garringer et al., 2018; Gotwals, 2011; Valdez & Juan, 2020).

Perfectionism and Athlete Burnout

Some researchers have suggested that perfectionism is primarily maladaptive in the sport context (Flett & Hewitt, 2005), while others have argued that some aspects of perfectionism (e.g., the pursuit of high standards) can be adaptive (Gotwals et al., 2012; Stoeber, 2012). One of the challenges with understanding the relationship between perfectionism and athlete burnout has been the lack of agreement on how to define and assess perfectionism. A variety of different models and measures have been used to describe perfectionism. Factor analytical evidence has identified a higher-order model for perfectionism that includes two dimensions for perfectionism - perfectionistic strivings (e.g., excessively high personal standards) and perfectionistic concerns (e.g., concerns over making mistakes; Hill & Curran, 2016; Hill et al., 2018). Perfectionistic strivings has been shown to be negatively related to athlete burnout (Hill et al., 2008; Jowett et al., 2013), whereas perfectionistic concerns have been shown to positively related to athlete burnout (Garinger et al., 2018; Hill, 2013; Jowett et al., 2013; Madigan et al., 2015; 2016).

One limitation of this line of research has been the reliance on the use of multidimensional self-report instruments such as the Multidimensional Perfectionism Scale

(MPS; Hewitt & Flett, 1991) and Multidimensional Inventory of Perfectionism in Sport (MIPS; Stoeber et al., 2006). These instruments examine perfectionism from a trait perspective and do not take into account the cognitive elements of perfectionism (Hill et al., 2020). From the trait point of view, perfectionism is an individual difference characteristic that explains how people differ. For example, self-oriented perfectionists demand perfection from themselves, whereas socially prescribed perfectionists view others as demanding of perfection (Hewitt & Flett, 1991). In this regard, a large body of work has attested to the importance of trait aspects of perfectionism inside and outside sport. For example, a number of meta-analyses have shown that perfectionism is an important predictor of psychopathology in students and the general population (e.g., Limberg et al., 2017). Inside sport, recent reviews highlight the important motivational, emotional, and wellbeing consequence of perfectionism for athletes (see Hill et al., 2018 for a review).

Perfectionistic Cognitions

Perfectionism can also be viewed from a cognitive or state-like perspective. For example, Shafran et al. (2002) have suggested that perfectionism is driven by irrational cognitions or thinking patterns. Other researchers have suggested that perfectionistic individuals have a cognitive style occupied with automatic and frequent thoughts for maintaining perfectionism (Hall et al., 2012; Flett & Hewitt, 2014). Flett et al. (1998) referred to these frequent thoughts as perfectionistic cognitions which represent an influential cognitive bias driving perfectionistic behavior. The utility of examining perfectionistic cognitions has been found outside of sport. Individuals who report higher perfectionistic cognitions have been found to be more psychologically stressed, anxious, self-critical, and display an inability to change the cognitive processes related to maintaining perfectionism (Flett et al., 1998; Flett et al., 2007; Flett et al., 2012; Flett et al., 2002). There is also evidence for the utility of perfectionistic cognitions inside

of sport. For example, Donachie et al. (2018; 2019) have shown that perfectionistic cognitions predict pre-competition emotions in athletes both cross-sectionally and over time. Perfectionistic cognitions did so over and above trait perfectionism (i.e., added unique explanatory capacity when controlling for trait dimensions).

Importantly, based on factor-analysis, several models of perfectionistic cognitions have been proposed. Originally, perfectionistic cognitions were assessed using the Perfectionism Cognition Inventory (PCI; Flett et al., 1998). The PCI contains 25 items and is conceptualized as a unidimensional measure. More recently, Donachie and colleagues (2018) developed the PCI-10, a 10-item short-form, and found it to a valid and reliable unidimensional measure of perfectionistic cognitions. Finally, using exploratory factor analysis, Stoeber et al. (2014) revealed three substantial factors for the original PCI (perfectionistic concerns [concerns about mistakes, self-ideal discrepancies, and other people's evaluations], perfectionistic strivings [high personal standards], and perfectionistic demands [demands for self-improvement]) demonstrating that the PCI may actually have a multidimensional structure. In addition, Stoeber et al. (2014) found that these dimensions showed stronger positive and negative relationships to psychological maladjustment than the original PCI.

Perfectionistic Cognitions and Athlete Burnout

The role of perfectionism in the development of burnout in sport has been reiterated and tested many times. This includes numerous cross-sectional studies that have been summarized in meta-analyses (see Hill & Curran, 2016) and also in longitudinal studies showing that perfectionism precedes increases in burnout over time (e.g., Madigan et al., 2016). This large body of work has been extensively dedicated to the study of the relationship between trait perfectionism and athlete burnout (Hill & Curran, 2016). This is because trait perfectionism likely contributes to the chronic stress that forms the basis of burnout development (Maslach &

Leiter, 2016; Smith, 1986). The cognitive aspects of perfectionism (i.e., perfectionistic cognitions) have also been shown to be related to psychological distress (Flett et al., 2007; Flett et al., 2012; Flett et al., 2002); however, research examining the relationship between perfectionistic cognitions and athlete burnout is very limited.

So far, only one study has examined the relationship between perfectionistic cognitions and athlete burnout. Hill and Appleton (2011) recruited a sample of 202 male rugby players and adopted the original 25-item PCI and found that perfectionistic cognitions were positively related to burnout (and even explained additional variance in burnout after controlling for the trait characteristics of perfectionism). This previous work provided preliminary evidence that perfectionistic cognitions may be important in regards to athlete burnout. However, the study by Hill and Appleton has the limitation that it adopted a cross-sectional design. Such designs provide us with limited evidence in relation to causality (e.g., Taris, 2000). Consequently, longitudinal designs that allow for an inference of temporal precedence are an important next step in terms of establishing causal relations between perfectionistic cognitions and athlete burnout.

Although studies have tested both the original 25-item conceptualisation of perfectionistic cognitions and the shortened 10-item conceptualisation in sport (Donachie et al., 2018; Hill & Appleton, 2011), no study has tested the multidimensional model. In addition, no study has yet compared the empirical utility of the different models of perfectionistic cognitions. This is important because it would provide us with a clearer picture in relation to which model may be most useful in sport. This would have important practical implications in relation to perfectionism-fuelled burnout (see Hill & Curran, 2016). This is because perfectionistic cognitions may be more malleable than trait aspects of perfectionism, and therefore, more likely to change following intervention (Flett et al., 2002). This is an area currently missing from the

perfectionism and athlete burnout literature and represents a potentially important intervention strategy for reducing burnout in college athletes.

Longitudinal Research Examining Athlete Burnout and Perfectionism

Athlete burnout has been mostly examined using a cross-sectional design; however, longitudinal designs are useful for examining potential causal relationships between certain variables and burnout. For example, different motivational indices were able predict changes in burnout over the course of a season (Lonsdale & Hodge, 2011). In addition, Schellenberg et al. (2013) found that coping was a mediating variable between harmonious and obsessive passion and changes in burnout during a competitive season. In a more recent study, Martinent et al. (2020) found that the reduced accomplishment dimension of athlete burnout could predict changes in the other two dimensions of burnout over a two-month period.

Only a few longitudinal studies have examined the relationship between perfectionism and athlete burnout over time (Chen et al., 2009; Madigan et al., 2015, 2016). Chen et al. (2009) assessed trait perfectionism and athlete burnout over a three month period; however, perfectionism was only assessed at one time point during the three month period and burnout was assessed before and after a three month interval when athletes were not training.
In contrast, Madigan et al. (2015) assessed trait perfectionism and athlete burnout in junior athletes at two different time periods separated by three months of active training. They found that perfectionistic concerns predicted increases in athlete burnout over time, whereas perfectionistic strivings predicted decreases. In a follow up study, Madigan et al. (2016) examined whether these two dimensions of perfectionism interacted with each other to predict athlete burnout and found that perfectionistic strivings could buffer the effects of perfectionistic concerns on burnout over time. Currently, however, there are no studies examining whether perfectionistic cognitions could predict changes in burnout over time.

The Present Study

The aim of the present study was to provide the first longitudinal examination of the relationship between perfectionistic cognitions and burnout in college athletes. In doing so, we tested the predictive ability of the three factor structures of perfectionistic cognitions (original, short, and multidimensional). Based on previous cross-sectional research (Hill & Appleton, 2011), we expected perfectionistic cognitions to predict increases in athlete burnout over time. In addition, based on previous work using the multidimensional conceptualisation of perfectionistic cognitions (Stoeber et al., 2014), we expected that the perfectionistic concerns cognitions dimension would show the strongest positive relationship with changes in athlete burnout.

Method

Participants

A sample of 170 collegiate athletes (95 males, 75 females) was recruited to participate in the present study. The majority of participants were aged 18 to 22 years old (93.5%). Participants were involved in a range of sports (53 in soccer, 51 in football, 14 in softball, 14 in volleyball, 12 in cross country, 11 in baseball, and 15 in others [e.g., tennis]) and the majority had been involved in their sport for over 12 years (51.2%). The athletes engaged in the typical training and competitive requirements respective to their sport for the duration of three months.

Procedure

A sample of NCAA Division II male and female athletes from various sports at a single university consented to participate in the study. In order to participate in the study, the athletes had to be both actively training and competing. Permission to conduct research at this site was authorized by the Athletic Director for sports at the university and the university's Institutional Review Board. Informed consent was obtained from all participants. A secure online system (Qualtrics) was used to administer the questionnaire at the beginning and end of the athlete's

competitive season, which lasted three months. The Qualtrics system notified the athlete that they had to complete all questions before moving on to the next section of the questionnaire and submitting the survey. The survey could not be submitted unless all questions were completed. This was done to minimize or eliminate missing data. Only teams that had a three-month competitive season were considered for this study in order to maintain consistency for the time period among all the participants. This period also allowed us to capture an entire season for as many athletes as possible (see also Madigan et al., 2015).

Measures

Perfectionistic cognitions. To measure perfectionism, we used the Perfectionistic Cognitions Inventory (PCI; Flett et al., 1998). The original PCI is a self-report measure that has 25 items and uses a five-point Likert scale. Participants were asked how often they experienced cognitions as described in the statements responding on a scale from 0 ("Not all") to 4 ("All of the time"). We also examined the Short-PCI (i.e., PCI-10; Donachie et al., 2018) which has 10-items. Finally, we examined the multidimensional version of the PCI (Stoeber et al., 2014) which has three subscales capturing perfectionistic strivings cognitions (9 items; e.g., "It's important to set high standards for myself"), perfectionistic concerns cognitions (10 items; "I must be perfect at any cost"), and perfectionistic demands cognitions (6 items; "I'll blame myself if I make a mistake"). There is reliability and validity evidence for each of the three approaches (Flett et al., 2012; Hill & Appleton, 2011; Kobori et al., 2011; Stoeber et al., 2010; Stoeber et al., 2014).

Athlete burnout. To measure burnout, we used the Athlete Burnout Questionnaire (ABQ; Raedeke & Smith, 2001). The ABQ is a 15-item measure using a 5-point Likert scale. It comprises three subscales capturing the key symptoms of athlete burnout: reduced sense of accomplishment (5 items; e.g., "I am not achieving much in my sport"), physical and emotional

exhaustion (5 items; e.g., “I am exhausted by the mental and physical demands of my sport”), and devaluation (5 items; e.g., “I’m not into my sport like I used to be”). Participants were asked how often they experienced the symptoms described in the statements responding on a scale from 1 (“Almost never”) to 5 (“Almost always”). The ABQ is the most widely used measure of athlete burnout and has demonstrated reliability and validity in numerous studies (e.g., Cresswell & Eklund, 2005; Lemyre et al., 2006; Lonsdale et al., 2007).

A demographics questionnaire was also part of the survey. The following demographic information was requested from the athletes: (a) sport, (b) gender, (c) age, and (d) number of years participating in their chosen sport.

Data Screening

First, we inspected the data for missing values. There were no missing item responses. Next, we computed Cronbach’s alphas for our variables which were all satisfactory (see Table 1). Then, following recommendations by Tabachnick and Fidell (2007), we examined the skewness and kurtosis of the data. We found that the data showed a multivariate normal distribution. Next, data were screened for multivariate outliers. No participant showed a Mahalanobis distance larger than the critical value of $\chi^2_{(8)} = 26.13$, $p < .001$. As such, inferential statistics were calculated using all available data. The level of statistical significance was set at $p < .05$.

Analytic Strategy

To examine whether perfectionistic cognitions predicted longitudinal changes in athlete burnout, we employed structural equation modeling with manifest variables to test and compare a series of cross-lagged models (Kline, 2005). To do so, we employed Mplus 8.1 (Muthén & Muthén, 1998-2012) using robust maximum likelihood estimation, with the accompanying mean-adjusted chi square test statistic that is robust to non-normality (Satorra & Bentler, 1994).

To evaluate model fit, we chose the following fit indices: comparative fit index (CFI), Tucker-Lewis index (TLI [also known as non-normed fit index, NNFI]), standardized root mean square residual (SRMR), and the root mean square error of approximation (RMSEA; see Marsh, Hau, & Wen, 2004). We used the following cut-off values as benchmarks for acceptable (CFI > .90, TLI > .90, SRMR < .10, RMSEA < 10) and good model fit (CFI > .95, TLI > .95, SRMR < .08, RMSEA < .08; Marsh et al., 2004). We then tested three models of perfectionistic cognitions predicting athlete burnout, which included the different conceptualizations of perfectionistic cognitions. Model 1 tested the original unidimensional conceptualization. Model 2 tested the short-form version. Model 3 tested the multidimensional version (differentiating between perfectionistic concerns, perfectionistic strivings, and perfectionistic demands cognitions). All models included within-wave correlations and stability coefficients (i.e., autoregressive paths from a variable at Time 1 to the same variable at Time 2). See Figure 1 for an illustrative example using Model 1.

Results

Descriptive Statistics and Correlations

First, we inspected the bivariate correlations between all variables (see Table 1). In regards to the correlations between perfectionistic cognitions and burnout, at Time 1, the short-form perfectionistic cognitions and perfectionistic concerns cognitions were positively correlated with exhaustion and reduced accomplishment. Perfectionistic strivings cognitions were negatively correlated with devaluation. Further, Time 1 perfectionistic concerns cognitions were positively correlated with Time 2 exhaustion and reduced accomplishment. Time 1 perfectionistic strivings were negatively correlated with Time 2 devaluation. All correlations between cognition dimensions and burnout were small-sized.

Cross-Lagged Panel Models

Next, we examined fit and path coefficients for the cross-lagged models. Fit indices are reported in Table 2. All models provided adequate-to-good fit to the data. They also revealed moderate stability of both perfectionistic cognitions and athlete burnout. Model 1 showed that perfectionistic cognitions was a nonsignificant predictor of all dimensions of athlete burnout (perfectionistic cognitions T1 → exhaustion T2: β = .01; perfectionistic cognitions T1 → reduced accomplishment T2: β = .01; perfectionistic cognitions T1 → devaluation T2: β = -.03). Similarly, Model 2 showed that perfectionistic cognitions was a nonsignificant predictor of all dimensions of athlete burnout (perfectionistic cognitions T1 → exhaustion T2: β = -.01; perfectionistic cognitions T1 → reduced accomplishment T2: β = .03; perfectionistic cognitions T1 → devaluation T2: β = -.03). However, Model 3 showed that the perfectionistic concerns cognitions dimension predicted both reduced accomplishment (β = .17) and devaluation (β = .16). As such, based on these findings, Model 3 was accepted as our final model out of the three models. See Figure 2 for the significant paths from Model 3 (see Supplementary Material for nonsignificant paths and within-wave correlations).

Discussion

The aim of the present study was to examine for the first time whether perfectionistic cognitions predicted changes in burnout over time in college athletes. We also sought to determine whether this relationship differed based on the model of perfectionistic cognitions that was used (original, short, and multidimensional). In line with our expectations, the perfectionistic concerns cognitions dimension predicted increases in the reduced sense of accomplishment and devaluation dimensions of burnout. However, no other dimension, including the original and short unidimensional conceptualisations of perfectionistic cognitions, predicted changes in athlete burnout.

Extending previous cross-sectional work, the present study provides the first evidence that perfectionistic concerns cognitions predict changes in athlete burnout. Specifically, when athletes experience a high frequency of perfectionistic concerns-based automatic thoughts (e.g., "Why can't things be perfect?") they are vulnerable to an increased frequency of burnout symptoms. This is particularly worrying given the ways in which burnout can negatively affect the experiences of athletes in their sports (Madigan et al., 2019). In the context of the present sample, college athletes are already susceptible to burnout given the requirement for managing other stressors related to their academic, social, and financial obligations (Dos Santos et al., 2020), so those with high perfectionistic concerns cognitions may be particularly at risk. In addition to trait aspects of perfectionism, which have repeatedly been tied to increased burnout (e.g., Madigan et al., 2015; 2016), then, the present findings suggest that further research examining perfectionistic cognitions in relation to athlete burnout is warranted.

In regards to other relevant findings from the present study, the short conceptualisation of perfectionistic cognitions showed positive correlations with the exhaustion and reduced sense of accomplishment dimensions of burnout at Time 1. These findings parallel Hill and Appleton's (2011) cross-sectional study in which perfectionistic cognitions (using the original PCI) was significantly correlated with these same burnout dimensions. However, neither the original nor short conceptualizations of perfectionistic cognitions predicted changes in burnout over time. As to why this is the case, a comparison of uni- versus multi-dimensionality may be important. It is possible that the multidimensional model of perfectionistic cognitions better encapsulates the concerns about mistakes, self-ideal discrepancies, and other people's evaluations that are likely to be involved in the stress process (Stoeber et al., 2014). Overall, then, these findings offer initial empirical evidence that a multidimensional approach to the study of perfectionistic cognitions may be appropriate in sport, at least in context of athlete burnout.

It is worth noting that the athletes in this study were experiencing low to moderate levels of burnout at the end of the competitive season. The mean scores for emotional/physical exhaustion, reduced sense of accomplishment, and sport devaluation were 2.85 (*SD* = .88), 2.38 (*SD* = .75), and 2.20 (*SD* = .91), respectively. In the only other study examining the relationship between perfectionistic cognitions and athlete burnout, Hill and Appleton (2011) reported a mean score of 2.15 (*SD* = .73) for emotional/physical exhaustion, 2.39 (*SD* = .62) for reduced sense of accomplishment, and 1.65 (*SD* = .71) for sport devaluation. The mean values reported for emotional/physical exhaustion, reduced sense of accomplishment, and sport devaluation in this study are also consistent with other studies examining burnout in college athletes (DeFreese & Smith, 2013; Dubuc-Charbonneau et al., 2014; Holmberg & Sheridan, 2013; Lemyre et al., 2006; Raedeke & Smith, 2001).

Based on the standard deviation of burnout dimensions noted in this study, it is possible that a proportion of the athletes were experiencing higher levels of burnout. The results of this research suggests that athletes who have frequent perfectionistic cognitions will experience increasing levels of burnout over time and may reach higher levels of burnout given enough time. It should also be noted that recent research has questioned the emotional/physical exhaustion and sport devaluation dimensions for athlete burnout and whether the ABQ accurately captures the elements of these dimensions (Isoard-Gauther et al., 2018). The development of the Athlete Burnout Scale (ABO-S; Isoard-Gauther, 2018) may represent an alternative measurement tool for burnout, but further research is needed to validate its use in the sport domain, especially with regards to identifying interventions for athletes who achieve high scores on the scale.

Interventions targeting perfectionism-fuelled burnout in sport are clearly needed (see Hill & Curran, 2016). Due to the stable nature of trait perfectionism, however, it may not be

amenable to change via intervention and, as such, perfectionistic cognitions may be a better alternative for intervening (Macedo et al., 2014). This is because perfectionistic cognitions are theorised to be less stable (and more state-like) than trait aspects of perfectionism. Based on the present findings and research showing that trait perfectionism itself can contribute to perfectionism concerns cognitions (see Macedo et al., 2017), we suggest that interventions aimed at reducing perfectionistic cognitions target the concerns dimension as a preliminary and promising place to start such work. For example, students higher in perfectionistic concerns reported lower scores in quality of daily life; however, positive reframing, acceptance, and humor were accommodative coping strategies especially for those students high in perfectionistic concerns (Stoeber & Jansenn, 2011).

Cognitive Behavioral Therapy (CBT) has been shown to reduce the symptoms for burnout (Lagerveld et al., 2012). CBT has also been shown to reduce perfectionism with large effect sizes for changes in the concerns over mistakes dimension (Lloyd et al., 2015). Perfectionistic concerns were also reduced following cognitive-behavioral interventions (Egan et al., 2014). Emerging approaches to CBT such as Acceptance and Commitment Therapy (ACT) and Mindfulness-based Cognitive Therapy (MBCT) have also shown promise in reducing symptoms for burnout (Lloyd et al., 2013; Gustafsson et al., 2015; Jouper et al., 2013). A combination of mindfulness-, acceptance-, and value-based (MAV) interventions were able to decrease the symptoms for burnout with the largest effects observed in individuals who practiced more often and showed higher learning during the intervention period (Kinnunen et al., 2019). Research is clearly needed to determine whether targeting perfectionistic concerns cognitions can alleviate the risk of burnout in athletes.

Limitations and Future Research

The present study had a number of limitations. First, previous research has controlled for

trait dimensions of perfectionism. Future research is therefore required to determine whether perfectionistic cognitions predict burnout over and above trait dimensions when examined over time. In this regard, there is also evidence that perfectionistic cognitions serve a mediating role between trait aspects and pre-competition emotions in athletes (e.g., Donachie et al., 2019). Examining such an explanatory model in relation to athlete burnout would also be worthwhile. Second, it is unclear whether the present findings will generalise beyond the present sample. Future work should therefore re-examine these relationships in other samples such as junior and elite athletes to confirm whether perfectionistic cognitions act in a similar manner in these groups. Third, we also note that the present significant effects may seem small. However, it is important to be aware that even small effects can be meaningful when they accumulate over time (Prentice & Miller, 1992). Future work should explore different durations between measurement waves to determine whether this makes a difference to the size of the relationships between perfectionistic cognitions and athlete burnout (see e.g., Donachie et al., 2019). Finally, a general measure of perfectionistic cognitions was utilized in the study (as opposed to a domain-specific measure). Shafran et al. (2002) suggested that individuals may develop greater perfectionistic tendencies in achievement domains (e.g., sport) that have personal meaning to them. For example, the Sport Multidimensional Perfectionism Scale-2 (Sport-MPS-2; Gotwals & Dunn, 2010) was developed to assess trait perfectionism within the sport domain, and has shown greater explanatory capacity for sport-related outcomes. The development of a sport-specific measure of perfectionistic cognitions represents another opportunity for future research.

Researchers studying occupational burnout have suggested that burnout is chronic in nature and the result of ineffective coping with chronic stressors (Maslach & Leiter, 2016; Maslach et al., 2001; Shirom, 2005). Studies investigating the chronic nature of athlete burnout are clearly needed. Research in this field should examine the relationship between stressors and

burnout in athletes over prolonged periods of time, perhaps evens years to further our understanding of the nature of its developmental course. More longitudinal studies are also needed to determine whether interventions over different points in time in an athlete's career can alleviate its progression.

Conclusion

The present study is the first to examine the longitudinal relationship between perfectionistic cognitions and burnout in college athletes. In doing so, we found evidence that perfectionistic concerns cognitions predicted increased athlete burnout over time. Interventions aimed at reducing the risk of burnout in college athletes over the course of a competitive season should include a focus on reducing perfectionistic cognitions, especially with those athletes who present with higher perfectionistic appraisals of their performance. Evidence suggests that CBT-based interventions may be effective in helping athletes with alleviating the symptoms of burnout and perfectionism. Athletes may also find benefit from psychological skills training (e.g., relaxation techniques, self-talk, imagery, goal setting) as provided by a sport psychologist. As a whole, the results of this study highlight the importance of examining the cognitive aspects of perfectionism and its role in the development of burnout in athletes.

References

Abedalbasit, A., Altahayneh, Z., & Al-Haliqu, M. (2010). Sources of stress and coping styles among student-athletes in Jordan universities. *Procedia Social and Behavioral Sciences, 5*, 1911-1917.

Aghdasi, M. T. (2014). The relationship between perfectionism and burnout in junior-elite athletes. *International Journal of Science Culture and Sport*, *2*(1), 27-39.

Appleton, P. R., & Hill, A. P. (2012). Perfectionism and athlete burnout in junior elite athletes: The mediating role of motivation regulations. *Journal of Clinical Sport Psychology, 6,* 129-145.

Black, J. M., & Smith, A. L. (2007). An examination of Coakley's perspectives on identity, control, and burnout among adolescent athletes. *International Journal of Sport Psychology, 38*, 417-436.

Bozorghi, N. H., Nikbakhsh, R., and Tojora, F. (2014). The relationship between quality of life and burnout on athletes. *Bulletin of Environment, Pharmacology and Life Sciences, 3,* 16-19.

Chang, K., Lu, F. J., Chyi, T., Hsu, Y., Chan, S. W., & Wang, E. T. W. (2017). Examining the stress-burnout relationship: the mediating role of negative thoughts. *Peer J, 5*, 1-17.

Chen, L. H., Kee, Y. H., Chen, M., & Tsai, Y. (2008). Relation of perfectionism with athlete burnout: Further examination. *Perceptual and Motor Skills, 106,* 811-820.

Chyi, T., Jing-Horng Lu, F., Wang, E. T. W., Hsu, Y., & Chang, K. (2019). Prediction of life stress on athletes' burnout: the dual role of perceived stress. *Peer J, 6,* 1-14.

Coakley, J. (1992). Burnout among adolescent athletes: A personal failure or social problem? *Sociology of Sport Journal*, *9*, 271-285.

Cresswell, S. L., & Eklund, R. C. (2003). The athlete burnout syndrome: A practitioner's guide.

The New Zealand Journal of Sports Medicine, 31(1), 4-9.

Cresswell, S. L., & Eklund, R. C. (2006). Changes in athlete burnout over a thirty-week "rugby year". *Journal of Science and Medicine in Sport*, *9*, 125-134.

DeFrancisco, C. D., Arce, C., del Pilar Vilchez, M., & Vales, A. (2016). Antecedents and consequences of burnout in athletes: Perceived stress and depression. *International Journal of Clinical and Health Psychology*, *16*, 239-246.

DeFreese, J. D., & Smith, A. L. (2013). Teammate social support, burnout, and self-determined motivation in collegiate athletes. *Psychology of Sport and Exercise*, *14*, 258-265.

Donachie, T. C., Hill, A. P., & Hall, H. K. (2018). The relationship between multidimensional perfectionism and pre-competition emotions of youth footballers. *Psychology of Sport and Exercise*, *37*, 33-42.

Donachie, T., Hill, A. P., & Madigan, D. J. (2019). Perfectionism and precompetition emotions in youth footballers: A three-wave longitudinal test of the mediating role of perfectionistic cognitions. *Journal of Sport and Exercise Psychology*, *41*, 309-319.

Dos Santos, M. L., Ufring, M., Stahl, C. A., Lockie, R. G., Alvar, B., Mann, J. B., & Dawes, J. J. (2020). Stress in academic and athletic performance in collegiate athletes: A narrative review of sources and monitoring strategies. *Frontiers in Sports and Active Living*, *2*, 1-10.

Dubuc-Charbonneau, N., & Durand-Bush, N. (2105). Moving to action: The effects of a self-regulation intervention on the stress, burnout, well-being, and self-regulation capacity levels of university student-athletes. *Journal of Clinical Sport Psychology*, *9*, 173-192.

Dubuc-Charbonneau, N., Durand-Bush, N., & Forneris, T. (2014). Exploring levels of student-athletes burnout at two Canadian universities. *Canadian Journal of Higher Education*, *44*, 135-151.

Egan, S. L., van Noort, E., Chee, A., Kane, R. T., Hoiles, K. J., Shafran, R., & Wade, T. D. (2014). A randomized controlled trial of face to face versus pure online self-help cognitive behavioural treatment for perfectionism. *Behaviour Research and Therapy, 63*, 107-113.

Flett, G. L., & Hewitt, P. L. (2002). Perfectionism and maladjustment: An overview of theoretical, definitional, and treatment issues. In P. L. Hewitt & G. L. Flett (Eds.), *Perfectionism: Theory, research, and treatment* (pp. 5-31). American Psychological Association.

Flett, G. L., & Hewitt, P. L. (2005). The perils of perfectionism in sports and exercise. *Current Directions in Psychological Science*, *14*, 14-18.

Flett, G. L., & Hewitt, P. L. (2014). The perils of perfectionism in sports revisited: Toward a broader understanding of the pressure to be perfect and its impact on athletes and dancers. *International Journal of Sport Psychology*, *45*, 395-407.

Flett, G. L., Hewitt, P. L., Blankstein, K. R., & Gray. L. (1998). Psychological distress and the frequency of perfectionistic thinking. *Journal of Personality and Social Psychology, 75*, 1363-1381.

Flett, G. L., Hewitt, P. L., Demerjian, A., Sturman, E. D., Sherry, S. B., & Cheng, W. (2012). Perfectionistic automatic thoughts and psychological distress in adolescents: An analysis of the perfectionism cognitions inventory. *Journal of Rational-Emotive and Cognitive-Behavior Therapy*, *30*, 91-104.

Flett, G. L., Hewitt, P. L., Whelan, T., & Martin, T. R. (2007). The perfectionism cognitions inventory: Psychometric properties and associations with distress and deficits in cognitive self-management. *Journal of Rational-Emotive and Cognitive Therapy, 25*, 255-277

Flett, G. L., Madorsky, D., Hewitt, P. L., & Heisel, M. J. (2002). Perfectionism cognitions,

rumination, and psychological distress. *Journal of Rational-Emotive & Cognitive-Behavior Therapy*, *20*, 33-47.

Garinger, L. M., Chow, G. M., & Luzzeri, M. (2018). The effect of perceived stress and specialization on the relationship between perfectionism and burnout in collegiate athletes. *Anxiety, Stress, & Coping*, *31*(6), 714-727.

Goodger, K., Lavallee, D., Gorely, T., & Harwood, C. (2010). Burnout in sport: Understanding the process-from early warning signs to individualized intervention. In J. Williams (Ed.), *Applied sport psychology: Personal growth to peak performance* (6th ed., pp. 492-511). McGraw-Hill.

Goodger, K., Wolfenden, L., & Lavallee, D. (2007). Symptoms and consequences associated with three dimensions of burnout in junior tennis players. *International Journal of Sport Psychology*, *38*, 342-364.

Gotwals, J. K. (2011). Perfectionism and burnout within intercollegiate sport: A person-oriented approach. *The Sport Psychologist*, *25*, 489-510.

Gotwals, J. K., Dunn, J. G. H., Causgrove-Dunn, J., & Gamache, V. (2010). Establishing validity evidence for the Sport Multidimensional Perfectionism Scale-2 in intercollegiate sport. *Psychology of Sport and Exercise*, *11*, 423-432.

Gotwals, J. K., Stoeber, J., Dunn, J. G. H., & Stoll, O. (2012). Are perfectionistic strivings in sport adaptive? A systematic review of confirmatory, contradictory, and mixed evidence. *Canadian Psychology*, *53*(4), 263-279.

Gould, D. (1996). Personal motivation gone awry: Burnout in competitive athletes. *Quest*, *48*, 275-289.

Gould, D., Tuffey, S., Udry, E., & Loehr, J. (1996). Burnout in competitive junior tennis players: I. A quantitative psychological assessment. *The Sport Psychologist*, *10*, 322-340.

Gould, D., & Whitley, M. A. (2009). Sources and consequences of athletic burnout among college athletes. *Journal of Intercollegiate Sports, 2,* 16-30.

Gustafsson, H., Davis, P., Skoog, T., Kentta, G., & Harberl, P. (2015). Mindfulness and its relationship to perceived stress, affect, and burnout in elite junior athletes. *Journal of Clinical Sport Psychology, 9,* 263-281.

Gustafsson, H., DeFreese, J. D., & Madigan, D. J. (2017). Athlete burnout: review and recommendations. *Current Opinion in Psychology, 16,* 109-113.

Gustafsson, H., Hancock, D. J., & Cote, J. (2014). Describing citation structures in sport burnout literature: A citation network analysis. *Psychology of Sport and Exercise, 15,* 620-626.

Gustafsson, H., Hassmen, P., Kentta, G., & Johansson, M. (2008). A qualitative analysis of burnout in elite Swedish athletes. *Psychology of Sport and Exercise, 9,* 800-816.

Gustafsson, H., Kentta, G., & Hassmen, P. (2011). Athlete burnout: an integrated model and future research directions. *International Review of Sport and Exercise Psychology, 4,* 3-24.

Gustafsson, H,, Madigan, D. J., & Lundkvist, E. (2018). Burnout in Athletes. In R. Fuchs, & M. Gerber, M. (eds.), *Handbook of stress regulation and sport* (pp. 1-21). Springer.

Hall, H. K., Hill, A. P., & Appleton, P. R. (2012). Perfectionism: A foundation for sporting excellence or an uneasy pathway toward purgatory? In G. Roberts & D. Treasure (Eds.), *Advances in motivation in sport and exercise* (pp. 129-168). Human Kinetics.

Hewitt, P. L., & Flett, G. L. (1991). Perfectionism in the self and social contexts: Conceptualization, assessment, and association with psychopathology. *Journal of Personality and Social Psychology, 60,* 456-470.

Hewitt, P. L., & Flett, G. L. (2002). Perfectionism and stress in psychopathology. In G. L. Flett & P. L. Hewitt (Eds.), *Perfectionism: Theory, research, and treatment* (pp. 255-284).

American Psychological Association.

Hill, A. P. (2013). Perfectionism and burnout in junior soccer players: A test of the 2 X 2 model of dispositional perfectionism. *Journal of Sport & Exercise Psychology*, *35*, 18-29.

Hill, A. P., & Appleton, P. R. (2011). The predictive ability of the frequency of perfectionism cognitions, self-oriented perfectionism, and socially prescribed perfectionism in relation to symptoms of burnout in youth rugby players. *Journal of Sports Sciences*, *29*, 695-703.

Hill, A. P., & Curran, T. (2016). Multidimensional perfectionism and burnout: A meta-analysis. *Personality and Social Psychology Review*, *20*, 269-288.

Hill, A. P., Hall, H. K., & Appleton, P. R. (2010). Perfectionism and athlete burnout in junior elite athletes: The mediating influence of coping tendencies. *Anxiety, Stress, & Coping, 23*, 415-430.

Hill, A. P., Madigan, D. J., Smith, M. M., Mallison-Howard, S. H., & Donachie, T. C. (2020). Perfectionism. In D. Hackfort, & R. J. Schinke (Eds.), *The Routledge International Encyclopedia of Sport and Exercise Psychology: Theoretical and Methodological Concepts* (pp. 405-412). (Key Issues in Sport and Exercise Psychology). Routledge.

Hill, A. P., Mallinson-Howard, S. H., & Jowett, G. E. (2018). Multidimensional perfectionism in sport: A meta-analytical review. *Sport, Exercise, and Performance Psychology*, *7*(3), 235-270.

Holden, S. L., Forester, B. E., Williford, H. N., & Reilly, E. Sport locus of control and perceived stress among college student-athletes. *International Journal of Environmental Research and Public Health*, *16*, 1-7.

Holmberg, P. M., & Sheridan, D. A. (2013). Self-determined motivation as a predictor of burnout among college athletes. *The Sport Psychologist*, *27*, 177-187.

Humphrey, J. H., Yow, D. A., & Bowden, W. W. (2000). *Stress in college athletics: Causes,*

consequences, coping. The Haworth Half-Court Press.

Isoard-Gauther, S., Trouilloud, D., Martinent, G., Guillet-Descas, E., & Cece, V. (2018). Development and evaluation of the psychometric properties of a new measure of athlete burnout: The Athlete Burnout Scale. *International Journal of Stress Management, 25*, 108-123.

Jouper, J., & Gustafsson, H. (2013). Mindful recovery: A case study of a burned-out elite shooter. *The Sport Psychologist, 27*, 92-102. doi: 10.1123/tsp.27.1.92

Jowett, G. E., Hill, A. P., Hall, H. K., & Curran, T. (2013). Perfectionism and junior athlete burnout: The mediating role of autonomous and controlled motivation. *Sport, Exercise, and Performance Psychology, 2*(1), 48-61

Judge, L. W., Bell, R. J., Theodore, R., & Simon, L. (2012). An exploratory examination of burnout in NCAA Division II athletes. *Journal of Intercollegiate Sport, 5*, 230-240.

Kinnunen, S. M., Puolakanaho, A., Asko, T., Makikangas, A., & Lappalainen, R. (2019). Does mindfulness-, acceptance-, and value-based intervention alleviate burnout? A person-centered approach. *International Journal of Stress Management, 26*(1), 89-101.

Kobori, O., Yoshie, M., Kudo, K., & Ohtsuki, T. (2011). Traits and cognitions of perfectionism and their relation with coping style, effort, achievement, and performance anxiety in Japanese musicians. *Journal of Anxiety Disorders, 25*, 674-679.

Lagerveld, S. E., Blonk, R. W., Brenninkmeijer, V., Wijngaards-de Meij, L., & Schaufeli, W. B. (2012). Work-focused treatment of common mental disorders and return to work: a comparative outcome study. *Journal of Occupational Health Psychology, 17*, 220-234.

Lemyre, P., Treasure, P. C., & Roberts, G. C. (2006). Influence of variability in motivation and affect on elite athlete burnout susceptibility. *Journal of Sport and Exercise Psychology, 28*, 32–48.

Limburg, K., Watson, H. J., Hagger, M. S., & Egan, S. J. (2017). The relationship between perfectionism and psychopathology: A meta-analysis. *Journal of Clinical Psychology*, 73(10), 1301-1326.

Lloyd, J., Bond, F. W., & Flaxman, P. (2013). The value of psychological flexibility: Examining psychological mechanisms underpinning a cognitive behavioural therapy intervention for burnout. *Work and Stress, 27*(2), 181-199.

Lloyd, S., Schmidt, U., Khondoker, M., & Tchanturia, K. (2015). Can psychological interventions reduce perfectionism? A systematic review and meta-analysis. *Behavioural and Cognitive Psychotherapy, 43*, 705-731.

Lonsdale, C., & Hodge, K. (2011). Temporal ordering of motivational quality and athlete burnout in elite sport. *Medicine and Science in Sports and Exercise, 43*(5), 913-921

Lonsdale, C., Hodge, K., & Rose, E. (2009). Athlete burnout in elite sport: A self-determination perspective. *Journal of Sport Sciences, 27*(8). 785-795.

Macedo, A., Marques, M., & Pereira, A. T. (2014). Perfectionism and psychological distress: A review of the cognitive factors. *International Journal of Clinical Neurosciences and Mental Health, 1*, 1-10.

Macedo, A., Marques, C., Quaresma, V., Soares, M. J., Amaral, A. P., Araujo, A. I., & Pereira, A. T. (2017). Are perfectionism cognitions and cognitive emotion regulation strategies mediators between perfectionism and psychological distress? *Personality and Individual Differences, 119*, 46-51.

Madigan, D. J., Gustafsson, H., Smith, A., Raedeke, T. D., & Hill, A. P. (2019). The BASES expert statement on burnout in sport. *The Sport and Exercise Scientist, 61*, 6-7.

Madigan, D. J., Stoeber, J., & Passfield, L. (2015). Perfectionism and burnout in junior athletes: A three-month longitudinal study. *Journal of Sport and Exercise Psychology, 37*, 305-315.

Madigan, D. J., Stoeber, J., & Passfield, L. (2016). Motivation mediates the perfectionism-burnout relationship: A three-wave longitudinal study with junior athletes. *Journal of Sport and Exercise Psychology, 38,* 341-354.

Main, L. C., & Landers, G. J. (2012). Overtraining or burnout: A training and psycho-behavioral case study. *International Journal of Sports Science and Coaching, 7,* 23-31.

Martinent, G., Louvet, B., & Decret, J. C. (2020). Longitudinal trajectories of athlete burnout among young table tennis players: A 3-wave study. *Journal of Sport and Health Science, 9,* 367-375.

Maslach, C. & Leiter, M. P. (2016). Understanding the burnout experience: recent research and its implications for psychiatry. *World Psychiatry, 15,* 103-111.

Maslach, C., Schaufeli, W. B., & Leiter, M. P. (2010). Job burnout. *Annual Review of Psychology, 52,* 397-422.

Moen, F., Hrozanova, M. Stiles, T. C., & Stenseng, F. (2019). Burnout and perceived performance among junior athletes-associations with affective and cognitive components of stress. *Sports, 7,* 1-11.

Nixdor, I., Beckmann, J., & Nixdorf, R. (2020). Psychological predictors for depression and burnout among German junior elite athletes. *Frontiers in Psychology, 11,* 1-13.

Prentice, D. A., & Miller, D. T. (1992). When small effects are impressive. *Psychological Bulletin, 112,* 160-164.

Raedeke, T. D. (1997). Is athlete burnout more than just stress? A sport commitment perspective. *Journal of Sport and Exercise Psychology, 19,* 396-417.

Raedeke, T. D., & Smith, A. L. (2001). Development and preliminary validation of an athlete burnout measure. *Journal of Sport and Exercise Psychology, 23,* 281-306.

Schellenberg, B. J., Gaudreau, P., & Crocker, P. R. (2013). Passion and coping: Relationship

with changes in burnout and goal attainment in collegiate volleyball players. *Journal of Sport & Exercise Psychology, 35*, 270-280.

Schmidt, G. W., & Stein, G. L. (1991). Sport commitment: A model integrating enjoyment, dropout, and burnout. *Journal of Sport and Exercise Psychology*, *8*, 254-265.

Shafran, R., Cooper, Z., & Fairburn, C. G. (2002). Clinical perfectionism: A cognitive-behavioral analysis. *Behavior Research and Therapy, 40*, 773-791.

Shirom, A. (2005). Reflections on the study of burnout. *Work & Stress*, *19*, 263-270.

Smith, R. E. (1986). Toward a cognitive-affective model of athletic burnout. *Journal of Sport Psychology*, *8*, 36-50.

Smith, A.L., Pacewicz, C.E. & Raedeke, T.D. (2019). Athlete burnout in competitive sport. In T.S. Horn & A.L. Smith (Eds.), *Advances in sport and exercise psychology* (pp. 409-424). Human Kinetics.

Stoeber, J. (2012). Perfectionism and performance. In S. M. Murphy (Ed.), *Oxford handbook of sport and performance psychology* (pp. 294-303). New York, NY: Oxford University Press.

Stoeber, J., & Janssen, D. P. (2011). Perfectionism and coping with daily failures: positive reframing helps achieve satisfaction at the end of the day. *Anxiety, Stress, & Coping*, *24*(5), 477-497.

Stoeber, J., Kobori, O., & Brown, A. (2014). Examining mutual suppression effects in the assessment of perfectionism cognitions: Evidence supporting multidimensional assessment. *Assessment, 21*, 647-660.

Stoeber, J., Kobori, O., & Tanno, Y. (2010). The Multidimensional Perfectionism Cognitions Inventory–English (MPCI-E): Reliability, validity, and relationships with positive and negative affect. *Journal of Personality Assessment, 92*, 16-25.Stoeber, J., Otto, K., &

Stoll, O. (2006). Multidimensional inventory of perfectionism in sport: English version. Retrieved from https://kar.kent.ac.uk/41560/1/MIPS%20-%20English%20Version%20%28Nov%202006%29.pdf

Surjlal, J., Van Zyl, Y., & Nolan, V. T. (2013). Perceived stress and coping skills of university student-athletes and the relationship with life satisfaction. *African Journal for Physical, Health Education, Recreation and Dance*, *19*(4), 1047-1059.

Tabachnick, B.G., & Fidell, L.S. (2007). *Using multivariate statistics* (5th ed.). Boston, MA: Pearson.

Taris, T. W. (2000). *A primer in longitudinal data analysis*. Thousand Oaks, CA: Sage.

Valdez, R. B., & Juan, V. T. (2020). Levels of perfectionism and sports burnout among student-athletes. *International Journal of Scientific & Technology Research*, *9*(4), 271-279.

Wilson, G., & Pritchard, M. (2005). Comparing sources of stress in college student athletes and non-athletes, *Athletic Insight*, *7*, 1-8. Retrieved from http://www.athleticinsight.com/Vol7Iss1/StressPDF.pdf

Table 1

Descriptive Statistics, Cronbach's Alphas, Bivariate and Partial Correlations

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Time 1																
1. PCI																
2. PCI-10	.96***															
3. PS	.89***	.82***														
4. PC	.88***	.92***	.62***													
5. PD	.84***	.72***	.74***	.59***												
6. E	.14	.18*	.04	.23**	.05											
7. RA	.07	.15*	-.09	.22**	.03	.48***										
8. D	-.04	.05	-.17*	.12	-.12	.53***	.63***									
Time 2																
9. PCI	.67***	.66***	.59***	.62***	.53***	.11	.07	.01								
10. PCI-10	.62***	.65***	.51***	.63***	.43***	.10	.14	.07	.95***							
11. PS	.63***	.60***	.69***	.47***	.51***	-.05	-.11	-.12	.88***	.79***						
12. PC	.53***	.57***	.35***	.64***	.31***	.25**	.24**	.17*	.85***	.90***	.55***					
13. PD	.55***	.49***	.49***	.41***	.59***	.05	.01	-.09	.81***	.66***	.69***	.50***				
14. E	.10	.11	.01	.19*	.00	.68***	.35***	.44***	.14	.14	-.03	.29***	.05			
15. RA	.06	.12	-.08	.20**	-.03	.35***	.66***	.48***	.11	.18*	-.12	.36***	-.05	.42***		
16. D	-.06	-.00	-.19*	.11	-.14	.41***	.46***	.71***	.01	.08	-.14	.24**	-.16*	.55***	.63***	
M	2.20	1.95	2.59	1.55	2.69	2.84	2.21	2.01	2.12	1.88	2.49	1.51	2.57	2.85	2.38	2.20
SD	0.67	0.84	0.77	0.81	0.70	0.82	0.66	0.77	0.65	0.79	0.76	0.78	0.76	0.88	0.75	0.91
Alpha	.93	.88	.87	.87	.76	.89	.77	.85	.91	.86	.85	.86	.76	.92	.81	.91

Note. PCI = 25-item perfectionistic cognitions, PCI-10 = short-form perfectionistic cognitions, PS = perfectionistic strivings cognitions, PC = perfectionistic concerns cognitions, PD = perfectionistic demands cognitions, E = physical and emotional exhaustion, RA = reduced sense of accomplishment, D = devaluation.

Table 2

Model Fit Indices for Cross-Lagged Models

Model	χ^2	*df*	S-B	RMSEA (90% CI)	SRMR	TLI	CFI
Model 1: Original	6.98	9	0.99	.000 (.000-.072)	.051	1.00	1.00
Model 2: Short	7.58	9	0.99	.000 (.000-.076)	.051	1.00	1.00
Model 3: Multidimensional	28.11	21	0.99	.045 (.000-.084)	.052	0.98	0.99

Note. χ^2 = Chi-Square, S-B = Satorra-Bentler correction, RMSEA = Root Mean Square Error of Approximation, CI = Confidence Interval, SRMR = Standardised Root Mean Residual, Tucker Lewis Index, CFI = Comparative Fit Index.

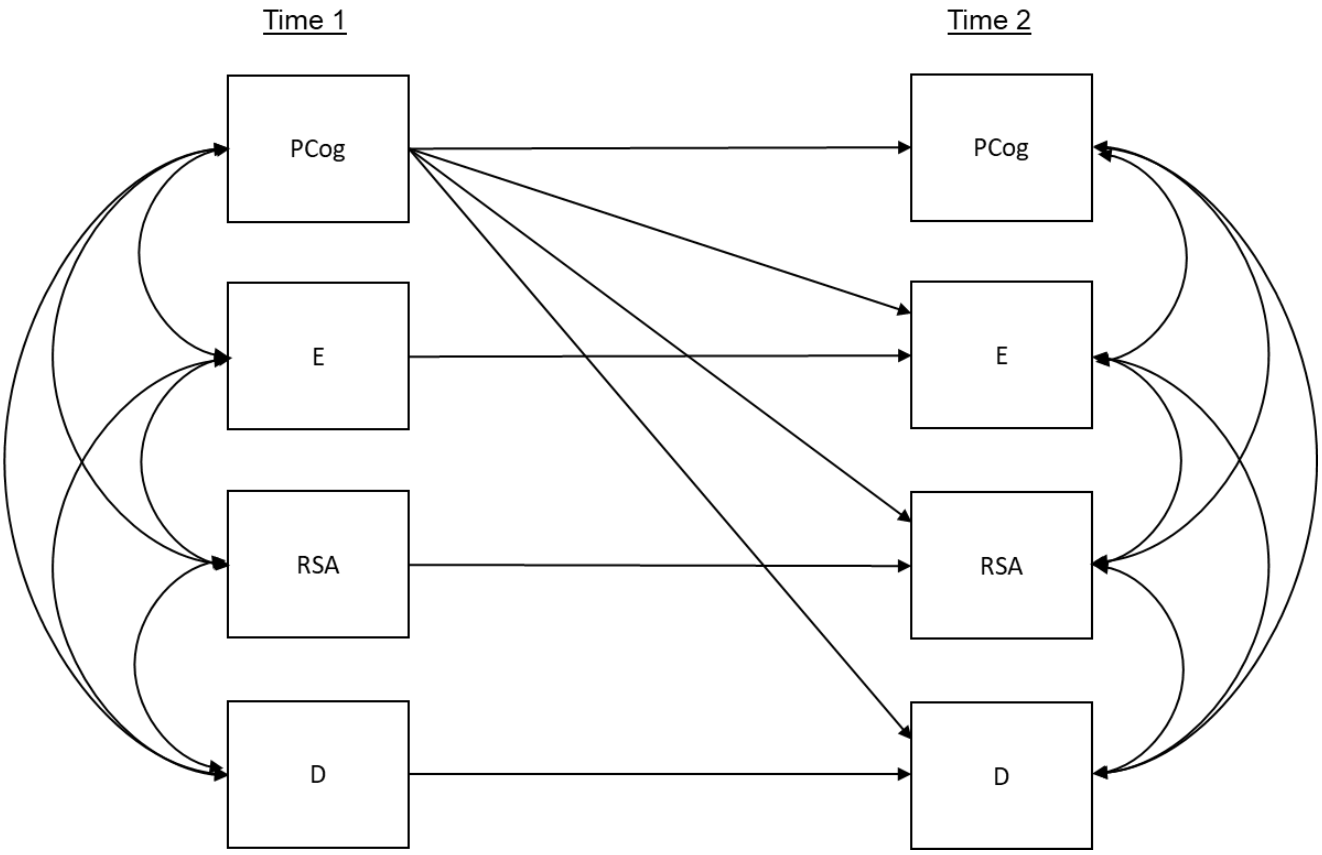

Figure 1. Hypothesised model of the relationships between perfectionistic cognitions and athlete burnout over time. *Note.* PCog = perfectionistic cognitions, E = exhaustion, RSA = reduced sense of accomplishment, D = devaluation.

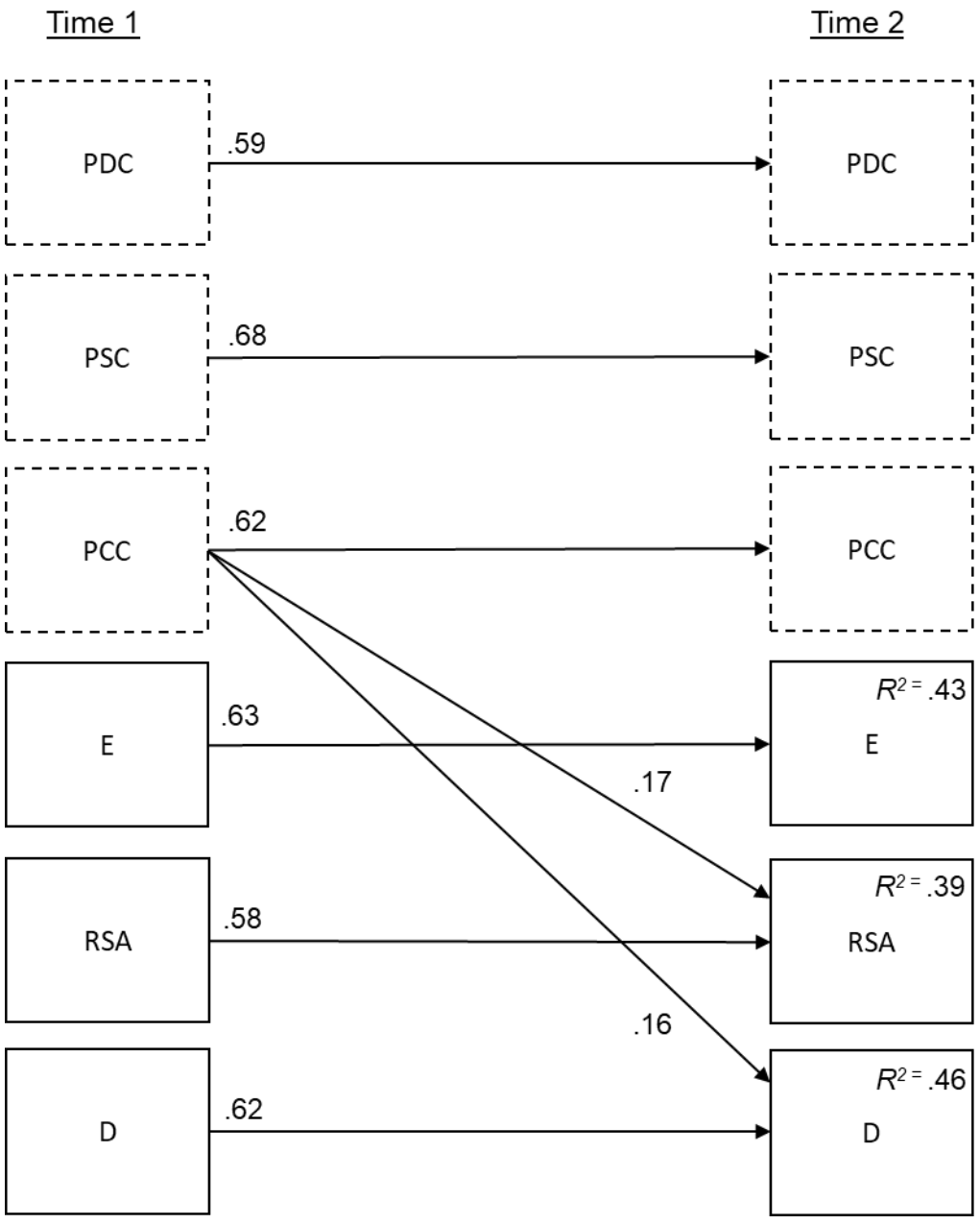

Figure 2. Final empirical model of multidimensional perfectionistic cognitions predicting changes in athlete burnout over time (Model 3: Multidimensional). For clarity, only significant cross-lagged paths are shown. *Note.* PDC = perfectionistic demands cognitions, PSC = perfectionistic strivings cognitions, PCC = perfectionistic concerns cognitions. E = exhaustion, RSA = reduced sense of accomplishment, D = devaluation.