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Perfectionism, Burnout and Engagement in Youth Sport: The Mediating Role of Basic
Psychological Needs

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Abstract

Recent research indicates perfectionistic concerns and perfectionistic strivings share divergent associations with athlete burnout and athlete engagement. Guided by self-determination theory, the present study examined whether these associations were explained by basic psychological needs. Youth athletes ($n = 222$, M age = 16.01, $SD = 2.68$) completed measures of multidimensional perfectionism, athlete burnout, athlete engagement, basic psychological need satisfaction and thwarting. Structural equation modelling revealed that basic psychological need satisfaction and thwarting mediated the perfectionism-engagement and perfectionism-burnout relationships. Perfectionistic concerns shared a negative relationship (via need satisfaction) with athlete engagement and a positive relationship (via need satisfaction and thwarting) with athlete burnout. In contrast, perfectionistic strivings shared a positive relationship (via need satisfaction) with athlete engagement and a negative relationship (via need satisfaction and thwarting) with athlete burnout. The findings highlight the role of basic psychological needs in explaining the differential associations that perfectionistic concerns and strivings share with athlete burnout and engagement.

Keywords: Perfectionistic strivings, perfectionistic concerns, basic psychological need satisfaction, basic psychological need thwarting, youth sport

Perfectionism, Burnout and Engagement: The Mediating Role of Basic Psychological Needs

Youth athletes seeking elite status must dedicate significant physical resources to deliberate practice and maintain this level of dedication over several years in order to achieve their goal (Ward, Hodges, Starkes, & Williams, 2007). This is a challenging endeavour and the experiences of athletes who undertake it can differ considerably. For some youth athletes, this process can be psychologically rewarding and place them on a path to long-term participation in sport. However, for others, the psychological and physical demands can prove too great, fostering an experience laden with self-doubt and frustration that places them on a path to extreme disaffection. Two outcomes reflective of the potential for differing experiences in youth sport are the focus of this study, namely athlete engagement and athlete burnout.

Athlete burnout is a psychosocial syndrome characterised by symptoms of reduced athletic accomplishment, emotional and physical exhaustion, and devaluation of sport participation (Raedeke, 1997; Raedeke & Smith, 2001). It is estimated that a significant minority of athletes (approximately 6% to 11%) suffer elevated levels of these burnout symptoms (Eklund & Cresswell, 2007), with indications that aspiring young athletes may be particularly at risk (Curran, Appleton, Hill, & Hall, 2013). This is concerning given that athletes with high levels of burnout have been found to report feeling depressed, irritated, frustrated, and exhausted (Gustafsson, Hassmén, Kenttä, & Johansson, 2008). Afflicted athletes also report negative changes in their attitude towards sport, as well as an aversion to training coupled with feelings of guilt (Gustafsson et al., 2008). In accord, the symptoms of athlete burnout are tied to a number of negative experiential outcomes including anxiety, low levels of enjoyment (Cresswell & Eklund, 2006; Goodger, Gorely, Lavalley, & Harwood, 2007) and negative affect (Gustafsson, Skoog, Podlog, Lundqvist, & Wagnsson, 2013).

An alternative, altogether more adaptive, experiential state for youth athletes is captured by athlete engagement. Athlete engagement is considered a distinct, conceptually opposing, construct to athlete burnout (Defreese & Smith, 2013). Its dimensions include confidence, dedication, vigour, and enthusiasm (Lonsdale, Hodge, & Raedeke, 2007). Consequently, athlete engagement reflects generalized positive affect and cognitions about one's sport (Lonsdale et al., 2007). In accord, researchers have found that athlete engagement is associated with positive cognitive and affective experiences including flow (Hodge, Lonsdale, & Jackson, 2009), higher self-regulation (Martin & Malone, 2013), better work-life balance and lower burnout (DeFreese & Smith, 2013). Given that athlete engagement and burnout reflect such contrasting youth sport experiences that could either provide a foundation for future sport participation or undermine it, an important goal for sport psychology researchers is to identify factors that may contribute to their occurrence.

Higher-order perfectionism, athlete burnout and engagement

Perfectionism is one factor that appears to underpin youth athlete burnout, but may also energise engagement. Perfectionism is defined as a multidimensional personality disposition that includes striving for flawlessness accompanied by harsh critical evaluations (Frost, Marten, Lahart & Rosenblate, 1990). A recent consensus has emerged that two higher-order dimensions of perfectionism should be differentiated, namely perfectionistic concerns and perfectionistic strivings (Stoeber, 2011, 2014). Perfectionistic concerns are defined as the pursuit of exacting standards imposed by significant others, perceived negative evaluation from others, and discrepancy between one's expectations and performance. In contrast, perfectionistic strivings are defined as the pursuit of self-imposed goals and standards accompanied by harsh self-criticism (Dunkley, Blankstein, Halsall, Williams, & Winkworth, 2000). Support for this approach is provided by factor analytical studies outside of sport in which a two factor higher-order solution has consistently emerged from existing

multidimensional models (e.g., Bieling, Israeli, & Antony, 2004; Cox, Enns, & Clara, 2002; Frost, Heimberg, Holt, Mattia, & Neubauer, 1993).

In sport, researchers examining perfectionistic concerns and strivings have found support for their distinction. Perfectionistic concerns tend to be positively related to maladaptive outcomes and negatively related to adaptive outcomes. For example, Gaudreau and Antl (2008) found that perfectionistic concerns shared a positive association with avoidance-based coping strategies and shared an inverse association with life satisfaction in athletes. Perfectionistic strivings, on the other hand, exhibit a mixed pattern of association with intrapersonal outcomes in sport (see Gotwals, Stoeber, Dunn, & Stoll, 2012 for a review). For instance, numerous studies indicate that perfectionistic strivings are associated with indicators of both well- and ill-being (see Gotwals et al., 2012), integrated and non-integrated motivation (Appleton & Hill, 2012), learning and outcome goals (Stoeber, Uphill, & Hotham, 2009) and activity dependence and performance (Hall, Hill, Appleton & Kozub, 2009; Rasquinha, Dunn, & Causgrove Dunn, 2014).

Perfectionistic concerns and perfectionistic strivings also differentially correlate with athlete burnout. Here, a number of studies indicate that perfectionistic concerns share a positive association with athlete burnout, whereas perfectionistic strivings are inversely associated, or unrelated, to the syndrome (e.g., Appleton, Hall, & Hill, 2009; Hill, Hall, Appleton, & Kozub, 2008; Hill, Hall, Appleton, & Murray, 2010). In the case of athlete engagement, no study has to date examined its interplay with perfectionism dimensions. Yet research among employees alludes to a pattern of relationships which opposes the perfectionism-burnout relationships. Specifically, Childs and Stoeber (2010) recently found that higher perfectionistic strivings corresponded with higher work engagement, whereas higher perfectionistic concerns corresponded with lower work engagement. On the basis of

extant research, then, multidimensional perfectionism appears to be an important factor in the onset of both burnout and engagement.

A next step in understanding the interplay of perfectionistic concerns and strivings, with athlete burnout and engagement, is to identify potential mediating processes that link the constructs. Several mediating variables in the perfectionism-burnout relationship have been identified. This research has predominantly been aligned with the stress-based model of athlete burnout (see Smith, 1986), which emphasises the balance between perceived demands and resources. In this literature, researchers have found that coping strategies (Hill, Hall, & Appleton, 2010), and factors which influence athletes' appraisals of athletic demands (e.g., unconditional self-acceptance, Hill et al., 2008; validation seeking, and growth seeking, Hill, Hall, Appleton, & Murray, 2010) mediate the perfectionism-burnout relationship in youth sport settings. While these studies provide useful insight into this process, these variables are limited inasmuch as they may not account for the perfectionism-athlete engagement relationship, which is likely to be underpinned by more than the absence of stress (i.e., just because a youth athlete has low levels of stress and anxiety, doesn't mean that they will be highly engaged). In addition, the perfectionism-burnout relationship is likely to be explained by more than stress (i.e., stress-related variables are likely to be only one of multiple explanatory processes). Therefore, a more encompassing approach which extends this stress-based approach is required.

Self-determination theory

Self-determination theory (Ryan & Deci, 2002) is an organismic framework of human motivation that offers explanations for both the perfectionism-engagement and perfectionism-burnout relationships in youth sport. According to self-determination theory, optimal functioning (e.g., engagement) is the result of dispositional and environmental factors that provide support for behavioral integration (i.e., when behavior aligns with one's interests).

Behavioral integration is fostered by perceived satisfaction of innate basic psychological needs. These include needs for autonomy (viz. a sense of personal agency), competence (viz. a sense of effectiveness within one's environment), and relatedness (viz. a sense of belonging and connection with significant others) (Ryan & Deci, 2000). In the same vein, though, humans are also vulnerable to maladaptive functioning (e.g., burnout) when dispositions or environments are antagonistic to behavioral integration (i.e., when behavior and one's interests conflict). Antagonism to behavioral integration is underpinned by a thwarting of the basic psychological needs, encapsulated by perceptions of heteronomy, incompetence, and rejection. Accordingly, self-determination theory offers a useful lens through which to view the processes by which perfectionism might evoke engagement or burnout in youth sport.

Taking heed of self-determination theory, recent research suggests that different levels of behavioural integration mediate the perfectionism-burnout relationship. For example, in study with youth athletes, Jowett, Hill, Hall and Curran (2013) found that a controlled motivation composite consisting of poorly integrated forms of behavioural regulation (viz. introjection and external) mediated the positive association between perfectionistic concerns and athlete burnout. Conversely, an autonomous motivation composite consisting of well-integrated forms of behavioural regulation (viz. intrinsic, integrated and identified) mediated the negative association between perfectionistic strivings and athlete burnout. In addition, other recent work has highlighted low levels of amotivated behavioural regulation, in particular, as a further mediator of the perfectionistic strivings-burnout association among youth athletes (Appleton & Hill., 2012). Given that behavioural integration and subsequent well-or-ill-being occurs via basic psychological needs, a next logical step in this line of enquiry is to examine the mediating role of basic psychological needs in the perfectionism-burnout and perfectionism-engagement associations.

Recent evidence supports the role of basic psychological needs in the development of burnout and engagement. Most notably, a recent meta-analysis demonstrated that higher psychological need satisfaction is associated with lower athlete burnout (Li, Wang, Pyun & Kee, 2013). Likewise, researchers have also found evidence to support a positive association between basic psychological need satisfaction and athlete engagement (Hodge et al., 2009). In a recent extension to this research, Bartholomew, Ntoumanis, Ryan, and Thøgersen-Ntoumani (2011) observed that the positive association between basic psychological need thwarting and athlete burnout, was stronger than the negative association between basic psychological need satisfaction and athlete burnout. This finding is important because it highlights the conceptual distinction between need satisfaction (a lack of opportunities for need fulfilment) and need thwarting (active obstruction to need fulfilment). In doing so, it suggests that active obstruction of needs may place athletes at greater risk of increased burnout and reduced engagement than perceiving lack of opportunities for need satisfaction (Bartholomew, Ntoumanis, Ryan, & Thøgersen-Ntoumani, 2011).

Perfectionism and basic psychological needs

It is likely that perfectionistic strivings and perfectionistic concerns will predict athlete engagement and burnout via the satisfaction and thwarting of basic psychological needs. Perfectionistic concerns are likely to undermine basic psychological need satisfaction and increase basic psychological need thwarting. This is because perfectionistic concerns regulate behaviour largely through the avoidance of negative social-evaluation (Kaye, Conroy, & Fifer, 2008). This means that excessive external performance standards must be met in order to preserve self-worth and avoid negative emotional experiences. These neurotic tendencies are likely to undermine perceptions of autonomy, competence, and relatedness, and promote perceptions of heteronomy, incompetence, and rejection (Niemic, Ryan, & Brown, 2008). In support of these ideas, researchers have recently found longitudinal

evidence for a positive association between perfectionistic concerns and psychological need thwarting (Boone, Vansteenkiste, Soenens, Deeder, & Verstuyf, 2014). Furthermore, it appears that these associations are mirrored in the context of youth sport, where Mallinson and Hill (2011) found a positive association between perfectionistic concerns and psychological need thwarting in young athletes.

Perfectionistic strivings, by contrast, are likely to predict higher levels of basic psychological need satisfaction, and lower levels of basic psychological need thwarting. This is because perfectionistic strivings regulate behaviour largely through the approach tendencies and the attainment of high personal standards. These standards are self-set, and highly energising, meaning athletes exhibiting perfectionistic strivings are likely to experience concomitant gains in the basic psychological needs – particularly those of autonomy and competence (Mallinson & Hill, 2011). In support of these ideas, Mallinson and Hill (2011) found that when perfectionistic concerns were controlled, individual dimensions of perfectionistic strivings were inversely related to competence thwarting and unrelated to other elements of psychological need thwarting. Together, the findings from Mallinson and Hill (2011) and Boone et al. (2014) have begun to highlight the divergent associations that perfectionistic strivings and perfectionistic concerns share with basic psychological need thwarting and possibly need satisfaction.

The present study

In line with the theoretical and empirical evidence outlined above, the present study had three aims. The first aim was to examine the perfectionism-engagement association for the first time in a youth sport context. The second was to examine the perfectionism-burnout association. The third aim was to examine whether basic psychological need satisfaction and thwarting mediated these associations. Given the theoretical and empirical associations

outlined above and in line with the aims of the study, the hypotheses are formalised below and summarised in Figure 1.

1. Perfectionistic concerns will share a negative association athlete engagement and perfectionistic strivings will share a positive association with athlete engagement.
2. Perfectionistic concerns will share a positive association with athlete burnout and perfectionistic strivings will share a negative association with athlete burnout.
- 3a. The perfectionistic concerns-engagement and perfectionistic concerns-burnout associations will be mediated via a negative association with basic psychological need satisfaction and a positive association with basic psychological need thwarting.
- 3b. The perfectionistic strivings-engagement and perfectionistic strivings-burnout associations will be mediated via a positive association with basic psychological need satisfaction, and via a negative association with basic psychological need thwarting.

Method

Participants and procedure

Following institutional ethical approval, parental consent and participant assent, 222 junior athletes were recruited from sports clubs and organisations across Northern England. They included 98 males and 124 females whose mean age was 16.01 years ($SD = 2.68$ years). Sports from which they were recruited included football ($n = 61$), rugby ($n = 47$) cricket ($n = 17$), swimming ($n = 62$), synchronised swimming ($n = 20$), diving ($n = 14$), and golf ($n = 1$). On average, participants trained and competed for 9.51 hours per week ($SD = 4.54$ hours), had been competing for 7.21 years ($SD = 3.53$ years), and rated their participation in sport as

very important in comparison to other activities in their lives ($M = 6.24$, $SD = .85$: 1 = *not at all important* to 7 = *extremely important*).

Instruments

Athlete Burnout. The Athlete Burnout Questionnaire (ABQ; Raedeke & Smith, 2001) was used in the present study to assess athlete burnout. The ABQ is a 15-item inventory made up of three five item subscales: reduced sense of accomplishment (e.g., “I am not achieving much in sport”), perceived emotional and physical exhaustion (e.g., “I feel so tired from my training that I have trouble finding the energy to do other things”); and athlete's devaluation of their sport (e.g., “The effort I spend in sport would be better spent doing other things”). The subscales were measured on a 5-point Likert (1 = *almost never* to 5 = *almost always*). As in previous research (e.g., Lonsdale, Hodge, & Rose, 2009), a global burnout score was calculated by averaging scores from the three subscales. Evidence has been provided to support the validity and the reliability of the scale. This includes factor structure, internal consistency ($\alpha \geq .85$), and test-retest reliability ($r \geq .86$) (Raedeke & Smith, 2001).

Athlete Engagement. The Athlete Engagement Questionnaire (AEQ; Lonsdale et al., 2007) was used in the present study. The AEQ includes the stem “When I participate in sport...” and is a 16 item inventory consisting of four subscales: confidence (e.g., “I am confident in my abilities”), dedication (e.g., “I am dedicated to achieving my goals”), vigour (e.g., “I feel really alive”), and enthusiasm (e.g., “I feel excited about my sport”). Each subscale includes four items and is measured on a 5-point Likert scale (1 = *almost never* to 5 = *almost always*). As in previous research (Hodge et al., 2009), an overall engagement score was calculated by averaging scores from the four subscales. Evidence has been provided which supports the validity and reliability of the scale. This includes support for the factor structure of the scale via confirmatory factor analysis and internal consistency ($\alpha \geq .84$; Lonsdale et al., 2007).

Perfectionistic Concerns and Perfectionistic Strivings. In line with the suggestions of Stoeber (2011, 2014) multiple measures were used as indicators of perfectionistic concerns and perfectionistic strivings. Three subscales were used as indicators of perfectionistic concerns. These were the eight item concern over mistakes subscale (e.g., “If I fail in competition I feel like a failure as a person”) and the six item doubts about actions subscale (e.g., “I usually feel unsure about the adequacy of my pre-competition practices”) from the Sport Multidimensional Perfectionism Scale (SMPS-2; Gotwals & Dunn, 2009), and the five item socially prescribed perfectionism subscale (e.g., “People expect nothing less than perfection from me.”) from the Cox et al. (2002) short version of the Hewitt and Flett (1991) Multidimensional Perfectionism Scale (H-MPS). Two subscales were used as indicators of perfectionistic strivings. These were the seven item personal standards subscale (e.g., “I hate being less than the best at things in my sport”) from the SMPS-2 and the five item self-oriented perfectionism subscale (e.g., “One of my goals is to be perfect in everything I do.”) from H-MPS. Evidence has been provided to support the internal consistency (H-MPS, $\alpha \geq .79$; SMPS, $\alpha \geq .74$) of the subscales (Cox et al., 2002; Gotwals, Dunn, Causgrove Dunn, & Gamache, 2010).

Basic Psychological Need Satisfaction. The Basic Need Satisfaction in Sport Scale (BNSSS; Ng, Lonsdale, & Hodge, 2011) was used to measure basic psychological need satisfaction. The BNSSS is a 20 item inventory and was used to assess general autonomy satisfaction (ten items e.g., “In my sport, I get opportunities to make choices.”), competence satisfaction (five items e.g., “I am skilled at my sport.”), and relatedness satisfaction (five items e.g., “In my sport, I feel close to other people.”). All subscales were measured on a seven point Likert scale (1 = *not true at all* to 7 = *very true*). The initial validation study by Ng et al. (2011) supported the internal consistency ($\alpha \geq .80$), and the factor structure of the scale. As in previous research (e.g. Curran, et al., 2013), a composite approach was adopted

for basic psychological need satisfaction. This approach adhered to the self-determination theory principal that satisfaction of one need goes hand in hand with satisfaction of the other two (Ryan & Deci, 2002). It was also supported by the positive correlations between the three basic psychological needs demonstrated in previous studies in sport (e.g. Lonsdale et al., 2009).

Basic Psychological Need Thwarting. The Psychological Need Thwarting Scale (PNTS; Bartholomew Ntoumanis, Ryan, & Thøgersen-Ntoumani, 2011) was used to measure basic psychological need thwarting. The PNTS is a 12 item inventory made up of three four-item subscales, measured on a seven point Likert scale (1 = *strongly disagree* to 7 *strongly agree*). The subscales include autonomy thwarting (e.g., “I feel pushed to behave in certain ways in my sport.”), competence thwarting (e.g., “There are situations in my sport where I am made to feel inadequate.”), and relatedness thwarting (e.g., “I feel I am rejected by those around me in my sport.”). The initial validation paper (Bartholomew, Ntoumanis, Ryan, & Thøgersen-Ntoumani, 2011) supported the internal consistency ($\alpha \geq .77$), and the factor structure of the scale. As with basic psychological need satisfaction and in line with recent studies (e.g. Bartholomew, Ntoumanis, Ryan, Bosch, & Thøgersen-Ntoumani, 2011), a composite approach was adopted for basic psychological need thwarting. This was supported by the positive correlations between three components of need thwarting demonstrated previously (e.g. Bartholomew Ntoumanis, Ryan, & Thøgersen-Ntoumani, 2011).

Data analysis

The data were analysed in five stages. Stages one and two were carried out using IBM Statistics SPSS 20.0. In stage one preliminary analyses took place in line with the procedures outlined in Tabachnick and Fidell (2007). This involved initial screening for out of range values, missing value analysis, and checking assumptions of univariate and multivariate normality and reliability. In stage two descriptive statistics were calculated along with

Pearson's bivariate correlations which allowed assessment of the perfectionism-engagement and perfectionism-burnout relationships. Cohen's (1988) descriptors for small ($r \geq .10$ to $.30$), medium ($r \geq .30$ to $.50$) and large effects ($r > .50$) were used in order to aid interpretation of the magnitude of these relationships.

Stage three and four consisted of the two-step procedure for structural equation modelling outlined by Anderson and Gerbing (1988). Firstly, confirmatory factor analysis was used to test the measurement model before assessing the structural relationships. These analyses were conducted using maximum likelihood estimation (ML) in AMOS 20.0 (Arbuckle, 2011). The measurement model consisted of six interrelated latent variables including perfectionistic strivings, perfectionistic concerns, psychological need satisfaction, psychological need thwarting, athlete engagement, and athlete burnout. The latent athlete burnout and athlete engagement variables were linear composites of their respective subscales. Random parcels of items from relevant subscales were used as indicators of latent variables for basic psychological need satisfaction, basic psychological need thwarting, perfectionistic strivings and perfectionistic concerns (Little, Cunningham, Shahar, & Widaman, 2002). Conventional criteria (Marsh, Hau, & Wen, 2004) were used to aid model assessment for adequate (χ^2/df ratio < 3.00 , CFI and IFI $> .90$, SRMR $< .10$, RMSEA $< .10$) and excellent fit (χ^2/df ratio < 2.00 , IFI and CFI $> .95$, SRMR $< .06$, RMSEA $< .06$).

In the fifth stage mediation was assessed by examining the specific indirect effects using the *PRODCLIN* programme (MacKinnon, Fritz, Williams, & Lockwood, 2007). This involved calculating the size and significance of specific indirect effects along with their 95% confidence intervals. Indirect effects are the effect of a predictor variable on an outcome variable via a mediating variable (Preacher & Hayes, 2008). Therefore, indirect effects can be calculated as the product of the path from the predictor to the mediator and the path from the mediator to the outcome (i.e. *ab*, Preacher & Hayes, 2008). Researchers have argued that

indirect effects should be presented with 95% confidence intervals in order to allow interpretation of how accurately the sample statistic reflects the population parameters (Preacher & Kelley, 2011). Significant indirect effects are evident when their 95% confidence intervals exclude zero.

Results

Preliminary analysis

Several participants ($n = 89$) had small amounts of missing data ($M = 2.01$, $s = 1.15$, range 1-5). Therefore, missing values were replaced using the mean of the non-missing items from the relevant subscale in each individual case (Graham, Cumsille, & Elek-Fisk, 2003). In line with Tabachnick and Fidell (2007), reliability analyses were conducted (see Table 1.), and the data were screened for univariate and multivariate outliers. Eight cases with values outside the standardized z score range (± 3.29 , $p < .001$) were removed from the analysis. Mahalanobis Distance $\chi^2_{(19)} = 43.82$ ($p < .001$) revealed six multivariate outliers which were removed. Subsequently, the remaining sample ($n = 208$) were considered approximately, univariate normal (absolute skewness $M = 0.33$, $SD = 0.25$, $SE = 0.17$, absolute kurtosis $M = 0.30$, $SD = 0.20$, $SE = 0.34$). However, estimates of multivariate kurtosis indicated an asymmetrical multivariate distribution (Mardia's normalised coefficient = 27.88). Maximum likelihood estimation is robust to minor deviations from normality but the risk of Type I error (based on chi-square) is increased when deviations are moderate or large (Curran, West, & Finch, 1996). Consequently, a bootstrapping procedure with 5000 iterations was employed to provide a more robust assessment of parameter estimates (Hayes, 2009).

Descriptive statistics and bivariate correlations

The means and standard deviations revealed several noteworthy findings. Firstly, on average, junior athletes tended to display moderate-to-low perfectionistic concerns and moderate-to-high perfectionistic strivings. Secondly, a similar pattern was found for basic

psychological needs with athletes demonstrating high levels of need satisfaction and moderate-to-low levels of need thwarting. Finally, the athletes also tended to display high levels of engagement, and moderate-to-low levels of athlete burnout. These findings are consistent with research which has investigated higher-order factors of perfectionism and basic psychological need thwarting (e.g., Mallinson & Hill, 2011), basic psychological need satisfaction and athlete burnout (Lonsdale et al., 2009; Quested & Duda, 2011), and basic psychological need satisfaction and athlete engagement (Hodge et al., 2009).

Pearson's correlation coefficients revealed that perfectionistic concerns shared medium positive associations with need thwarting and athlete burnout. In contrast perfectionistic strivings shared medium positive associations with need satisfaction and athlete engagement, and small inverse associations with need thwarting and athlete burnout. Need thwarting shared a large positive association with athlete burnout, and medium inverse associations with need satisfaction and athlete engagement. In contrast need satisfaction shared a large positive association with athlete engagement, and a medium inverse association with athlete burnout. As predicted athlete engagement shared a large inverse association with athlete burnout. However, contrary to the hypotheses, no significant association was shared between perfectionistic concerns and need satisfaction or between perfectionistic concerns and athlete engagement. Descriptive statistics and correlations are reported in Table 1.

Structural equation modelling

The results of the confirmatory analysis indicated that the measurement model provided adequate fit to the data, $\chi^2_{(137)} = 341.89, p < .001; \chi^2/df = 2.50, CFI = .92, IFI = .92, SRMR = .09, RMSEA = .09, 90\% CI = .07 \text{ to } .10$. Composite reliabilities (ρ_c) supported the measurement model: perfectionistic striving = .82; perfectionistic concerns = .76; basic

psychological need satisfaction = .89; basic psychological need thwarting = .90, athlete engagement = .90, and athlete burnout = .75.¹

Structural equation modelling indicated that the hypothesized model also provided adequate fit, $\chi^2_{141} = 366.50, p < .001; \chi^2/df = 2.60, CFI = .91, IFI = .91, SRMR = .09, RMSEA = .09, 90\% CI = .08 \text{ to } .10$. The path coefficients are shown in Figure 2. Perfectionistic concerns and perfectionistic strivings accounted for 28% of variance in psychological need satisfaction, and 38% of variance in psychological need thwarting. The combination of higher-order factors of perfectionism and psychological need satisfaction and thwarting accounted for 59% of variance in athlete engagement, and 46% in athlete burnout.

Bootstrap analysis

Bootstrapping with 5000 iterations was employed to assess the stability of the parameter estimates in the structural model. Bootstrapped parameter estimates are displayed in Table 2. These were highly analogous with the parameter estimates derived from the maximum likelihood estimation method, which indicates high parameter stability.

Assessment of mediation

All indirect effects were statistically significant with the exception of the effects of perfectionistic strivings and perfectionistic concerns on athlete engagement via basic psychological need thwarting. Indirect effects are displayed in Table 3. The analyses revealed that perfectionistic strivings-engagement and perfectionistic concerns-engagement associations were mediated by basic psychological need satisfaction. Furthermore, the perfectionistic concerns-burnout and perfectionistic strivings-burnout associations were mediated by basic psychological need satisfaction and thwarting.

¹ Standardized factor loadings from indicator variables to relevant latent variables were all significant ($p < .001$): perfectionistic strivings parcel 1 = .79, parcel 2 = .80, parcel 3 = .75; perfectionistic concerns parcel 1 = .76, parcel 2 = .62, and parcel 3 = .76; psychological need satisfaction parcel 1 = .80, parcel 2 = .85, and parcel 3 = .92; psychological need thwarting parcel 1 = .83, parcel 2 = .88, and parcel 3 = .87; reduced sense of accomplishment = .78, emotional and physical exhaustion = .55, and sport devaluation = .79; confidence = .84, dedication = .85, vigour = .81, and enthusiasm = .81.

Discussion

The first aim of the present study was to examine the perfectionism-engagement association for the first time in a youth sport context. The second aim was to examine the perfectionism-burnout association. The third aim was to examine whether these associations were mediated by basic psychological need satisfaction and thwarting.

Higher-order perfectionism, athlete burnout and athlete engagement

It was hypothesised (Hypotheses 1 and 2) that perfectionistic concerns and perfectionistic strivings would share opposing associations with athlete burnout and athlete engagement. In line with these hypotheses, positive associations were found between perfectionistic concerns and burnout, and perfectionistic strivings and engagement, and a negative association was found between perfectionistic strivings and burnout. In regards to athlete burnout, this confirms the findings of previous research in youth sport (e.g., Hill et al., 2008; Jowett et al., 2013) and provides further evidence of the association between dimensions of perfectionism and athlete burnout. In regards to engagement, the findings are more novel as this is the first study in youth sport to illustrate that the divergence between perfectionistic concerns and strivings extends to the conceptual opposite of athlete burnout, athlete engagement. Most notably, on this issue, the findings demonstrate that as well as being a protective factor against burnout, perfectionistic strivings may also promote engagement in youth athletes.

Perfectionistic concerns, athlete burnout and engagement

It was hypothesised (Hypotheses 3a and 3b) that basic psychological need satisfaction and thwarting would mediate the associations between perfectionism, burnout and engagement. In line with Hypothesis 3a, the findings provide initial cross-sectional evidence that perfectionistic concerns were associated with burnout via a perceived lack of need satisfaction, as well as the perceived thwarting of basic psychological needs. This finding sits

nicely alongside recent work in sport which has illustrated the positive association between perfectionistic concerns and need thwarting (Mallinson & Hill, 2011). It also extends research that has identified other self-determination theory related mechanisms (i.e., controlled and amotivated behavioural integration) as potentially important when explaining the perfectionistic concerns-burnout relationship (Appleton & Hill, 2012; Jowett et al., 2013; Mallinson & Hill, 2011). Consequently, the role of basic psychological needs may provide a valuable avenue for future research examining the associations that perfectionistic concerns share with burnout and other maladaptive outcomes in youth sport.

Perfectionistic concerns also shared an inverse indirect association with athlete engagement via basic psychological need satisfaction. Therefore, in addition to promoting burnout, this dimension of perfectionism may also detract from engagement due to its association with lower need satisfaction. This is a novel finding and is the first time research has identified a possible explanation for the association between perfectionistic concerns and engagement (see Childs & Stoeber, 2010). It is noteworthy, however, that the association between perfectionistic concerns and engagement was not mediated by need thwarting. This was due largely to the small, non-significant association between need thwarting and engagement. When considered together, these pathways suggest that when it comes to athlete engagement, it is perfectionistic concerns inability to nourish rather than actively impoverish psychological need fulfilment that is important.

Perfectionistic strivings, athlete burnout and engagement

In line with Hypothesis 3b, the perfectionistic strivings-burnout association was explained via basic psychological need satisfaction and thwarting. As expected, the effects were in the opposing direction to perfectionistic concerns. It therefore appears that, striving for self-set standards relates to youth athletes' sense of agency, effectiveness and belonging. In line with self-determination theory, when this psychological need satisfaction occurs, ill-

being in the form of burnout is less likely to ensue. Again, this complements other self-determination theory-based research that has found related variables, such as autonomous behavioural integration, to mediate the perfectionistic strivings-burnout relationship (e.g., Appleton & Hill, 2012; Jowett et al., 2013).

The perfectionistic strivings-engagement association was also explained via basic psychological need satisfaction. Mirroring the findings regarding perfectionistic concerns and engagement, this was not the case via basic psychological need thwarting. This particular finding is important because it offers the first clear indication of a possible explanatory mechanism for the direct relationship between perfectionistic strivings and engagement observed here and elsewhere (Childs & Stoeber, 2010). In doing so, it supports a fundamental tenet of self-determination theory that basic psychological needs satisfaction will share a direct relationship with factors indicative of well-being (Ryan & Deci, 2002). It also illustrates that the perfectionistic strivings-engagement and perfectionistic strivings-burnout pathways are characterised by distinct patterns of need fulfilment. This augments the position that engagement and burnout are distinct constructs that warrant individual attention, rather than antipodes on a conceptual continuum (Defreese & Smith, 2013).

Practical Implications

The findings outlined above have potentially important implications for elite youth sport environments, where emphasis is placed on youth athletes adopting high standards and goals (Coakley, 1992). Here coaches and other youth sport practitioners should encourage youth athletes to prioritise setting their *own* (realistic) performance expectations. In line with self-determination theory, this should be done in an autonomy supportive manner, whereby, the coach places emphasis on the athlete's problem solving, decision making and initiation of personal development (Black & Deci, 2000). A technique that may help in this regard is performance profiling (Butler & Hardy, 1992).

Performance profiling consists of athletes identifying personally meaningful attributes, assessing themselves on these attributes in comparison to an ideal standard (e.g. a world class athlete whom they admire), and using resulting discrepancies as a framework for personal development. The technique has proven successful in raising athletes' awareness, motivating athletes to improve, and in supporting athletes' goal setting and subsequent evaluation (Weston, Greenlees, & Thelwell, 2011). By encouraging athletes to identify meaningful attributes and engage in self-assessment, performance profiling offers an autonomy supportive approach to personal improvement that could enhance engagement and reduce the risk of burnout in youth athletes.

Limitations and future directions

The present study findings should be considered in light of a number of limitations. The reliance on self-report measures means the potential for mono-method bias (or common-method variance). This is likely to inflate the association among variables and partly account for the magnitude of the effects. To alleviate this issue future research could consider adopting more diverse measures of well-being and ill-being, such as physiological measures or observations from the viewpoints of coaches or parents. Another limitation stems from the cross sectional design of the study; specifically, the inability to examine temporal precedence. This is important because the ordering of variables cannot be disentangled and mediation effects may differ when examined over time (Maxwell & Cole, 2007). Therefore, in future researchers should seek to re-examine the current model longitudinally. Relatedly, evidence suggests that burnout develops over an extended period of time (Lemyre, Hall, & Roberts, 2008; Quested & Duda, 2011). Capturing this process over intense periods of participation such as end of season competitions may therefore be particularly valuable. Finally, the current study examined mediators of the perfectionism-burnout and perfectionism-engagement associations. Future researchers may also like to examine potential moderating

variables from within self-determination theory. For example, recent research in education highlights the potential moderating role of climate variables (e.g. autonomy support; Benita, Roth, & Deci, 2014).

Conclusions

The present study adds to the growing body of research examining perfectionism and burnout in youth sport, and provides initial evidence of the link between perfectionism and youth athlete engagement. It indicates that perfectionistic strivings and perfectionistic concerns share opposing associations with youth athlete burnout, and that perfectionistic strivings may underpin youth athletes' psychological engagement in sport. It suggests that self-determination theory can explain these associations through basic psychological need satisfaction and thwarting. In doing so the study highlights the importance of the extent to which youth athletes perceive their basic psychological needs to be satisfied or thwarted.

References

- Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin, 103*, 411–423.
DOI:10.1037/0033-2909.103.3.411
- Appleton, P. R., Hall, H. K., & Hill, A. P. (2009). Relations between multidimensional perfectionism and burnout in junior-elite male athletes. *Psychology of Sport and Exercise, 10*, 457–465.
- Appleton, P. A. & Hill, A. P. (2012). Perfectionism and athlete burnout in junior elite athletes: The mediating role of motivation regulations. *Journal of Clinical Sport Psychology, 6* (2). 129-146.
- Arbuckle, J. L. (2011). *IBM SPSS Amos 20.0 [computer program]*. New York: IBM.
- Bartholomew, K. J., Ntoumanis, N., Ryan, R. M., Bosch, J. A., & Thøgersen -Ntoumani, C. (2011). Self-determination theory and diminished functioning: The role of

- interpersonal control and psychological need thwarting. *Personality and Social Psychology Bulletin*, 37, 1459–1473.
- Bartholomew, K. J., Ntoumanis, N., Ryan, R. M., & Thøgersen-Ntoumani, C. (2011). Psychological need thwarting in the sport context: Assessing the darker side of athletic experience. *Journal of Sport & Exercise Psychology*, 33, 75-102.
- Benita, M., Roth, G., & Deci, E. L. (2014). When are mastery goals more adaptive? It depends on experiences of autonomy support and autonomy. *Journal of Educational Psychology*, 106(1), 258-267.
- Bieling, P. J., Israeli, A. L., & Anthony, M. M. (2004). Is perfectionism good, bad, or both? Examining models of the perfectionism construct. *Personality and Individual Differences*, 36, 1373-1385.
- Black, A. E., & Deci, E. L. (2000). The effects of instructors' autonomy support and students' autonomous motivation on learning organic chemistry: A self-determination theory perspective. *Science Education*, 84(6), 740-756.
- Boone, L., Vansteenkiste, M., Soenens, B., Van der Kaap-Deeder, J., & Verstuyf, J. (2014). Self-critical perfectionism and binge eating symptoms: A longitudinal test of the intervening role of psychological need frustration. *Journal of Counseling Psychology*, 61(3), 363-373.
- Butler, R., & Hardy, L. (1992). The performance profile: Theory and application. *The Sport Psychologist*, 6(3), 253-264.
- Childs, J. H., & Stoeber, J. (2010). Self-oriented, other-oriented, and socially prescribed perfectionism in employees: Relationships with burnout and engagement. *Journal of Workplace Behavioral Health*, 25(4), 269-281. doi: 10.1080/15555240.2010.518486
- Coakley, J. (1992). Burnout among adolescent athletes: A personal failure or social problem. *Sociology of Sport Journal*, 9(3), 271-285.

- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.
- Cresswell, S. L., & Eklund, R. C. (2006). Athlete burnout: Conceptual confusion, current research and future research directions. In S. Hanton & S. D. Mellalieu (Eds.), *Literature reviews in sport psychology* (pp. 91-126). Hauppauge, NY: Nova Science Publishers.
- Cox, B. J., Enns, M. W., & Clara, I. P. (2002). The multidimensional structure of perfectionism in clinically distressed and college student samples. *Psychological Assessment, 14*, 365- 373.
- Curran, P. J., West, S. G., & Finch, J. F. (1996). The robustness of test statistics to nonnormality and specification error in confirmatory factor analysis. *Psychological Methods, 1*(1), 16-29.
- Curran, T., Appleton, P. R., Hill, A. P., & Hall, H. K. (2013). The mediating role of psychological need satisfaction in relationships between types of passion for sport and athlete burnout. *Journal of Sports Sciences, 31*(6), 597-606.
- DeFreese, J. D., & Smith, A. L. (2013). Areas of worklife and the athlete burnout engagement relationship. *Journal of Applied Sport Psychology, 25*(2), 180-196.
- Dunkley, D. M., Blankstein, K. R., Halsall, J., Williams, M., & Winkworth, G. (2000). The relation between perfectionism and distress: Hassles, coping, and perceived social support as mediators and moderators. *Journal of Counseling Psychology, 47*, 437-453.
- Eklund, R. C., & Cresswell, S. L. (2007). Athlete burnout. In G. Tenenbaum & R. C. Eklund (Eds.) *Handbook of sport psychology* (3rd ed., pp. 621-641). Hoboken, NJ: John Wiley & Sons Inc.

- Frost, R. O., Heimberg, R. G., Holt, C. S., Mattia, J. I., & Neubauer, A. L. (1993). A comparison of two measures of perfectionism. *Personality and Individual Differences, 14*, 119-126.
- Frost, R. O., Marten, P., Lahart, C., & Rosenblate, R. (1990). The dimensions of perfectionism. *Cognitive Therapy and Research, 14*, 449-468.
- Gaudreau, P., & Antl, S. (2008). Athletes' broad dimensions of perfectionism: examining change in life-satisfaction and the mediating role of motivation and coping. *Journal of Sport & Exercise Psychology, 30*, 356-382.
- Goodger, K., Gorely, T., Harwood, C. and Lavallee, D. (2007). Burnout in sport: A systematic review. *The Sport Psychologist, 21*, 127–151.
- Gotwals, J. K., & Dunn, J. G. H. (2009). A multi-method multi-analytic approach to establishing internal construct validity evidence: The Sport Multidimensional Perfectionism Scale 2. *Measurement in Physical Education & Exercise Science, 13*, 71-92. DOI:10.1080/10913670902812663
- 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. DOI:10.1016/j.psychsport.2010.04.013
- 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.
- Graham, J. W., Cumsille, P. E., & Elek-Fisk, E. (2003). Methods for handling missing data. In J. A. Schinka & W. F. Velicer (Eds.). *Research Methods in Psychology* (pp. 87-114). Volume 2 of Handbook of Psychology (I. B. Weiner, Editor-in-Chief). New York: Wiley.

- Gustafsson, H., Hassmén, P., Kenttä, G., & Johansson, M. (2008). A qualitative analysis of burnout in elite Swedish athletes. *Psychology of Sport and Exercise, 9*(6), 800-816.
- Gustafsson, H., Skoog, T., Podlog, L., Lundqvist, C., & Wagnsson, S. (2013). Hope and athlete burnout: Stress and affect as mediators. *Psychology of Sport and Exercise, 14*(5), 640-649.
- Hall, H. K., Hill, A. P., Appleton, P. R., & Kozub, S. A. (2009). The mediating influence of unconditional self-acceptance and labile self-esteem on the relationship between multidimensional perfectionism and exercise dependence. *Psychology of Sport and Exercise, 10*(1), 35-44.
- Hayes, A. F. (2009). Beyond Baron and Kenny: Statistical mediation analysis in the new millennium. *Communication Monographs, 76*, 408-420.
- 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. DOI:10.1037/0022-3514.60.3.456
- Hill, A.P., Hall, H.K., Appleton, P.R., & Kozub, S.R. (2008). Perfectionism and burnout in junior elite soccer players: The mediating influence of unconditional self-acceptance. *Psychology of Sport and Exercise, 9*, 630–644.
- Hill, A. P., Hall, H. K., & Appleton, P. R. (2010). Perfectionism and athlete burnout in junior elite athletes: The mediating role of coping tendencies. *Anxiety, Stress, & Coping, 23*(4), 415-430.
- Hill, A.P., Hall, H.K., Appleton, P.R., & Murray, J.J. (2010). Perfectionism and burnout in canoe polo and kayak slalom athletes: The mediating influence of validation and growth-seeking. *The Sport Psychologist, 24*, 16–34.

- Hodge, K., Lonsdale, C., & Jackson, S. A. (2009). Athlete engagement in elite sport: An exploratory investigation of antecedents and consequences. *The Sport Psychologist*, 23(2), 186-202.
- 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, 48-61. DOI: 10.1037/a0029770.
- Kaye, M. P., Conroy, D. E., & Fifer, A. M. (2008). Individual differences in incompetence avoidance. *Journal of Sport & Exercise Psychology*, 30(1), 110-132.
- Lemyre, P. N., Hall, H. K., & Roberts, G. C. (2008). A social cognitive approach to burnout in elite athletes. *Scandinavian Journal of Medicine & Science in Sports*, 18(2), 221-234.
- Li, C., Wang, C. K. J., Pyun, D. Y., & Kee, Y. H. (2013). Relationships between self-determined motivation and burnout among athletes: A systematic review and meta-analysis. *Psychology of Sport and Exercise*, 14(5), 692-700. DOI: 10.1016/j.psychsport.2013.04.009
- Little, T. D., Cunningham, W. A., Shahar, G., & Widaman, K. F. (2002). To parcel or not to parcel: Exploring the question, weighing the merits. *Structural Equation Modeling*, 9, 151-173. DOI:10.1207/S15328007SEM0902_1
- Lonsdale, C., Hodge, K., & Jackson, S. A. (2007). Athlete engagement: II. Development and initial validation of the Athlete Engagement Questionnaire. *International Journal of Sport Psychology*, 38(4), 471-492.
- Lonsdale, C., Hodge, K., & Rose, E. (2009). Athlete burnout in elite sport: A self-determination perspective. *Journal of Sports Sciences*, 27, 785-795.

- MacKinnon, D. P., Fritz, M. S., Williams, J., & Lockwood, C. M. (2007). Distribution of the product confidence limits for the indirect effect: Program PRODCLIN. *Behavior Research Methods, 39*, 384-389.
- Mallinson, S. H. & Hill, A. P. (2011). The relationship between multidimensional perfectionism and psychological need thwarting in junior sports participants. *Psychology of Sport and Exercise, 12*, 676-684.
- Marsh, H. W., Hau, K. T., & Wen, Z. L. (2004). In search of golden rules: Comment on hypothesis testing approaches to setting cutoff values for fit indexes and dangers in overgeneralising Hu & Bentler (1999) findings. *Structural Equation Modeling, 11*, 320–341. doi:10.1207/s15328007sem1103_2
- Martin, J. J., & Malone, L. A. (2013). Elite wheelchair rugby players' mental skills and sport engagement. *Journal of Clinical Sport Psychology, 7*(4), 253-263.
- Maxwell, S. E., & Cole, D. A. (2007). Bias in cross-sectional analyses of longitudinal mediation. *Psychological methods, 12*(1), 23-44.
- Niemiec, C. P., Ryan, R. M., & Brown, K. W. (2008). The role of awareness and autonomy in quieting the ego: A self-determination theory perspective. In H. A. Wayment & J. J. Bauer (Eds.), *Transcending self-interest: Psychological explorations of the quiet ego* (pp. 107-115). Washington, DC: APA Books.
- Ng, J. Y. Y., Lonsdale, C., & Hodge, K. (2011). The Basic Needs Satisfaction in Sport Scale (BNSSS): Instrument development and initial validity evidence. *Psychology of Sport and Exercise, 12*, 257-264.
- Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods, 40*(3), 879-891.

- Preacher, K. J., & Kelley, K. (2011). Effect size measures for mediation models: quantitative strategies for communicating indirect effects. *Psychological methods, 16*(2), 93-115.
- Quested, E., & Duda, J. L. (2011). Antecedents of burnout among elite dancers: A longitudinal test of basic needs theory. *Psychology of Sport and Exercise, 12*(2), 159-167.
- 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 & Exercise Psychology, 23*(4), 281-306.
- Rasquinha, A., Dunn, J. G., & Dunn, J. C. (2014). Relationships between perfectionistic strivings, perfectionistic concerns, and competitive sport level. *Psychology of Sport and Exercise, 15*(6), 659-667.
- Ryan, R. M., & Deci, E. L. (2000). The darker and brighter sides of human existence: Basic psychological needs as a unifying concept. *Psychological Inquiry, 11*(4), 319-338.
- Ryan, R.M. & Deci, E. L. (2002). Overview of self-determination theory: An organismic dialectical perspective. In E. L. Deci & R. M. Ryan (Eds.), *Handbook of self determination research*. (pp. 3-33). Rochester, NY: University of Rochester Press.
- Smith, R. E. (1986). Toward a cognitive-affective model of athletic burnout. *Journal of Sport Psychology, 8*, 36-50.
- Stoeber, J. (2011). The dual nature of perfectionism in sports: Relationships with emotion, motivation, and performance. *International Review of Sport and Exercise Psychology, 4*(2), 128-145. DOI: 10.1080/1750984x.2011.604789
- Stoeber, J. (2014). Perfectionism in sport and dance: A double-edged sword. *International Journal of Sport Psychology, 45*(4), 385-394. DOI: 10.7352/IJSP 2014.45.385

- Stoeber, J., Uphill, M. A., & Hotham, S. (2009). Predicting race performance in triathlon: The role of perfectionism, achievement goals, and personal goal setting. *Journal of Sport & Exercise Psychology, 31*(2), 211-245.
- Tabachnick, B. G., & Fidell, L. S. (2007). *Using Multivariate Statistics (5th ed.)*. New York: Allyn and Bacon.
- Ward, P., Hodges, N. J., Starkes, J. L., & Williams, M. A. (2007). The road to excellence: Deliberate practice and the development of expertise. *High Ability Studies, 18*(2), 119-153.
- Weston, N. J., Greenlees, I. A., & Thelwell, R. C. (2011). Athlete perceptions of the impacts of performance profiling. *International Journal of Sport and Exercise Psychology, 9*(2), 173-188.

Table 1. Descriptive statistics, bivariate correlations, and reliability estimates.

	<i>M</i>	<i>SD</i>	α	1.	2.	3.	4.	5.	6.
1. Perfectionistic Strivings	4.91	0.70	.80	-					
2. Perfectionistic Concerns	3.67	0.77	.80	.22**	-				
3. Need Satisfaction	5.60	0.66	.89	.44**	-.07	-			
4. Need Thwarting	3.02	1.11	.91	-.16*	.42**	-.36**	-		
5. Athlete Engagement	4.09	0.58	.94	.41**	-.07	.68**	-.37**	-	
6. Athlete Burnout	2.19	0.63	.88	-.26**	.36**	-.41**	.52**	-.53**	-

$p < .05^*$, $p < .01^{**}$

Table 2. Standardised coefficients from the hypothesised model and the bootstrap analysis.

Path	Hypothesised model	Bootstrap analysis	
	Standardized coefficient	Mean standardised coefficient (SE)	Bias corrected 95% CI
Perfectionistic strivings to need satisfaction	.69	.69 (.12)	.47 to .92
Perfectionistic strivings to need thwarting	-.35	-.36 (.14)	-.63 to -.11

Perfectionistic concerns to need satisfaction	-.42	-.42 (.13)	-.68 to -.16
Perfectionistic concerns to need thwarting	.78	.79 (.13)	.56 to 1.06
Need satisfaction to athlete engagement	.71	.71 (.07)	.58 to .83
Need satisfaction to athlete burnout	-.34	-.35 (.10)	-.53 to -.16
Need thwarting to athlete engagement	-.12	-.12 (.07)	-.25 to .00
Need thwarting to athlete burnout	.47	.47 (.08)	.30 to .63

Table 3. Standardized indirect effects of perfectionism dimensions on athlete burnout and athlete engagement via basic psychological needs.

	Indirect effect	95% CI
PC – BPNS – AB	.04 (.02)	.01 to .08
PC – BPNT – AB	.11 (.03)	.05 to .17
PS – BPNS – AB	-.05 (.02)	-.08 to -.02
PS – BPNT – AB	-.04 (.02)	-.07 to -.01
PC – BPNS – AE	-.08 (.04)	-.16 to -.02
PC – BPNT – AE	-.03 (.02)	-.07 to .00
PS – BPNS – AE	.11 (.03)	.06 to .16
PS – BPNT – AE	.01 (.01)	-.00 to .03

Note. PC = Perfectionistic concerns; PS = perfectionistic strivings; BPNS = Basic psychological need satisfaction; BPNT = Basic psychological need thwarting; AB = Athlete burnout; AE = Athlete engagement.

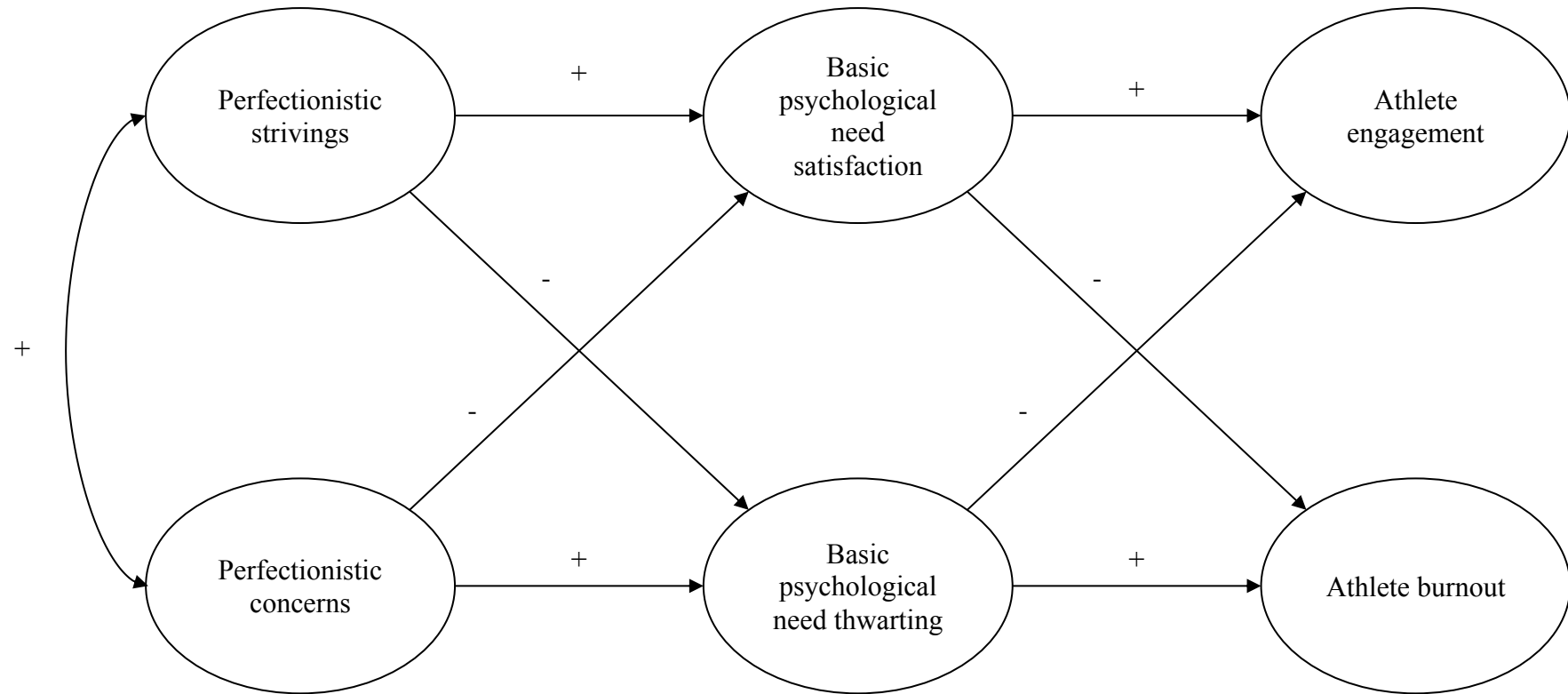


Figure 1. Hypothesised model (H1) - The associations between higher-order factors of perfectionism, composite basic psychological need satisfaction and thwarting, athlete engagement, and athlete burnout.

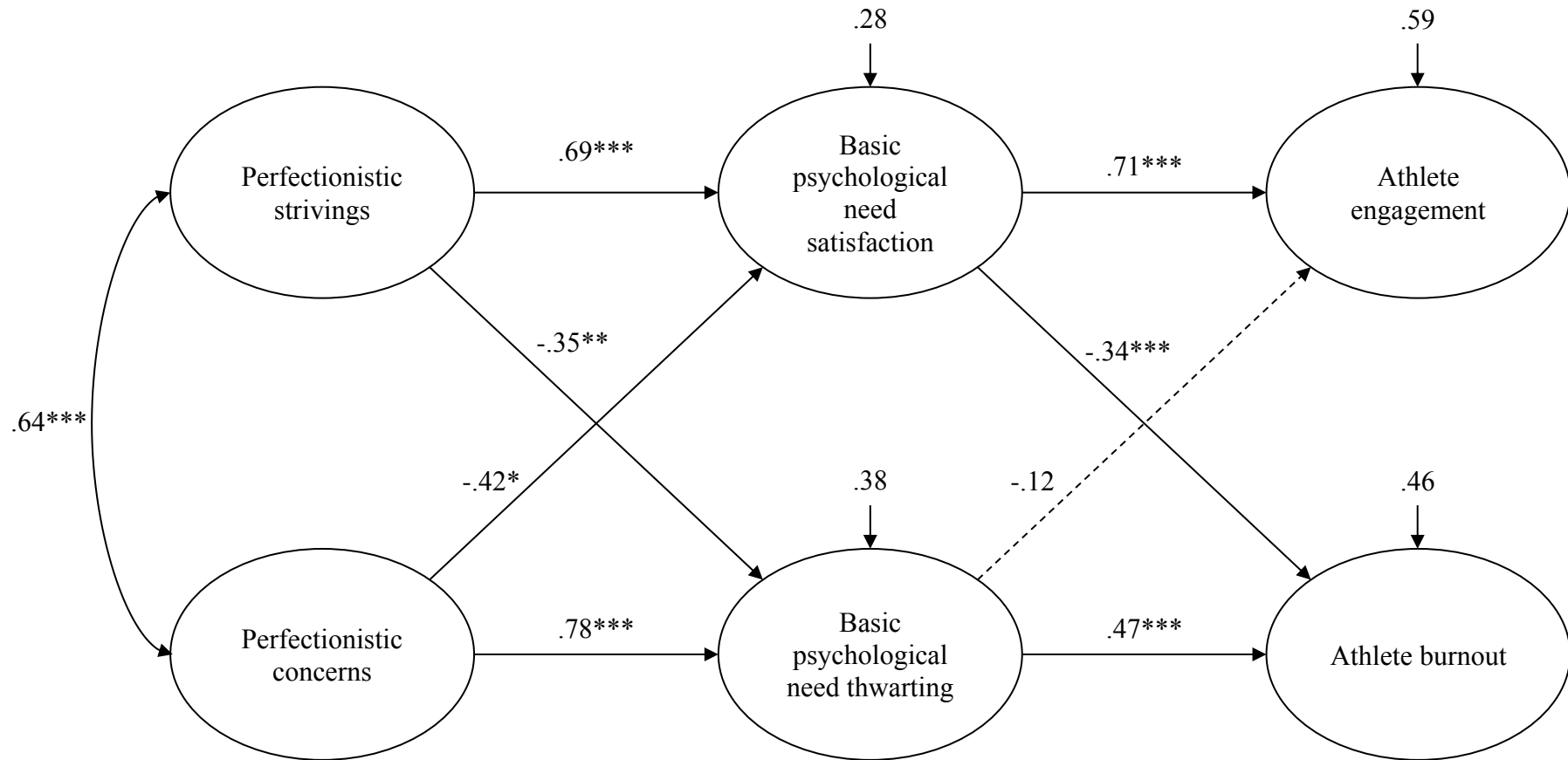


Figure 2. Final structural equation model: The associations between higher-order factors of perfectionism, basic psychological need satisfaction and thwarting, athlete engagement, and athlete burnout. *Note:* All pathways are standardized, $n = 214$, Dashed line = *ns*, $*p < .05$, $**p < .01$, $***p < .001$.