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1 **Abstract**

2 *Objectives:* Perfectionism is thought to energise high quantities of motivation; however, its
3 wider influence on the quality of the motivation exhibited by athletes is less clear. The
4 purpose of this study was to examine the multivariate and univariate relationship between
5 multidimensional perfectionism (perfectionistic concerns and perfectionistic striving) and
6 perceived psychological need thwarting. Perfectionistic concerns was assessed via sub-
7 dimensions of socially prescribed perfectionism, concern over mistakes, doubts about actions,
8 parental pressure and coach pressure. Perfectionistic striving was assessed via sub-
9 dimensions of self-oriented perfectionism, other-oriented perfectionism, personal standards
10 and a need for organisation.

11 *Design:* A cross-sectional, survey-based design was employed.

12 *Method:* One hundred and ninety-nine junior sports participants were recruited from after-
13 school sports clubs and completed measures of multidimensional perfectionism and
14 psychological need thwarting.

15 *Results:* Canonical correlation analyses revealed that higher levels of perfectionistic concerns
16 were associated with higher levels of perceived psychological need thwarting. Analogously,
17 lower levels of perfectionistic striving were associated with lower levels of perceived
18 psychological need thwarting. Regression analyses revealed that the relative importance of
19 individual sub-dimensions of perfectionism differed depending on the facet of psychological
20 need thwarting being assessed. Perceptions of parental pressure, coach pressure and concern
21 over mistakes emerged as especially important.

22 *Conclusion:* Overall, the findings indicate that while perfectionism may contribute to high
23 levels of behavioural investment, it may also impoverish the necessary support required for
24 the fulfilment of psychological needs.

25 *Keywords:* Motivation; Achievement; Self-determination theory

1 The relationship between multidimensional perfectionism and psychological need thwarting
2 in junior sports participants

3 The (mal)adaptive nature of perfectionism is currently the source of fervent debate
4 (Flett & Hewitt, 2006; Owens & Slade, 2008). While there is general agreement that
5 perfectionism can energise large quantities of motivation (i.e., behavioural investment), what
6 is less clear is whether energising participation via perfectionism is associated with any
7 psychological costs for athletes. In order for the consequences of perfectionism to be fully
8 understood, its wider influence on the quality of motivation exhibited by athletes must be
9 examined. Broadly, quality motivation can be inferred by the psychological well-being, moral
10 functioning, social relations and long-term consequences that accompany behavioural
11 investment (see Duda, 2005). The present study sought to address this issue by examining the
12 degree to which fundamental psychological needs are perceived to be thwarted by
13 multidimensional perfectionism in junior sports participants.

14 Perfectionism is broadly considered to be a multidimensional construct that entails
15 features reflective of a commitment to exceedingly high standards and a preoccupation with
16 harsh self-critical evaluation (Frost, Marten, Lahart, & Rosenblate, 1990; Hewitt & Flett,
17 1991). Contemporary multidimensional approaches are exemplified by the models developed
18 by Frost et al. (1990) and Hewitt and Flett (1991). Within Frost and colleagues' (1990)
19 model, perfectionism is characterised by the pursuit of excessively high performance
20 standards and an intolerance of imperfection. The model consists of six dimensions derived
21 from the descriptions of perfectionism offered by early theorists (e.g., Burns, 1980; Pacht,
22 1984). Four of these dimensions relate to the features of the achievement striving energised
23 by perfectionism (high personal standards, concern over mistakes, doubts about actions and a
24 need for organisation). The two remaining dimensions reflect the presumed origins of
25 perfectionism in the form of parental practices (parental criticism and parental expectations).

1 In sport, these two subscales have recently been supplanted by measures of coach pressure
2 and parental pressure, which are considered more salient to the domain (Dunn, Causgrove
3 Dunn, & Syrotuik, 2002; Gotwals & Dunn, 2009).

4 Hewitt and Flett's (1991) model adopts a different approach. They define
5 perfectionism as the perceived need, or actual requirement, for perfection. Their model
6 emphasises differences amongst dimensions of perfectionism in terms of the individual to
7 whom perfectionism is directed. The first of these dimensions is self-oriented perfectionism
8 and entails exceedingly high personal standards and the tendency to engage in self-criticism.
9 The second dimension is socially prescribed perfectionism and entails the belief that others
10 hold an excessively high standard for one's self and withhold approval based upon the
11 attainment of those standards. The final dimension is other-oriented perfectionism and entails
12 the tendency to impose unrealistically high standards on others.

13 Although these models offer alternative conceptualisations of perfectionism, research
14 suggests that there is a large amount of conceptual overlap between the two approaches. In
15 particular, a number of factor-analytical studies have found that the dimensions captured by
16 these two measures can be considered to be indicative of two higher-order dimensions of
17 perfectionism (e.g., Bieling, Israeli, & Antony, 2004; Cox, Enns, & Clara, 2002; Frost,
18 Heimberg, Holt, Mattia, & Neubauer, 1993). The two broad dimensions identified in these
19 studies are perfectionistic striving and perfectionistic concerns (Stoeber & Otto, 2006)¹.
20 Perfectionistic striving primarily involves the setting of exacting and high standards for one's
21 self (Dunkley & Blankstein, 2000). This dimension is typically measured by a combination of
22 personal standards, a need for organisation, self-oriented and other-oriented sub-dimensions
23 of perfectionism. Perfectionistic concerns, on the other hand, involve concerns about others'
24 unrealistic expectations and criticism, overly critical self-evaluation and the inability to
25 derive satisfaction from success (Dunkley & Blankstein, 2000). In contrast to perfectionistic

1 striving, perfectionistic concerns is typically measured by a combination of concern over
2 mistakes, doubts about actions, parental criticism, parental expectations and socially
3 prescribed sub-dimensions of perfectionism.

4 The divergent outcomes associated with perfectionistic striving and perfectionistic
5 concerns are evident in clinical, social and educational research (see Stoeber & Otto, 2006).
6 Specifically, while perfectionistic concerns appear to be a significant source of psychological
7 difficulties, perfectionistic striving is more equivocal in that it is largely unrelated to negative
8 consequences and, in some instances, is associated with positive consequences. Research by
9 Dunkley and his colleagues, for example, have found that these broad dimensions of
10 perfectionism have divergent relationships with psychological adjustment. Notably,
11 differences between them are evident in their relationships with coping tendencies (Dunkley,
12 Blankstein, Halsall, Williams, & Winkworth, 2000), self-esteem (Blankstein, Dunkley, &
13 Wilson, 2008), general positive and negative affect (Gaudreau & Thompson, 2010), anxiety
14 (Bieling, et al., 2004), and depression (Enns, Cox, & Clara, 2002).

15 To date, two studies have utilised similar broad conceptualisations of perfectionism in
16 sport (Gaudreau & Antl, 2008; Kaye, Conroy, & Fifer, 2008). Their findings support those
17 outside of sport and suggest that broad dimensions indicative of perfectionistic striving and
18 concerns are associated with different forms of motivational regulation, coping strategies and
19 achievement goals in athletes. Research that has focused on examining sub-dimensions of
20 perfectionism also suggests that perfectionistic concerns encapsulate features that are
21 responsible for the negative cognitive and affective experiences of athletes (e.g., higher levels
22 of competitive anxiety, anger, and exhaustion; Frost & Henderson, 1991; Hill, Hall,
23 Appleton, & Kozub, 2008; Vallance, Dunn, & Causgrove Dunn, 2006). In contrast, as found
24 outside of sport, research suggests that perfectionistic striving largely contains the energising
25 features of perfectionism (e.g., higher personal standards and higher performance; Stoeber,

1 Uphill, & Hotham, 2009). However, it is noteworthy that the salutogenic effects of
2 perfectionistic striving have yet to be established (Stoeber & Otto, 2006).

3 **Self-determination theory and basic psychological needs theory**

4 Self-determination theory (Deci & Ryan, 1985, Ryan & Deci, 2002) is a meta-theory
5 offering a lens through which the relationship between multidimensional perfectionism and
6 quality of athlete motivation can be examined. Over the past decade, self-determination
7 theory has become a popular model through which to explore motivational, performance,
8 interpersonal and well-being related outcomes in sport and exercise (see Ryan & Deci, 2007,
9 for a review). The foundation of self-determination theory concerns the interaction between
10 individuals' natural organismic tendencies toward growth, integration, vitality and healthy
11 functioning and the social-contextual environment that either nurtures or inhibits these
12 tendencies (Ryan & Deci, 2002). Moreover, the fulfilment of basic psychological needs is
13 thought to be central to the dialectical interplay between organism and environment. The
14 three fundamental needs within self-determination theory are autonomy (feelings of volition,
15 choice and self-directedness), competence (perceptions of being effective) and relatedness
16 (feelings of belonging or connectedness to others) (Deci & Ryan, 2000; Ryan & Deci, 2002).

17 According to basic psychological needs theory, a micro-theory of self-determination
18 theory (Deci & Ryan, 2000), the optimal conditions in which organismic tendencies are
19 enacted are defined by the satisfaction of the three innate psychological needs. The fulfilment
20 of these needs, in turn, are purported to lead to positive psychological consequences, such as
21 better quality, more autonomous, motivation and well-being (Deci & Ryan, 2000). This is
22 because when psychological needs are satisfied the organismic activities of the individual are
23 given full opportunity to flourish (Ryan, 1995). Research in a variety of life domains (e.g.,
24 work, health and exercise) has provided support for the assertions of basic needs theory (Deci
25 & Ryan, 2000). Similar findings are evident in sport where researchers have found support

1 for the beneficial effects of psychological need satisfaction. For example, higher levels of
2 psychological need satisfaction has been found to predict higher levels of subjective vitality,
3 autonomous motivation and positive affect in athletes (e.g., Adie, Duda, & Ntoumanis, 2008;
4 Hollembeak & Amorose, 2005; Reinboth & Duda, 2006).

5 Researchers in sport have recently turned their attention to examining need thwarting.
6 The frustration, or thwarting, of psychological needs is thought to lead to negative
7 psychological consequences, such as lesser quality, more controlled, motivation and ill-being
8 (Deci & Ryan, 2000). This is because when needs are thwarted, the natural organismic
9 activities of the individual are inhibited (Ryan, 1995). As recently described by
10 Bartholomew, Ntoumanis, Ryan and Thøgersen-Ntoumani (2011), need thwarting entails
11 more than perceptions of lower levels of need satisfaction. Instead, it is characterised by
12 perceptions that psychological needs are obstructed and *actively* undermined. In accord, the
13 three needs are likely to be thwarted when an individual's sense of choice and self-control is
14 quashed (autonomy); they feel ineffective or that the context is demeaning (competence); and
15 the social environment is perceived as being cold and neglectful (relatedness) (Vansteenkiste,
16 Niemiec, & Soenens, 2010). Initial research in the area of sport has found support for the
17 negative impact of need thwarting, with higher levels of psychological need thwarting being
18 found to be associated with lower levels of vitality and higher levels of exhaustion in athletes
19 (e.g., Bartholomew et al., 2011). Need thwarting may be especially important in the context
20 of understanding any costs associated with perfectionism for athletes because psychological
21 need thwarting is purported to be more relevant to the development of ill-being than the
22 absence of need satisfaction (Bartholomew et al., 2011).

23 **Multidimensional perfectionism and psychological need thwarting**

24 Perfectionistic concerns are likely to lead to higher perceptions of need thwarting.
25 This is because sub-dimensions of perfectionistic concerns (e.g., socially prescribed

1 perfectionism, parental pressure and coach pressure) entail a number of beliefs and
2 perceptions that include standards over which individuals have limited perceived control,
3 negative self-evaluative tendencies, perceptions of external pressure and sensitivity to social
4 rejection. This possibility is evident in empirical research inside and outside of sport. For
5 example, socially prescribed perfectionism and concern over mistakes are associated with
6 lower levels of perceived control and autonomy (e.g., Flett, Hewitt, Blankstein, & Mosher,
7 1995; Mor, Day, Flett, & Hewitt, 1995), poorer appraisals of task performance (e.g., Frost &
8 Marten, 1990; Frost et al., 1995), and lower levels of athletic confidence (Frost & Henderson,
9 1991; Gotwals, Dunn, & Wayment, 2003). Socially prescribed perfectionism is especially
10 problematic in terms of interpersonal-adjustment. Previous research suggests that it is
11 associated with perceptions of poorer close relationships (Flett, Hewitt, Shapiro, & Rayman,
12 2001-2002; Haring, Hewitt, & Flett, 2003), a higher frequency of negative social interactions
13 (Flett, Hewitt, Garshowitz, & Martin, 1997), and lower perceived social skills (Flett, Hewitt,
14 & De Rosa, 1996). In sport, Ommundsen, Roberts, Lemyre, and Miller (2005) also found that
15 a collection of sub-components of perfectionistic concerns were associated with perceptions
16 of lower quality peer-relationships in junior soccer players.

17 Perfectionistic striving, on the other hand, is likely to lead to lower perceptions of
18 need thwarting. This is because sub-dimensions of perfectionistic striving involve higher
19 levels of personal control and efficacy (e.g., personal standards and self-oriented
20 perfectionism), and are relatively undisruptive in terms of interpersonal-adjustment. In
21 support of this possibility, self-oriented perfectionism has been found to be associated with
22 higher levels of self-efficacy in an educational context and the competence facet of
23 conscientiousness (a sense that one is capable, sensible, prudent and effective) (Dunkley &
24 Kyparissis, 2008; Mills & Blankstein, 2000). Self-oriented perfectionism has also been found
25 to have either a positive influence (e.g., Hill, Zrull, & Turlington, 1997), or no influence

1 (Blankstein, Lumley, & Crawford, 2007; Sherry, Hewitt, Flett, & Harvey, 2003), on
2 interpersonal adjustment. Similar findings are evident in sport where personal standards are
3 related to higher perceptions of ability and confidence leading up to athletic competition
4 (Hall, Kerr, & Matthews, 1998) and unrelated to perceptions of peer-relationships in junior
5 soccer players (Ommundsen et al., 2005).

6 The current study had two purposes. The first purpose was to examine the
7 multivariate relationship between broad dimensions of perfectionism (perfectionistic
8 concerns and perfectionistic striving) and psychological need thwarting. The second purpose
9 was to examine the predictive ability of sub-dimensions of perfectionism in relation to each
10 facet of psychological need thwarting. Based on the preceding theoretical argument and
11 previous empirical research, it was hypothesised that perfectionistic concerns would be
12 positively associated with psychological need thwarting whereas perfectionistic striving
13 would be negatively associated with psychological need thwarting. It was also hypothesised
14 that the sub-dimensions of perfectionistic concerns would have the greatest predictive ability
15 in terms of psychological need thwarting. This is because these dimensions are likely to play
16 a more subversive role in the need fulfilment process. The importance of specific sub-
17 dimensions of perfectionistic concerns was also expected to vary depending on the facet of
18 psychological need thwarting being predicted. Consistent with research findings in sport that
19 suggest perceptions of social-contextual support (e.g., parent and coach autonomy support;
20 Adie et al., 2008; Gagné, Ryan, & Bargmann, 2003; Reinboth, Duda, & Ntoumanis, 2004)
21 may be more central to perceptions of autonomy and relatedness satisfaction than competence
22 satisfaction, inter-personal sub-dimensions of perfectionistic concerns (socially prescribed
23 perfectionism, parental pressure and coach pressure) were expected to be the largest predictor
24 of perceptions of autonomy and relatedness thwarting. In contrast, intra-personal sub-

1 dimensions of perfectionistic concerns (concern over mistakes and doubts about actions)
2 were expected to be the largest predictor of perceptions of competence thwarting.

3 **Method**

4 **Participants**

5 Two-hundred and five junior sports participants (88 males, 117 females, *M age* =
6 15.30 years, *s* = 1.36 years, range = 14-18 years) were recruited from a range of after-school
7 sport clubs. Participants were involved at recreational (*n* = 47), club (*n* = 113), county (*n* =
8 26), regional (*n* = 13) and national level (*n* = 5). There was one non-respondent in terms of
9 competitive level. On average, the sample had participated in their sport for 6.45 years (*s* =
10 3.37), trained and played for an average of 4.53 hours per week (*s* = 3.73) and reported on a
11 nine-point Likert scale that their participation in sport was considered very important (*M* =
12 7.04, *s* = 1.68) in comparison to other activities (1 = *not at all important* to 9 = *extremely*
13 *important*). Participants completed a multi-sectional questionnaire during a session of an
14 after-school sport club.

15 **Instruments**

16 **Multidimensional perfectionism.** Perfectionistic concerns and perfectionistic
17 striving were measured using a combination of the sub-dimensions contained on a brief
18 version of Hewitt and Flett's (1991) Multidimensional Perfectionism Scale developed by Cox
19 et al. (2002) and Dunn and colleagues Sport-Multidimensional Perfectionism Scale (Dunn et
20 al., 2006; Gotwals & Dunn, 2009). Perfectionistic concerns was assessed using socially
21 prescribed perfectionism, concern over mistakes, doubts about actions, parental pressure and
22 coach pressure sub-dimensions. Perfectionistic striving was assessed using self-oriented
23 perfectionism, other-oriented perfectionism, personal standards and a need for organisation
24 sub-dimensions.

1 The brief version of Hewitt and Flett's (1991) Multidimensional Perfectionism Scale
2 contains three, 5-item, subscales that assess self-oriented (SOP: e.g., "I set very high
3 standards for myself"), socially prescribed (SPP: e.g., "My family expects me to be perfect")
4 and other-oriented perfectionism (OOP: e.g., "I do not expect a lot from my friends"
5 [reversed]). Items are measured on a 7-point Likert scale (1 = *strongly disagree* to 7 =
6 *strongly agree*). The stem of the instrument was adapted to ensure that participants were
7 focused on sport specific cognitions and beliefs ("The following items ask you to think about
8 when you are practicing or playing your sport"). Cox et al. (2002) have provided evidence of
9 the validity and reliability of this instrument. This includes adequate factor structure,
10 acceptable internal reliability (SOP $\alpha = .84$, SPP $\alpha = .85$, and OOP $\alpha = .66$), and a strong
11 correlation between the shortened subscales and the original subscales (SOP $r = .95$, SPP $r =$
12 $.94$, and OOP $r = .77$).

13 The Sport Multidimensional Perfectionism Scale (Sport-MPS; Dunn et al., 2006;
14 Gotwals & Dunn, 2009) is based on Frost et al.'s (1990) measure of perfectionism. It contains
15 six subscales that assess personal standards (PS; 7-items, e.g., "I have extremely high goals
16 for myself in my sport"), concern over mistakes (COM; 8-items, e.g., "If I fail in competition,
17 I feel like a failure in person"), doubts about actions (DAA; 6-items, e.g., "Prior to
18 competition, I rarely feel satisfied with my training"), perceived parental pressure (PPP; 9-
19 items, e.g., "My parents expect excellence from me in my sport"), perceived coach pressure
20 (PCP; 6-items, e.g., "My coach sets very high standards for me in competition"); and a need
21 for organisation (ORG; 6-items, e.g., "I have and follow a pre-competitive routine"). Items
22 are measured on a 5-point Likert scale (1 = *strongly disagree* to 5 = *strongly agree*). Dunn
23 and colleagues have provided evidence of the validity and reliability of the instrument. This
24 includes factorial structure and adequate internal consistency for the six subscales (all α 's \geq
25 $.74$).

1 helps to both preserve the characteristics of the data set and maximises the available data for
2 the main statistical data-analysis (Graham et al., 2003).

3 Scales were then computed and screened for univariate and multivariate outliers using
4 the protocol outlined by Tabachnick and Fidell (2007). Standardised z-scores larger than 3.29
5 ($p < .001$, two-tailed) were used as criteria for univariate outliers and a Mahalanobis distance
6 greater than $\chi^2_{(12)} = 32.91$ was used as criteria for multivariate outliers. This led to the
7 removal of 2 further participants. Examination of the skewness and kurtosis values for each
8 variable indicated that self-oriented perfectionism (zskew = 3.37), socially prescribed
9 perfectionism (zskew = 3.00) and perceived parental pressure (zskew = 3.52) were
10 significantly skewed. These variables were subsequently transformed (SOP = $-\text{SQRT}[8-$
11 $\text{SOP}]$, SPP = $\text{SQRT}[\text{SPP}]$, and PPP = $\text{SQRT}[\text{PPP}]$) and, as a consequence, were no longer
12 significantly skewed (zskew = 0.76, zskew = 0.21, and zskew = 0.15). The transformed
13 variables were almost perfectly correlated with the corresponding original variables ($r = .99$).
14 The remaining data ($n = 199$, $M_{age} = 15.31$ years, $s = 1.34$ years, range 14-18 years) was
15 considered to be approximately univariate and multivariate normal (absolute skewness $M =$
16 $.09$, $s = .06$, $SE = .17$; absolute kurtosis $M = .34$, $s = .21$, $SE = .34$; Mahalanobis distance M
17 $= 11.62$, $s = 5.87$). Finally, an assessment of the internal reliability of each scale was
18 conducted. The results of this analysis are displayed in Table 1. All scales demonstrated
19 sufficient internal consistency. Specifically, all Cronbach's alphas exceeded .70 (Nunnally,
20 1978).

21 **Primary analyses**

22 **Descriptive statistics and bivariate correlations between psychological need** 23 **thwarting and dimensions of perfectionism**

24 The descriptive statistics and bivariate relationships between dimensions of
25 perfectionism and psychological need thwarting are reported in Table 1. Levels of

1 perfectionism and psychological need thwarting were consistent with findings in other
2 samples of youth athletes (e.g., Bartholomew et al., 2011; Hill et al., 2008; Lemyre, Hall &
3 Roberts, 2008). The three aspects of psychological need thwarting displayed a similar pattern
4 of relations with dimensions of perfectionism. Autonomy thwarting had a significant positive
5 relationship with all dimensions of perfectionism except other-oriented perfectionism.
6 Competence and relatedness thwarting had a significant positive relationship with most
7 dimensions of perfectionism. The only dimensions that these two aspects of need thwarting
8 were not related to were self-oriented perfectionism and other-oriented perfectionism.
9 Typically, the correlations between psychological need thwarting and perfectionism
10 dimensions were moderate in size (Cohen, 1992).

11 **The multivariate relationship between dimensions of perfectionism and** 12 **psychological need thwarting**

13 Canonical correlation analysis was used to examine the multivariate relationship
14 between dimensions of perfectionism and psychological need thwarting. Each canonical
15 correlation analysis included a set of predictor variables (perfectionistic concerns or striving
16 sub-dimensions) and a set of criterion variables (facets of psychological need thwarting).
17 Based on the recommendations of Tabachnick and Fidell (2007), canonical functions were
18 considered meaningful if they were statistically significant ($p < .05$) and the squared
19 canonical correlation exceeded 0.10. Factor loadings were used to identify the characteristics
20 of the canonical variates. Variables were considered to contribute to the canonical variate if
21 their canonical loading (i.e., canonical structure coefficient) exceeded $|.30|$. The results of
22 these analyses are reported in Table 2 and 3.

23 The first canonical correlation analysis examined the relationship between sub-
24 dimensions of perfectionistic concerns and facets of psychological need thwarting.
25 Perfectionistic concerns was represented as a linear composite of socially prescribed

1 perfectionism, concern over mistakes, doubts about actions, perceived parental pressure, and
2 perceived coach pressure. Psychological need thwarting was represented as a composite of
3 autonomy, competence and relatedness thwarting. This analysis revealed a significant
4 multivariate relationship: Wilks' $\lambda = 0.74$, $F(15, 569) = 3.97$, $p < 0.001$. One statistically
5 significant canonical function emerged. The canonical correlation between the two variates
6 was .46 ($R_c^2 = .21$).

7 Examination of canonical loadings indicated that all perfectionism sub-dimensions
8 loaded highly on the first canonical variate (.69 to .89). Therefore, the canonical variate was
9 considered to be reflective of perfectionistic concerns. Similarly, all of the psychological
10 need thwarting facets loaded highly on the second canonical variate (.75 to .99). This
11 canonical variate was therefore considered to be reflective of psychological need thwarting.
12 The perfectionistic concerns variate explained an average of 68.03% of the variance in the
13 perfectionism dimensions, while the psychological need thwarting variate explained an
14 average of 72.81% of the variance in facets of need thwarting. Overall, the canonical
15 correlation between the two variates suggests that higher levels of perfectionistic concerns are
16 associated with higher levels of psychological need thwarting.

17 The second canonical correlation analysis examined the relationship between sub-
18 dimensions of perfectionistic striving and facets of psychological need thwarting.
19 Perfectionistic striving was represented as a linear composite of self-oriented perfectionism,
20 other-oriented perfectionism, personal standards, and a need for organisation. Again,
21 psychological need thwarting was represented as a composite of autonomy, competence and
22 relatedness thwarting. This analysis revealed a significant multivariate relationship: Wilks' λ
23 = 0.83, $F(12, 508) = 3.19$, $p < 0.001$. Two statistically significant canonical functions
24 emerged ($p < .05$). The first canonical function had a canonical correlation of .33 ($R_c^2 = .11$).
25 The second canonical function had a canonical correlation of .24 ($R_c^2 = .06$). However,

1 because the squared canonical correlation fell below the criteria to be considered meaningful
2 (.10), it was not interpreted.

3 Examination of canonical loadings for the perfectionistic striving variate indicated
4 that, with the exception of other-oriented perfectionism, dimensions of perfectionism
5 typically loaded moderately-to-highly on the variate (-.39 to -.94). It was largely
6 characterised by lower levels of high personal standards. This canonical variate was
7 considered to be reflective of lower levels of perfectionistic striving. All facets of
8 psychological need thwarting loaded highly (-.49 to -.88) on the psychological need thwarting
9 variate. This canonical variate was therefore considered to be reflective of lower levels of
10 psychological need thwarting. The perfectionistic striving variate explained an average of
11 34.09% of the variance in the perfectionism dimensions, while the psychological need
12 thwarting variate explained an average of 49.69% of the variance in facets of need thwarting.
13 Overall, the canonical correlation between the two variates and the canonical loadings
14 suggest that lower levels of perfectionistic striving are associated with lower levels of
15 psychological need thwarting.

16 **The predictive ability of dimensions of perfectionism in relation to psychological** 17 **need thwarting**

18 Three regression analyses were used to examine the predictive ability of all
19 dimensions of perfectionism in relation to psychological need thwarting. The results of these
20 analyses are reported in Table 4. Preliminary analysis indicated that multicollinearity between
21 variables was unproblematic in each analysis (tolerance: regression one [autonomy] = 0.33–
22 0.94, regression two [competence] = 0.33–0.94, and regression three [relatedness] = 0.33–
23 0.94). There was a lack of autocorrelation (regression one [autonomy] Durbin–Watson =
24 2.02, regression two [competence] Durbin–Watson = 2.14, and regression three [relatedness]

1 Durbin–Watson = 2.06). Finally, residuals were normally distributed and homoscedastic
2 (based on standardised predicted values-standardised residuals plots).

3 The first hierarchical regression indicated dimensions of perfectionism accounted for
4 21% of variance in autonomy, $F = 5.61, p < .01$. Perceived coach pressure was the only
5 significant individual predictor of autonomy thwarting ($B = .33, \beta = .22, p < .05$). The second
6 hierarchical regression indicated dimensions of perfectionism accounted for 17% of variance
7 in competence, $F = 4.31, p < .01$. Personal standards ($B = -.48, \beta = -.30, p < .05$) and concern
8 over mistakes ($B = .38, \beta = .25, p < .05$) were the only significant individual predictors of
9 competence thwarting. The third hierarchical regression indicated dimensions of
10 perfectionism accounted for 17% of variance in relatedness, $F = 4.25, p < .01$. Perceived
11 parental pressure was the only significant individual predictor of relatedness thwarting ($B =$
12 $.97, \beta = .22, p < .05$).

13 Discussion

14 The purpose of the study was to: (i) examine the multivariate relationship between
15 broad dimensions of perfectionism (perfectionistic concerns and perfectionistic striving) and
16 psychological need thwarting and (ii) to examine the predictive ability of sub-dimensions of
17 perfectionism in relation to each facet of psychological need thwarting. It was hypothesised
18 that perfectionistic concerns would be positively associated with psychological need
19 thwarting, whereas perfectionistic striving would be negatively associated with psychological
20 need thwarting. It was also hypothesised that the sub-dimensions of perfectionistic concerns
21 would have the greatest predictive ability in terms of psychological need thwarting. Inter-
22 personal sub-dimensions (socially prescribed perfectionism, parental pressure and coach
23 pressure) were expected to be the largest predictor of autonomy and relatedness thwarting. In
24 contrast, intra-personal sub-dimensions (concern over mistakes and doubts about actions)
25 were expected to be the largest predictor of competence thwarting.

1 The findings provided partial support for the hypotheses. In support of the hypotheses,
2 canonical correlation analyses revealed that higher levels of perfectionistic concerns were
3 associated with higher perceptions of psychological need thwarting. However, contrary to
4 expectations, lower levels of perfectionistic striving were associated with lower perceptions
5 of psychological need thwarting, suggesting a positive association. In terms of the assessment
6 of the predictive ability of sub-dimensions of perfectionism, the findings were largely
7 consistent with the hypotheses. Perceived coach pressure emerged as the only significant
8 predictor of perceived autonomy thwarting. Perceived parental pressure emerged as the only
9 significant predictor of perceived relatedness thwarting. Both concern over mistakes and
10 personal standards emerged as significant predictors of perceived competence thwarting.

11 **Perfectionistic concerns and psychological need thwarting**

12 Current understanding of perfectionistic concerns is that it embodies the most
13 problematic features of perfectionism and is an antecedent of negative cognitive and affective
14 experiences in sport (Frost & Henderson, 1991; Hall et al., 1998; Hill et al., 2008). The
15 findings extend this research by indicating that a further concomitant of perfectionistic
16 concerns is higher levels of psychological need thwarting. This broad dimension of
17 perfectionism appears to engender perceptions of helplessness and excessive external
18 pressures that subvert the self-agency, effectance and positive inter-personal relations
19 required to fulfil psychological needs (Deci & Ryan, 2000). In doing so, this dimension of
20 perfectionism may render athletes vulnerable to an array of negative consequences via need
21 thwarting. For example, pro-social and anti-social behaviour (Ntoumanis & Standage, 2009),
22 drop-out (Sarrazin, Vallerand, Guillet, Pelletier, & Cury, 2002), burnout (Perreault,
23 Gaudreau, Lapointe, & Lacroix, 2007), and well-being (Quested & Duda, 2010) are all
24 associated with need satisfaction, in varying degrees. In short, perfectionistic concerns are
25 likely to have substantial psychological costs for athletes.

1 **Perfectionistic striving and psychological need thwarting**

2 The finding that lower levels of perfectionistic striving may be associated with lower
3 levels of psychological need thwarting and, therefore, higher levels of this dimension of
4 perfectionism may contribute to higher levels of perceived need thwarting was unexpected.
5 This dimension of perfectionism is typically unrelated to negative outcomes and, in some
6 instances, related to positive consequences (Stoeber & Otto, 2006). Stoeber and colleagues
7 (Stoll, Lau, & Stoeber, 2008; Stoeber et al., 2009), for example, have demonstrated through
8 the use of a unitary measure of perfectionistic striving that this feature may energise higher
9 levels of investment and lead to greater athletic performance. However, the current findings
10 indicate that perfectionistic striving may be associated with higher levels of need thwarting.
11 As a consequence, perfectionistic striving may also have some of the same costs associated
12 with perfectionistic concerns that arise as a consequence of psychological need thwarting
13 (e.g., anti-social behaviour, drop-out, burnout and ill-being).

14 There are a number of possible explanations for this unexpected finding. It is possible
15 that it reflects the broad and multifaceted nature of perfectionistic striving when measured as
16 a latent factor. In particular, as manifested through personal standards, other-oriented and
17 self-oriented perfectionism, perfectionistic striving includes both self and other-evaluative
18 tendencies that extend the construct beyond the act of achievement striving. This possibility
19 is reflected in some of its sub-dimensions. The nature of self-oriented perfectionism, for
20 example, is currently unclear and appears to have the potential to contribute to both positive
21 and negative outcomes (Flett & Hewitt, 2006). It is also possible that the finding reflects the
22 absence of perfectionistic concerns as a covariate in the canonical correlation analysis. As
23 noted elsewhere (e.g., Aldea & Rice, 2006; Wu & Wei, 2008), when the relationship between
24 dimensions of perfectionism are controlled, they may become polarised and appear more
25 adaptive or maladaptive. A final possibility is that the findings may reflect the influence of

1 moderating variables (e.g., levels of satisfaction, achievement and perfectionistic concerns;
2 Besser, Flett, & Hewitt, 2004; Hewitt et al., 2002; Stoeber, Kempe, & Keogh, 2008). Overall,
3 the findings allude to a complex relationship between perfectionistic striving and
4 psychological need fulfilment that requires further examination.

5 **Comparative importance of sub-dimensions of perfectionism**

6 The findings attest to the subversive role of perfectionistic concerns sub-dimensions
7 and the utility of differentiating between the inter-personal and intra-personal expression of
8 perfectionism when considering its relationship with need thwarting. Inter-personal
9 dimensions of perfectionistic concerns (perceived coach and parental pressure) predicted
10 autonomy and relatedness thwarting, whereas an intra-personal dimension of perfectionistic
11 concerns (concern over mistakes) predicted perceptions of competence thwarting. These
12 findings are consistent with the notion that the fulfilment of the three psychological needs in
13 sport may be inhibited by different personal and social-contextual factors (Deci & Ryan,
14 2000). For example, Gagné et al. (2003) found that perceptions of parental autonomy support
15 only predicted relatedness satisfaction, whereas perceptions of coach autonomy support
16 predicted both relatedness and autonomy satisfaction in junior gymnasts. Similarly, Reinboth
17 et al., (2004) found that autonomy, relatedness and competence satisfaction were derived
18 from different sources (autonomy support, social support and personal improvement).

19 Unexpectedly, personal standards also emerged as a negative predictor of perceived
20 competence thwarting. Although perfectionistic concerns sub-dimensions were expected to
21 play a more active role in subverting need fulfilment, it is possible that if features of
22 perfectionism promote need satisfaction, they may also contribute to need thwarting in an
23 antithetical manner. In this instance, high personal standards may be indicative of feelings of
24 ability and agency that directly oppose perceptions of need thwarting. It should be noted,
25 however, that this finding is indicative of the benefits of endorsing high personal standards

1 when the influences of other dimensions of perfectionism are controlled (semi-partial
2 correlation with competence thwarting). In this form, the high personal goals are likely to
3 reflect ‘pure personal standards’ (DiBartolo, Frost, Chang, LaSota, & Grills, 2004) and be
4 primarily autonomously motivated. Such autonomously motivated goals have been found to
5 lead to need satisfaction in athletes (Smith, Ntoumanis, & Duda, 2007).

6 **Limitations and future directions**

7 The findings must be considered within the context of the study’s limitations. The
8 non-experimental and cross-sectional design does not allow inference of causality between
9 perfectionism and need thwarting. Longitudinal and prospective studies have proven useful in
10 research that has examined basic needs theory (see Gagné & Blanchard, 2007, for a review of
11 prospective diary studies) and provide a means of further unpacking the relationship between
12 multidimensional perfectionism, need thwarting and motivational outcomes. The potential bi-
13 directional relationship between perfectionism and need thwarting is a particularly important
14 avenue for future research. Previous research highlights the possibility that sub-dimensions of
15 perfectionism (e.g., perceptions of coach pressure) may precede perceptions of need
16 thwarting (Smoll & Smith, 2002). However, based on descriptions of the origins of
17 perfectionism (Flett, Hewitt, Oliver, & Macdonald, 2002), and the purposed influence of need
18 thwarting in childhood (Ryan, 2005), another interesting possibility is that perfectionism may
19 be an accommodation strategy that arises as a consequence of perceptions of need thwarting.
20 It would also be interesting to re-examine the current relationships in terms of need
21 satisfaction. Research suggests that need thwarting and need satisfaction can co-occur in a
22 given context (Bartholomew et al., 2011). This highlights the possibility that some
23 dimensions of perfectionism may predict higher levels of some facets of need satisfaction
24 (e.g., competence), as well as facets of need thwarting (e.g., relatedness). The degree to
25 which the findings generalise beyond the context of after-school sports clubs and a sample of

1 14-18 year old sports participants is also necessary. Given suggestions that ability or success
2 may moderate the impact of perfectionism (Flett & Hewitt, 2005), examining these
3 relationships in more elite samples appears particularly important. Finally, it is noteworthy
4 that other-oriented perfectionism did not load substantially on the perfectionistic striving
5 canonical variate. Consequently, as the implications of the absence of this dimension on the
6 nature of perfectionistic striving are not clear, findings concerning this dimension should be
7 interpreted cautiously.

8 **Conclusion**

9 The relative benefits and costs associated with promoting perfectionism in athletes are
10 currently being debated. Previous research suggests that while perfectionistic concerns may
11 be problematic for athletes, perfectionistic striving is less problematic and may even have
12 some benefits. The current study provides some initial evidence that both perfectionistic
13 concerns and perfectionistic striving may have some psychological costs in the form of the
14 thwarting of basic psychological needs. Concern over mistakes and perceived pressure from
15 coaches and parents emerged as especially problematic in terms of predicting individual
16 facets of need thwarting. This suggests that different beliefs and perceptions responsible for
17 the malaise that accompanies perfectionism are important when considering the
18 perfectionism-need relationship. Overall, while perfectionism may energise large quantities
19 of motivation, it may also serve to undermine the potential for participation in sport to be a
20 fulfilling experience for junior athletes.

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Footnote

¹The terms perfectionistic striving and perfectionistic concerns have been used here instead of other previously adopted terms (e.g., personal standards perfectionism and evaluative concerns perfectionism) because we believe the current labels more clearly convey the notion that these are broad dimensions of perfectionism, rather than forms or types of perfectionism.

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1 Table 1 *Descriptive statistics and bivariate correlation coefficients between variables*

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	Mean	s	α	1	2	3	4	5	6	7	8	9	10	11
1. Self-oriented perfectionism	4.78	1.23	.86											
2. Socially prescribed perfectionism	3.27	1.28	.81	.46**										
3. Other-oriented perfectionism	4.03	1.15	.76	.05	-.13									
4. Personal standards	3.13	0.80	.85	.63**	.54**	-.01								
5. Concern over mistakes	2.73	0.84	.86	.38**	.59**	-.04	.66**							
6. Doubts about actions	2.84	0.90	.84	.24**	.56**	-.14	.54**	.64**						
7. Perceived parental pressure	2.39	0.91	.92	.30**	.63**	-.05	.59**	.64**	.61**					
8. Perceived coach pressure	2.83	0.84	.86	.28**	.60**	-.01	.60**	.64**	.66**	.73**				
9. Organisation	2.88	1.03	.93	.43**	.34**	.05	.52**	.38**	.36**	.43**	.44**			
10. Autonomy thwarting	3.54	1.25	.81	.18**	.31**	-.02	.30**	.40**	.38**	.35**	.41**	.21**		
11. Competence thwarting	3.39	1.29	.83	.12	.23**	-.04	.16*	.33**	.33**	.29**	.31**	.19**	.75**	
12. Relatedness thwarting	3.11	1.31	.81	.05	.28**	-.15	.18*	.31**	.31**	.35**	.28**	.15*	.64**	.78**

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* $p < .05$ ** $p < .01$

1 Table 2 *Canonical correlation between perfectionistic concerns and psychological need*
 2 *thwarting*

Variable	Canonical factor	(r_s^2) (%)
	loadings (r_s)	
SPP	.69	48.61
COM	.88	77.44
DAA	.84	70.56
PPP	.80	64.32
PCP	.89	79.21
Adequacy		68.03
Autonomy	.99	98.01
Competence	.80	64.16
Relatedness	.75	56.25
Adequacy		72.81
Canonical correlation (R_c)		.46
R_c^2		21.20

3 *Note.* SPP = Socially prescribed perfectionism; COM = Concern over mistakes; DAA =
 4 Doubts about actions; PPP = Perceived parental pressure; PCP = Perceived coach pressure

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1 Table 3 *Canonical correlation between perfectionistic striving and psychological need*
 2 *thwarting*

Variable	Canonical factor	(r_s^2) (%)
	loadings (r_s)	
SOP	-.39	15.21
OOP	-.24	5.76
PS	-.94	88.36
ORG	-.52	27.04
Adequacy		34.09
Autonomy	-.88	77.44
Competence	-.49	24.01
Relatedness	-.69	47.61
Adequacy		49.69
Canonical correlation (R_c)		.33
R_c^2		10.90

3 *Note.* SOP = Self-oriented perfectionism; OOP = Other-oriented perfectionism; PS =
 4 Personal standards; ORG = Organisation

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1 Table 4 *The predictive ability of dimensions of perfectionism in relation to psychological need thwarting*

Criterion variable	<i>F</i>	df	<i>R</i> ²	β								
				SOP	SPP	OOP	PS	COM	DAA	PPP	PCP	ORG
<i>Autonomy</i>	5.61**	9, 189	.21	.07	-.01	.01	-.08	.20	.13	.02	.22*	-.00
<i>Competence</i>	4.31**	9, 189	.17	.11	-.06	-.02	-.30*	.25*	.18	.08	.13	.06
<i>Relatedness</i>	4.25**	9, 189	.17	-.07	.08	-.11	-.11	.17	.09	.22*	-.03	.04

2 ** $p < .01$ * $p < .05$ 3 *Note.* SOP = Self-oriented perfectionism; SPP = Socially prescribed perfectionism; OOP = Other-oriented perfectionism; PS = Personal

4 standards; COM = Concern over mistakes; DAA = Doubts about actions; PPP = Perceived parental pressure; PCP = Perceived coach pressure;

5 ORG = Organisation.