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5 Perfectionism and athlete burnout in junior elite athletes: The mediating role of coping
6 tendencies.

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Abstract

Recent research indicates that some dimensions of perfectionism are positively related to athlete burnout whereas others are negatively related to athlete burnout. The divergent relationship between these dimensions of perfectionism and athlete burnout may be explained by different coping tendencies. The present investigation examined whether different coping tendencies mediate the relationship between self-oriented and socially prescribed perfectionism and burnout. Two-hundred and six junior elite athletes (M age = 15.15 years, SD = 1.88 years, range = 11 to 22 years) completed measures of self-oriented and socially prescribed perfectionism, coping tendencies, and athlete burnout. Structural equation modeling indicated that the relationship between dimensions of perfectionism and athlete burnout was mediated by different coping tendencies. Higher levels of socially prescribed perfectionism was related to higher levels of avoidant coping which, in turn, was related to higher levels of athlete burnout. In contrast, higher levels of self-oriented perfectionism was related to higher levels of problem-focused coping and lower levels of avoidant coping which, in turn, was related to lower levels of athlete burnout. The findings suggest that different coping tendencies may underpin the divergent relationship between self-oriented and socially prescribed dimensions of perfectionism and athlete burnout.

1 Perfectionism and athlete burnout in junior elite athletes: The mediating role of coping
2 tendencies.

3 For a significant minority of junior athletes, competition and practice may be a source of
4 chronic psychological stress that significantly increases the risk of burnout (Smith, 1986).

5 Burnout is defined as a psychological syndrome comprising (i) emotional and physical
6 exhaustion, (ii) reduced athletic accomplishment, and (iii) sport devaluation (Raedeke & Smith,
7 2001). The first symptom is characterized by the perceived depletion of emotional and physical
8 resources beyond that associated with routine practice and competition. The second symptom is
9 characterized by an enduring sense of reduced personal accomplishment in terms of sport
10 abilities and achievement. The final symptom reflects the development of a cynical attitude
11 towards sport and participation. Although there is a growing body of empirical evidence to
12 suggest that athlete burnout is associated with numerous debilitating consequences such as
13 motivational difficulties, impaired health and interpersonal problems (see Cresswell & Eklund,
14 2006), to date, few studies have examined the processes by which junior elite athletes develop
15 the syndrome (e.g., Gould, Tuffrey, Udry, & Loehr, 1996; Hill, Hall, Appleton, & Kozub, 2008).

16 Current understanding of the athlete burnout process asserts that athletes are vulnerable
17 to the development of burnout to the extent that they experience chronic levels of psychosocial
18 stress (Smith, 1986). Personality factors are considered critical antecedents of burnout as they
19 are assumed to influence central appraisal processes and render athletes vulnerable to the
20 experience of elevated levels of threat and anxiety. Because some dimensions of perfectionism
21 are associated with negative achievement-related cognitions and anxiety in athletes (e.g., Hall,
22 Kerr, & Mathews, 1998), perfectionism has recently emerged as a disposition that may
23 predispose athletes to the development of burnout (e.g., Hill et al. 2008; Lemyre, Hall, &

1 Roberts, 2008). Perfectionism is considered to be a multidimensional disposition that broadly
2 reflects a rigid commitment to exceedingly high standards combined with a preoccupation with
3 harsh self-critical evaluation (e.g., Frost, Marten, Lahart, & Rosenblate, 1990; Hewitt & Flett,
4 1991). A recent summary of research examining the consequences of these two broad
5 dimensions by Stoeber and Otto (2006) indicates that when considered in isolation, a
6 commitment to the pursuit of high personal standards is generally associated with positive
7 outcomes. In contrast, a preoccupation with harsh self-critical evaluation is consistently
8 associated with psychological maladjustment, regardless of whether individuals pursue high
9 personal standards. In accord, research examining the relationship between perfectionism and
10 burnout in athletes has found that the presence of dimensions that reflect a preoccupation with
11 harsh self-critical evaluation correspond to higher levels of burnout symptoms in both junior
12 elite tennis players and junior winter sport athletes (Gould et al., 1996; Lemyre et al., 2008).

13 Hewitt and Flett (1991) have sought to examine the correlates, processes and outcomes
14 associated with self-oriented and socially prescribed dimensions of perfectionism. Self-oriented
15 and socially prescribed perfectionism can be considered subordinate dimensions, or facets, of the
16 two broad dimensions of perfectionism. Whereas self-oriented perfectionism is closely related to
17 a commitment to exceedingly high standards, socially prescribed perfectionism is more closely
18 related to a preoccupation with harsh self-critical evaluation (e.g., Dunkley, Blankstein, Halsall,
19 Williams, & Winkworth, 2000). Both self-oriented and socially prescribed perfectionism are
20 believed to energize the pursuit of exceedingly high standards but each is characterized by
21 distinct beliefs about what must be accomplished in order to attain a sense of acceptance (Hill et
22 al., 2008). Self-oriented perfectionism involves the belief that self-acceptance is based on the
23 attainment of exceedingly high personal standards. Conversely, socially prescribed

1 perfectionism involves the belief that self-acceptance and the acceptance of others is contingent
2 upon the attainment of exceedingly high standards that are imposed by others. A combination of
3 these beliefs and stringent self-evaluation are purported to lead to psychological difficulties for
4 both self-oriented and socially prescribed perfectionism. Research suggests that socially
5 prescribed perfectionism invariably leads to negative psychological outcomes, while self-
6 oriented perfectionism may be best considered a vulnerability factor that interacts with the
7 experience of stress to predict psychological and motivational difficulties (see Flett & Hewitt,
8 2005, 2006).

9 Hill et al. (2008) recently examined the relationship between self-oriented and socially
10 prescribed perfectionism and burnout in junior elite soccer players. They hypothesized that both
11 self-oriented and socially prescribed perfectionism would be positively associated with burnout
12 because each dimension has the potential to increase perceptions of threat through overly critical
13 self-evaluative tendencies. In partial support of their hypotheses, Hill et al. (2008) found that
14 socially prescribed perfectionism was related to higher levels of burnout. In contrast, the
15 relationship between self-oriented perfectionism and burnout was more complex. A direct
16 inverse relationship indicated that self-oriented perfectionism may have the potential to mitigate
17 the experience of the syndrome, while a positive indirect effect via an inverse relationship with
18 unconditional self-acceptance suggested that it may contribute to its eventual development.
19 These findings suggest that different psychological processes underpin the relationship between
20 these two dimensions of perfectionism and athlete burnout. The current investigation sought to
21 examine the possibility that their divergent direct relationship with burnout is, in part, explained
22 by differences in coping tendencies.

23 *Coping and athlete burnout*

1 Coping is defined as the cognitive and behavioral effort that an individual makes in order
2 to manage internal and external sources of psychological stress (Lazarus & Folkman, 1984).
3 There are currently a number of approaches to assess the manner in which athletes cope (see
4 Hoar, Kowlaski, Gaudreau, & Crocker, 2006, for a review). These include a distinction between
5 problem-focused and avoidant coping (Endler & Parker, 1994). These two coping categories
6 reflect the use of different strategies in response to the experience of stress. Problem-focused
7 coping entails strategies aimed at overcoming sources of stress. This includes, for example,
8 thinking about and analyzing the source of stress (planning) and taking direct behavioral steps to
9 remove it (active coping). In contrast, avoidant coping entails utilizing strategies that seek to
10 disengage from the coping process. This includes strategies such as refusal to acknowledge the
11 stressor exists (denial) and reducing behavioral efforts to overcome the stressor (behavioral
12 disengagement).

13 Within a cognitive-affective model of burnout (Smith, 1986), problem-focused coping is
14 likely to lead to lower levels of burnout through the attenuation of the frequency and duration of
15 stress (Dunkley et al., 2000). In contrast, avoidant coping may fail to attenuate the experience of
16 stress and, therefore, result in elevated burnout symptoms. This possibility is supported directly
17 by research that has found that greater endorsement of problem-focused coping discriminates
18 between tennis burnouts and active junior tennis players (Gould et al., 1996), as well as
19 indirectly by research that has found that problem-focused coping is associated with positive
20 affective consequences whereas avoidant coping is related to more negative affective
21 consequences in athletes (see Hoar et al., 2006, for a review). Importantly, the negative affective
22 consequences of avoidant coping includes higher levels of anxiety that are thought to precede the
23 development of burnout (e.g., Ntoumanis & Biddle, 2000; Gaudreau & Blondin, 2002).

1 *Perfectionism, coping and athlete burnout*

2 In a review of research examining the relationship between perfectionism and coping,
3 Hewitt and Flett (1996) argued that self-oriented and socially prescribed perfectionism can be
4 distinguished based on their relationship with variables associated with the coping process and
5 coping strategies. While self-oriented perfectionism is principally associated with coping
6 strategies that confront and remove sources of stress, socially prescribed perfectionism is
7 principally associated with coping strategies that aim to avoid sources of stress (Hewitt et al.,
8 1995). The divergent relationships with coping strategies are believed to reflect differences
9 between the two dimensions of perfectionism in terms of the perceived control and coping
10 efficacy (Hewitt & Flett, 1996). Since Hewitt and Flett's (1996) review, subsequent research
11 undertaken by Dunkley and colleagues (e.g., Dunkley & Blankstein, 2000; Dunkley et al., 2000;
12 Dunkley, Zuroff, & Blankstein, 2003) has further supported the contention that self-oriented and
13 socially prescribed perfectionism encourage different coping strategies (e.g., problem-focused
14 versus avoidant) and that coping is an important mediator of the relationship between these
15 dimensions of perfectionism and psychological distress (e.g. anxiety, negative affect, anger and
16 depression). More recently, Gaudreau and Antl (2008) have also found that coping strategies
17 mediate the relationship between broad dimensions of perfectionism that include self-oriented
18 and socially prescribed perfectionism and changes in the life-satisfaction of athletes.
19 Consequently, there is sufficient theoretical and empirical evidence to suggest that coping may
20 be an important mediator of the relationship between both self-oriented and socially prescribed
21 perfectionism and athlete burnout, and that differences in the coping tendencies associated with
22 these dimensions of perfectionism may explain their divergent direct relationship with athlete
23 burnout.

1 In summary, the purpose of the current study was to examine whether different coping
2 tendencies mediate the relationship between self-oriented and socially prescribed dimensions of
3 perfectionism and burnout in junior elite athletes. Congruent with the mediation model proposed
4 by Dunkley and colleagues (Dunkley & Blankstein, 2000; Dunkley et al., 2000; Dunkley et al.,
5 2003), it was hypothesized that socially prescribed perfectionism will have a positive direct
6 relationship with athlete burnout and a positive indirect relationship with athlete burnout. The
7 indirect relationship will indicate that the higher the level of socially prescribed perfectionism
8 the more avoidant coping would be typically utilized and the higher the subsequent level of
9 burnout. It was further proposed that self-oriented perfectionism will have an inverse direct
10 relationship with athlete burnout and an inverse indirect relationship with athlete burnout. The
11 indirect relationship will indicate that the higher the level of self-oriented perfectionism the more
12 problem-focused coping would typically be utilized and the lower the subsequent level of
13 burnout. The hypothesized mediation model would be supported if the direct relationship
14 between perfectionism and burnout is reduced but remains significant after controlling for
15 coping tendencies.

16 Method

17 *Participants*

18 Two-hundred and six junior elite athletes (97 males, 109 females; M age = 15.15 years,
19 $SD = 1.88$ years, range = 11 to 22 years) who were recruited based on their participation in
20 county, regional and national athletics competitions ($n = 12$ judo, $n = 81$ swimming, $n = 73$ track
21 athletics, $n = 38$ field athletics, $n = 2$ non-respondents). The sample included athletes that
22 represented their sport at club ($n = 42$), regional ($n = 116$) and national level ($n = 38$). There
23 were 8 non-respondents in terms of competitive level. The sample had, on average, participated

1 in their sport for 5.96 years ($SD = 3.31$) and reported that in comparison to other activities their
2 participation was considered very important ($M = 7.81$, $SD = 1.30$) on a nine-point Likert scale
3 (1 = *not at all important* to 9 = *extremely important*).

4 *Instruments*

5 *Multidimensional Perfectionism.* Hewitt and Flett's (1991) Multidimensional
6 Perfectionism Scale was used to assess self-oriented (e.g. "I must always be successful in
7 activities that are important to me.") and socially prescribed perfectionism (e.g. "Although they
8 may not show it, other people get very upset with me when I slip up."). To reflect the possible
9 domain-specificity of perfectionism (see Dunn, Gotwals, & Causgrove Dunn, 2005), the stem of
10 the instrument was adapted to focus the athletes on their participation in sport ("Listed below are
11 a number of statements concerning how you view your participation in your sport...").

12 Individual items largely remained the same¹. Each subscale contains 15-items measured on a
13 seven-point Likert scale (1 = *strongly disagree* to 7 = *strongly agree*). Hewitt and Flett (1991)
14 have provided evidence to support the validity and reliability of measurement associated with
15 the scale outside of the sport domain. Research has begun to emerge that supports the reliability
16 of the scale when measuring perfectionism in athletes (e.g., Appleton, Hall, Hill & Kozub,
17 2009).

18 *Coping.* The modified COPE (MCOPE) scale was used to assess coping tendencies
19 (Crocker & Graham, 1995). The scale measures self-regulatory coping strategies in the context
20 of sport (see Carver, Scheier, & Weintraub, 1989). These include planning, active coping,
21 suppression of competing activities, seeking instrumental social support, seeking emotional
22 social support, increasing effort, denial, venting of emotion, denial, behavioural disengagement,
23 humour, wishful thinking, and self-blame. Each subscale contains four items that assess each

1 coping strategy. For each item individuals respond on a five-point Likert scale to indicate the
2 degree to which they use these strategies (1 = *used not at all/very little* to 5 = *used very much*).
3 Previous research has supported the scale's psychometric properties (e.g., Crocker & Graham,
4 1995) and its validity as a measure of coping amongst athletes (e.g., Gould, Finch, & Jackson,
5 1993). The scale was selected to mirror the use of the MCOPE scale by Gould et al. (1996) when
6 examining the burnout in junior tennis players and the COPE scale by Dunkley and colleagues
7 when examining the relationship between perfectionism and psychological distress (Dunkley et
8 al., 2000; Dunkley et al., 2003). Rather than including all subscales, coping strategies were
9 selected from the MCOPE scale that corresponded with those used by Dunkley and colleagues to
10 represent problem-focused coping (planning, active coping, and suppression of competing
11 activities) and avoidant coping (denial and behavioural disengagement) as latent factors.
12 Previous research has provided evidence to support the reliability of these two coping latent
13 factors (see measurement models in Dunkley et al., 2000; Dunkley et al., 2003). The original
14 stem of the MCOPE asked athletes to describe a recent stressful performance situation and recall
15 the manner in which they coped ("For each item, indicate how much you used each strategy
16 during the stressful performance situation"). As burnout is presumed to develop as a
17 consequence of chronic stress over time, the stem of the instrument was adapted to assess how
18 athletes typically responded to the experience of stress when competing and practicing their
19 sport.

20 *Athlete Burnout.* Athlete burnout was assessed using Raedeke and Smith's (2001) Athlete
21 Burnout Questionnaire. This scale measures athlete burnout across three subscales; a reduced
22 sense of athletic accomplishment (e.g. "I am not performing up to my ability in my sport."),
23 perceived emotional and physical exhaustion (e.g. "I am exhausted by the mental and physical

1 demands of my sport.”), and sport devaluation (e.g. “I don’t care as much about my sport
2 performance as I used to.”). Each subscale contains 5-items and is scored on a five-point Likert
3 scale (1 = *almost never* to 5 = *almost always*). Raedeke and Smith (2001) have provided
4 evidence to support the validity and reliability of measurement associated with the scale. In the
5 current investigation, athlete burnout was represented as a latent factor manifested through the
6 three burnout symptoms. An athlete burnout latent factor has demonstrated sufficient composite
7 reliability ($\rho_c > .70$; Hair, Black, Babin, & Anderson, 2009) in recent research ($\rho_c = .83$; Hill et
8 al., 2008).

9 Results

10 *Preliminary analysis*

11 Missing value analysis indicated that the percentage of missing data due to item non-
12 response was extremely low for the overall sample ($M = 0.60$, $SD = 0.70$, range = 0 to 2.90%).
13 There were 159 complete cases and 47 incomplete cases. Participants whose percentage of item
14 non-response exceeded 5%, the equivalent of five items, were removed ($n = 4$). None of the
15 remaining participants had missing values for more than three items ($M = 1.44$, $SD = 0.70$, range
16 = 1 to 3). Given the low number of missing values, and previous satisfactory internal consistency
17 of the scales (e.g., Hewitt & Flett, 1991; Raedeke & Smith, 2001; Crocker & Graham, 1995),
18 missing values were replaced using the mean of the non-missing items from the subscale in each
19 individual case (see Graham, Cumsille, & Elek-Fisk, 2000).

20 The data was screened for univariate and multivariate outliers using the protocol
21 described by Tabachnick and Fidell (2007). Standardised z-scores were inspected and those
22 larger than 3.29 ($p < .001$) were removed. Cases with a Mahalanobis distance greater than $\chi^2_{(10)}$
23 = 29.59 ($p < .001$) were also then removed. This led to the removal of 8 participants. The

1 remaining data ($n = 198$) was considered to be approximately univariate and multivariate normal
2 (absolute skewness $M = .35$, $SD = .37$, $SE = .17$, absolute kurtosis $M = .48$, $SD = .17$, $SE = .34$,
3 Mahalanobis distance $M = 9.95$, $SD = 4.49$, Mardia's normalised multivariate kurtosis = 3.15).
4 The homogeneity of the covariance matrix across gender, age and sport were assessed using
5 three separate Box's M tests. These indicated that the covariance matrix was homogenous across
6 male and female athletes, Box's M (55.00, 117632.16) = 52.07 ($p > .05$), age (below 14yrs,
7 between 15-16yrs, above 16yrs), Box's M (110.00, 55730.18) = 144.94 ($p > .05$), as well as
8 sport, Box's M (165.00, 5620.96) = 198.84 ($p > .05$). Internal reliability analysis (Cronbach's α)
9 indicated that the measurement associated with each scale used in the current study
10 demonstrated sufficient internal consistency ($M = .76$, $SD = .10$, range .62 to .89)².

11 *Descriptive Analyses*

12 The sample reported high levels of self-oriented perfectionism and moderate levels of
13 socially prescribed perfectionism, as indicated on the seven-point Likert scale (self-oriented
14 perfectionism $M = 4.75$, $SD = 0.88$, socially prescribed perfectionism $M = 3.45$, $SD = 0.75$). The
15 sample reported moderate-to-low levels of burnout symptoms across the five-point Likert scale
16 (reduced athletic accomplishment $M = 2.29$, $SD = 0.74$, physical and emotional exhaustion $M =$
17 2.33 , $SD = 0.92$, devaluation $M = 1.92$, $SD = 0.92$). However, as in previous research, the
18 respective standard deviations of the athlete burnout symptoms indicate that a small number of
19 the sample may be exhibiting more extreme thoughts and feelings indicative of burnout. The
20 sample also reported a tendency to utilize more problem-focused strategies, than avoidant coping
21 strategies when dealing with achievement difficulties (planning $M = 3.39$, $SD = 0.86$, active
22 coping $M = 3.71$, $SD = 0.66$, suppression $M = 3.15$, $SD = 0.79$, denial $M = 2.24$, $SD = 0.76$,
23 behavioral disengagement $M = 1.75$, $SD = 0.80$).

1 *Structural equation modeling of the relationship between perfectionism, coping and athlete*
2 *burnout*

3 Prior to assessing the structural relationships, confirmatory factor analysis was used to
4 assess the fit of the measurement model (Anderson & Gerbing, 1988). The model included five
5 inter-related latent factors (self-oriented perfectionism, socially prescribed perfectionism,
6 problem-focused coping, avoidant coping and athlete burnout). Each dimension of perfectionism
7 was represented using three parcels constructed using item means, variances and inter-item
8 correlations (Landis, Beal, & Tesluk, 2000)³. Parceling is a common practice in structural
9 equation modeling and involves using composite scores derived from multiple individual scale
10 items (Landis et al., 2000). The technique has a number of proposed advantages that include
11 higher sample-size-to-estimated-paths ratios, increased reliability of manifest indicators and less
12 violation of normality assumptions (Bandalos & Finney, 2001). As stated previously, planning,
13 active coping and suppression were used as indicators of problem-focused coping, behavioral
14 disengagement and denial were used as indicators of avoidant coping, and the three symptoms of
15 burnout were used as indicators of athlete burnout.

16 Prior to examining the hypothesized structural relationships, the measurement model was
17 assessed. Fit indices are displayed in Table 1. The measurement model was considered to
18 provide acceptable fit in comparison to criteria used to indicate reasonable fit (CFI and NNFI
19 $>.90$, RMSEA $<.10$, SRMR $<.10$, $\chi^2/df < 3$; Hu & Bentler, 1995; Jöreskog & Sorbom, 1993;
20 Marsh, 2007). Standardized factor loading for indicator variables were statistically significant
21 (self-oriented perfectionism .86, 81 and 68, socially prescribed perfectionism .86, .55, and .64,
22 problem-focused coping .79, .76, and .66, avoidant coping .97 and .63, and athlete burnout .65,
23 .52, and .93). Each latent factor displayed sufficient composite reliability (self-oriented

1 perfectionism .84, socially prescribed perfectionism .73, problem-focused coping .78, avoidant
2 coping .79, and athlete burnout .75).

3 Correlations corrected for measurement error between latent factors indicated that self-
4 oriented perfectionism was inversely related to athlete burnout ($r = -.35, p < .01$), while socially
5 prescribed perfectionism was positively related to athlete burnout ($r = .20, p < .05$). Examination
6 of the relationship between dimensions of perfectionism and coping strategies indicated that self-
7 oriented perfectionism was positively related to problem-focused coping ($r = .62, p < .01$) and
8 inversely related to avoidant coping ($r = -.32, p < .05$). In contrast, socially prescribed
9 perfectionism was positively associated with avoidant coping ($r = .25, p < .01$) and unrelated to
10 problem-focused coping ($r = .09, p > .05$). Finally, problem-focused coping was inversely related
11 to athlete burnout ($r = -.38, p < .01$), while avoidant coping was positively related to athlete
12 burnout ($r = .73, p < .01$).

13 Next, structural equation modeling (AMOS 6.0.1 Arbuckle, 2006) with maximum
14 likelihood estimation was used to examine the proposed structural relationships between
15 dimensions of perfectionism, coping and athlete burnout. Fit indices are displayed in Table 1.
16 The hypothesized model stipulated that socially prescribed perfectionism would have a positive
17 direct relationship with athlete burnout and a positive indirect relationship with athlete burnout
18 via avoidant coping. In addition, self-oriented perfectionism would have an inverse direct
19 relationship with athlete burnout and an inverse indirect relationship with athlete burnout via
20 problem-focused coping⁴. The fit of the hypothesized model (M1) did not meet the criteria for
21 reasonable fit. Consequently, based on modification indices for the structural relationships (M.I
22 estimated $\Delta\chi^2 = 23.64$), an additional pathway from self-oriented perfectionism to avoidant
23 coping was added (M2). A chi-square difference test indicated that this model provided a

1 statistically significant improvement in fit in comparison to the original model: $\Delta\chi^2(1) = 31.43$
2 ($p < .05$). Although not originally hypothesized, this revision was considered justifiable as it is
3 possible that the preference for problem-focused coping associated with self-oriented
4 perfectionism may oppose the use of avoidant coping strategies. The possibility that socially
5 prescribed perfectionism was negatively related to problem-focused coping in a similar manner
6 was also examined. However, this pathway was not statistically significant ($\beta = -.15, p > .05$).
7 Modification indices indicated that no other additional pathways would improve model fit
8 significantly and were therefore not considered.

9 The meditational pathways in this model were then assessed by establishing the
10 conditions of mediation and examining individual meditation pathways (Holmbeck, 1997;
11 MacKinnon, 2008). For mediation to be supported a number of conditions must be observed.
12 First, in the absence of the mediating variable, the direct effect of the predictor variables must be
13 statistically significant. Second, the path coefficients between the predictor variable and
14 mediator, and the mediator and outcome variable after controlling for the effect of the predictor,
15 must be statistically significant. Third, following the introduction of the mediator, the direct
16 effect of the predictor on the outcome variable must be reduced to zero and must not
17 significantly improve fit of the model. Mediation can also be supported that indicates the
18 presence of other important unmeasured mediators. In this case, following the introduction of the
19 mediator, the direct relationship between the predictor variable and the outcome variable would
20 be reduced but remain statistically significant. The fit indices of models tested in this analysis
21 are displayed in Table 1.

22 A model with direct pathways from perfectionism to athlete burnout in the absence of the
23 mediating latent coping factors (M3) was first examined. The fit of this model was acceptable

1 and the path coefficients from dimensions of perfectionism to athlete burnout were statistically
2 significant (self-oriented perfectionism $\beta = -.49$ & socially prescribed perfectionism $\beta = .39$, p
3 $<.01$). Next, using the structural relations in the revised model, a mediation model including only
4 indirect pathways between dimensions of perfectionism and burnout (M4) was compared with a
5 mediation model that included both indirect and direct pathways (M5). Both models provided
6 acceptable fit. However, the two direct pathways in the in second mediation model (M5) were
7 not statistically significant (self-oriented perfectionism to athlete burnout $\beta = -.02$, socially
8 prescribed perfectionism to athlete burnout $\beta = .07$, $p >.05$). A chi-square difference test also
9 indicated that there was no statistically significant difference between the fit of these mediation
10 models: $\Delta\chi^2(2) = 0.70$ ($p >.05$). Consequently, the mediation model that included only indirect
11 pathways between dimensions of perfectionism and athlete burnout were supported (Figure 1).

12 Specific indirect effects and total indirect effects of dimensions of perfectionism on
13 athlete burnout for the final model are displayed in Table 2. By calculating both specific indirect
14 effects and total indirect effects the magnitude and statistical significance of each individual
15 mediational pathway and the total mediation can be ascertained. Following the
16 recommendations of Shrouf and Bolger (2002), approximate standard errors for the total indirect
17 effects and individual path standard errors were estimated using bias-corrected bootstrap
18 analysis (1000 random samples from the observed covariance matrix). The standard errors for
19 specific indirect effects were then estimated using the procedure described by MacKinnon
20 (2008). All specific indirect and total indirect effects were statistically significant ($p <.05$). The
21 final model indicated that dimensions of perfectionism explained 37% and 27% of variance in
22 problem-focused coping and avoidant coping and, in turn, coping explained 58% of variance in
23 athlete burnout.

Discussion

The present study examined whether different coping tendencies mediate the relationship between self-oriented and socially prescribed perfectionism and athlete burnout (Hill et al., 2008; Raedeke & Smith, 2004). It was hypothesized that the relationship between self-oriented and socially prescribed dimensions of perfectionism and athlete burnout would be mediated by associations with problem-focused and avoidant coping. Specifically, socially prescribed perfectionism would have a positive direct relationship with athlete burnout and a positive indirect relationship with athlete burnout via a positive relationship with avoidant coping. Further, self-oriented perfectionism would have an inverse direct relationship with athlete burnout and an inverse indirect relationship with athlete burnout via a positive relationship with problem-focused coping. In partial support of this model the analyses indicated that the relationship between both dimensions of perfectionism and burnout were mediated by coping via indirect pathways only. The relationship between self-oriented perfectionism and athlete burnout was mediated by a positive relationship with problem-focused coping and an inverse relationship with avoidant coping, while the relationship between socially prescribed perfectionism and athlete burnout was mediated only by a positive relationship with avoidant coping. All specific indirect and total indirect effects were statistically significant. The model accounted for 37% of variance in problem-focused coping, 27% in avoidant coping, and 58% of variance in athlete burnout.

Socially prescribed perfectionism, coping and athlete burnout

The finding that the relationship between socially-prescribed perfectionism and burnout was explained by the tendency to employ avoidant coping, and an absence of the use of problem-focused coping, supports and extends previous research (e.g., Dunkley & Blankstein,

1 2000; Dunkley et al., 2000; Dunkley et al., 2003) in two ways. Firstly, it suggests that the
2 mediating influence of avoidant coping extends beyond the perfectionism-psychological distress
3 relationship (anxiety, negative affect, anger and depression) to perfectionism-athlete burnout
4 relationship. Secondly, it further demonstrates that dimensions of perfectionism which entail
5 socially prescribed standards are not associated with problem-focused coping (Dunkley et al.
6 2000; Dunkley et al., 2003). As Dunkley and colleagues (Dunkley et al., 2003) have suggested,
7 socially prescribed perfectionism may be unrelated to problem-focused coping as these coping
8 strategies are considered ineffective. This is because the standards that are believed to be
9 imposed by others are perceived to be uncontrollable and unrealistic. A further explanation is
10 that because problem-focused coping entails reengagement with stressful activities, problem-
11 focused coping also poses a significantly greater risk of future achievement difficulties and
12 negative evaluation by others. Consequently, problem-focused strategies are not considered
13 when coping with achievement stress. The avoidant coping tendencies that are used may have
14 the potential to reduce the experience of stress in the short term but by not making any direct
15 attempt to overcome stressors these strategies may undermine future coping efforts (Ntoumanis,
16 Biddle, & Haddock, 1999; Carver et al., 1989). In this sense, the coping tendencies associated
17 with this dimension of perfectionism do little to alleviate the stress that accompanies a belief that
18 achievement is necessary for the approval of others. Based on current understanding of the
19 burnout process, overtime the accrual of such stress may lead to higher levels of burnout
20 symptoms in athletes.

21 *Self-oriented perfectionism, coping and athlete burnout*

22 In contrast to the solely avoidant coping tendencies that mediated the socially prescribed
23 perfectionism-burnout relationship, the relationship between self-oriented perfectionism and

1 athlete burnout was explained by both problem-focused and avoidant coping tendencies. As
2 hypothesized, problem-focused coping was a significant mediator of the relationship between
3 this dimension of perfectionism and athlete burnout. Utilizing problem-focused coping may lead
4 to lower levels of burnout directly by reducing stress associated with perfectionistic self-
5 demands (Flett & Hewitt, 2006), as well as indirectly by increasing goal attainment (Gaudreau &
6 Antl, 2008; Gaudreau & Blondin, 2001). Contrary to the hypotheses, however, the model also
7 suggests that avoidant-coping is a significant mediator of the self-oriented perfectionism-burnout
8 relationship. Moreover, the specific indirect effects indicate that it is the tendency to spurn the
9 use of avoidant coping, rather than the use of problem-focused coping, that is the largest
10 contributor to the inverse relationship between self-oriented perfectionism and athlete burnout.
11 Previous research has not found an association between dimensions of perfectionism that include
12 self-oriented perfectionism and avoidant coping (Dunkley et al., 2003; Dunkley et al., 2000;
13 Gaudreau & Antl, 2008). There are a number of possible explanations for this discrepancy. For
14 example, there may be conceptual differences between self-oriented perfectionism and the
15 personal standards perfectionism latent factor used by Dunkley and colleagues which
16 encompasses other-oriented perfectionism, personal standards in addition to self-oriented
17 perfectionism as its indicators. Alternatively, this finding may reflect the inverse relationship
18 between the sense of control and coping efficacy associated with internal standards and the
19 belief that one is unable to implement effective action which underpins avoidant coping (Flett,
20 Hewitt, Blankstein, & O'Brien, 1991; Ntoumanis et al., 1999).

21 *Self-oriented perfectionism, coping and positive psychological consequences*

22 The findings of the current study raise some interesting questions regarding the nature of
23 self-oriented perfectionism and the role of coping in determining its consequences. The

1 consequences of self-oriented perfectionism in non-clinical samples are currently not clear (see
2 Hewitt & Flett, 2006). While self-oriented perfectionism has consistently emerged as a
3 component of a broader perfectionism construct that is considered to have primarily positive
4 consequences (see Stoeber & Otto, 2006), Flett and Hewitt (2005, 2006) have maintained that
5 self-oriented perfectionism inevitably leads to psychological difficulties. The tendency to utilize
6 problem-focused coping and eschew avoidant coping are qualities that are likely to contribute to
7 positive outcomes. However, self-oriented perfectionism also entails a number of core beliefs
8 about self-acceptance and self-blame which have previously been shown to adversely impact
9 coping efforts and underpin the use of avoidant coping (e.g., Dunkley, et al., 2003; Flett, Russo,
10 & Hewitt, 1994). Consequently, the impact of self-oriented perfectionism on the coping process
11 is likely to be complex and requires further examination. Because self-oriented perfectionism is
12 unlikely to lead to psychological difficulties while coping involves effective problem-focused
13 strategies, its relationship with coping appears central to understanding the consequences of this
14 dimension of perfectionism.

15 *Limitations and other future directions*

16 The findings must be considered in context of the limitations of the current investigation.
17 Because the study assessed a limited number of coping strategies, the role of other coping
18 strategies, particularly those that may not be adequately described as either problem-focused or
19 avoidant, is not clear. The assessment of coping strategies in the current study also presumes a
20 degree of stability in the manner in which athletes respond to stressors and consistency in
21 reported and actual coping. Research suggests that this may not always be the case (see
22 Gaudreau, Blondin, & Lapierre, 2001; Smith, Leffingwell, & Ptacek, 1999). Possible alternative
23 approaches involve assessing responses to recall (e.g., Ntoumanis et al., 1999) or hypothetical

1 scenarios (e.g., Eklund, Grove, & Heard, 1998). However, these approaches also have
2 limitations that are characteristic of research examining coping processes (see Gould et al.,
3 1993). Consequently, research that captures the influence of perfectionism on coping as a
4 process involving ongoing situational appraisal is warranted (Lazarus & Folkman, 1984). The
5 multilevel modeling diary methodologies employed by Dunkley et al. (2003), for example, may
6 provide insight into the interaction between perfectionism and situational variables which over
7 time leads to the development of burnout amongst athletes. Such an approach, and other
8 prospective designs, would also address common limitations associated with the cross-sectional
9 design and concurrent measurement utilized in the current study.

10 It also remains unclear what specific perfectionistic beliefs underpin the relationship
11 between self-oriented perfectionism and problem-focused coping. Research suggests that the
12 relationship between dimensions of perfectionism reflective of evaluative concerns and avoidant
13 coping are explained by doubts about actions (Dunkley, Zuroff, & Blankstein, 2006). Identifying
14 the specific dimensions that underpin the association between self-oriented perfectionism and
15 problem-focused coping is therefore an interesting avenue for future research. Finally, future
16 research is also required to examine the degree to which the final model generalizes beyond the
17 current study, especially in light of the modification of the hypothesized model. Given that the
18 interplay between perfectionism, stress and coping is purported to be central to the development
19 of burnout in other settings (e.g., Stoeber & Rennert, 2008) the model is likely to extend beyond
20 the current sample and context.

21

22 ¹ The word seldom was replaced with rarely in item 12 (original MPS).

1 ²When conducting the internal consistency analyses (Cronbach's α), a criterion of .60 was used
2 to indicate sufficient internal consistency with scales less than 5 items and .70 for scales with
3 more items (Loewenthal, 2001).

4 ³The three parcels for self-oriented perfectionism contained items 1, 6, 17, 18, 36 (parcel one α
5 = .67), 14, 12, 20, 32, 40 (parcel two α = .66), and 8, 15, 23, 34, 42 (parcel three α = .66). The
6 three parcels for socially prescribed perfectionism contained items 18, 33, 35, 39 (parcel one α =
7 .78), 9, 13, 21, 30 (parcel two α = .61), and 5, 11, 25, 31, 41 (parcel three α = .63). To ensure
8 sufficient internal consistency, two items were excluded from the socially prescribed
9 perfectionism parcels (37 and 44 in the original MPS).

10 ⁴Residual terms of the mediators were permitted to covary in all models assessing structural
11 relationships (see Preacher and Hayes, 2008).

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Table 1 *Assessment of fit of measurement and structural models*

	χ^2	df	χ^2/df	CFI	NNFI	SRMR	RMSEA (90% CI)	$\Delta\chi^2_{(df)}$
Measurement model	158.18	67	2.36	.91	.88	.08	.08 (.07 to .10)	
M1: Hypothesized model	192.60	69	2.79	.88	.85	.11	.10 (.08 to .11)	
M2: Revised model	161.17	68	2.37	.91	.88	.09	.08 (.07 to .10)	M1 vs. M2 = $(1) 31.43^{**}$
Test of mediation								
M3: Absence of mediators	78.90	24	3.29	.91	.86	.09	.11 (.08 to .14)	
M4: Full model- Indirect pathways only	161.87	70	2.31	.91	.89	.09	.08 (.07 to .10)	
M5: Full model- Indirect and direct pathways	161.17	68	2.37	.91	.88	.09	.08 (.07 to .10)	M4 vs. M5 = $(2) 0.70$

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

1 Table 2 *Decomposed effects, standard errors and 95% confidence intervals for the effect of self-oriented and socially prescribed perfectionism*
 2 *on athlete burnout*

Effect	Standardized estimate	Unstandardized estimate	SE	95% Confidence interval
Total indirect effects				
SOP-BO	-.46**	-.45	.09	-.62 to -.33
SPP-BO	.29**	.24	.09	.10 to .39
Specific indirect effects				
SOP-problem-focused coping-BO	-.13**	-.13	.05	-.22 to -.04
SOP-avoidant coping-BO	-.33**	-.32	.07	-.46 to -.18
SPP-avoidant coping-BO	.29**	.24	.08	.09 to .39

3 *Note.* Standard errors and 95% confidence intervals are based on unstandardized path coefficients. SOP = Self-oriented perfectionism, SPP =
 4 Socially prescribed perfectionism, and BO = Athlete burnout.

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

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Figure 1 - Final structural equation model: The mediating influence of problem-focused and avoidant coping on the relationship between self-oriented and socially prescribed perfectionism and athlete burnout. The disturbances of two coping factors were free to covary. Standardized parameter estimates and disturbances are displayed. All parameter estimates are significant at $p < .01$.

