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Perfectionism and Junior Athlete Burnout: The Mediating Role of Autonomous and
Controlled Motivation

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1 Abstract

2 Certain dimensions of perfectionism appear to place junior athletes at greater risk of burnout.
3 The current study adopted self-determination theory to explain why this is the case.
4 Specifically, as athlete burnout is believed to have a motivational signature that can be
5 described using motivational regulation, the study examined whether autonomous motivation
6 and controlled motivation mediated the perfectionism-burnout relationship. Junior athletes (n
7 = 211, M age = 15.61 yrs, s = 1.73) completed measures of multidimensional perfectionism,
8 athlete burnout, and motivational regulation. Structural equation modelling revealed that
9 autonomous motivation and controlled motivation partially mediated the relationship between
10 perfectionism and burnout. Perfectionistic concerns had a positive direct and indirect (via
11 controlled motivation) relationship with burnout. In contrast, perfectionistic strivings had a
12 negative direct and indirect (via autonomous motivation) relationship with burnout. The
13 findings suggest that perfectionistic concerns encompass a pattern of motivational regulation
14 which contributes to the occurrence of athlete burnout, whereas perfectionistic strivings
15 encompass a pattern of motivational regulation inversely associated with athlete burnout.

16

17 *Keywords:* Perfectionistic strivings, perfectionistic concerns, self-determination theory,
18 burnout, sport

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1 Perfectionism and Junior Athlete Burnout: The Mediating Role of Autonomous and 2 Controlled Motivation

3 Athlete burnout is an extreme form of sport disaffection that can afflict junior athletes
4 (Coakley, 1992). The syndrome manifests in symptoms of reduced perceptions of athletic
5 accomplishment, perceived emotional and physical exhaustion, and devaluation of
6 participation (Raedeke & Smith, 2001). Along with performance difficulties, these symptoms
7 have implications for the psychological well-being of athletes. For example, depression and
8 general anxiety have been reported by athletes experiencing burnout (Cresswell & Eklund,
9 2004). To observers, athlete burnout can appear to mark a motivational shift from high levels
10 of behavioural commitment to psychological, emotional and physical withdrawal. What
11 underpins this apparent motivational shift in sport is currently unclear. However, personality
12 characteristics are thought to play an important role, with a number of theoretical frameworks
13 offering explanations of the manner in which they may do so (see Creswell & Eklund, 2006,
14 for a review). Perfectionism has been identified as one factor that may predispose athletes to
15 dysfunctional achievement striving and burnout (Gould, Tuffey, Udry, & Loehr, 1996). The
16 purpose of the current study is to examine the perfectionism-athlete burnout relationship and
17 to explain this relationship using self-determination theory.

18 Perfectionism has been broadly defined as striving for exceedingly high standards
19 accompanied by harsh self-criticism (Frost, Marten, Lahart, & Rosenblate, 1990). Two
20 multidimensional approaches to perfectionism have typically been adopted to investigate the
21 association between perfectionism and athlete burnout. The first outlined by Frost, et al.
22 (1990) includes six dimensions, four of which reflect intrapersonal perfectionistic tendencies.
23 These include the setting of exacting personal standards and indicators of an irrational
24 importance placed on these standards, such as preoccupation with mistakes, chronic doubt
25 about inadequacies, and the necessity for precision and order. The other two dimensions

1 reflect interpersonal perfectionistic tendencies. These involve perceptions of parental pressure
2 (i.e., unrealistic standards and criticism). Researchers adopting this approach have found that
3 high personal standards tend to be inversely associated with athlete burnout, whereas concern
4 over making mistakes, doubts about action, and parental pressure tend to be positively
5 associated with athlete burnout (Gotwals, 2011; Gould et al., 1996; Lemyre, Hall, & Roberts,
6 2008). Evidence regarding a need for organisation is mixed (see Gotwals, 2011; Gould et al.,
7 1996).

8 The second approach used to examine the perfectionism-burnout relationship was
9 developed by Hewitt and Flett (1991). They argue that perfectionism can be directed both
10 inward and outward and that it has both intrapersonal and interpersonal qualities, which are
11 reflected in three specific dimensions. Self-oriented perfectionism is an intrapersonal
12 dimension characterised by an internal drive for exceedingly high personal standards and a
13 tendency to criticise oneself harshly. Socially prescribed perfectionism is an interpersonal
14 dimension characterised by perceptions that others hold unrealistically high standards for
15 oneself, are critical, and withhold approval based on attempts to obtain external standards.
16 Researchers have demonstrated that socially prescribed perfectionism is positively associated
17 with athlete burnout (Appleton, Hall, & Hill, 2009; Hill, Hall, Appleton, & Kozub, 2008;
18 Hill, Hall, Appleton, & Murray, 2010), whereas self-oriented perfectionism has demonstrated
19 a negative association (Appleton et al., 2009; Hill et al., 2008), no association (Hill et al.,
20 2010), and a positive indirect association (Hill et al., 2008) with athlete burnout.

21 To date, the association between perfectionism and athlete burnout has been examined
22 using the two models of perfectionism independently. However, in response to the emergence
23 of both of these models in sport research, researchers have recently begun to adopt a higher-
24 order approach. The potential integration of the two models is supported by factor analytical
25 studies that suggest that two broad dimensions of perfectionism may account for the

1 dimensions of these models (Bieling, Israeli, & Antony, 2004; Cox, Enns, & Clara 2002;
2 Frost, Heimberg, Holt, Mattia, & Neubauer, 1993). Perfectionistic strivings subsumes
3 personal standards and self-oriented perfectionism, whereas perfectionistic concerns
4 subsumes socially prescribed perfectionism, concern over mistakes and doubts about actions
5 (Dunkley, Blankstein, Halsall, Williams, & Winkworth, 2000). Based on their sub-
6 dimensions, perfectionistic strivings primarily entails the setting of exacting standards with
7 elements of stringent self-evaluation; whereas, perfectionistic concerns primarily entails a
8 commitment to exacting standards due to perceived expectations of significant others,
9 accompanied by overly critical self-evaluation (Dunkley, et al., 2000). Adopting a higher-
10 order approach may have some advantages in comparison to utilising models independently.
11 For example, it includes a wider array of dimensions to help capture perfectionism and avoids
12 disaggregation of individual sub-dimensions that in isolation may not fully capture
13 perfectionism. Consequently, the approach provides a useful extension to research in this
14 area.

15 To date, researchers have only conducted a handful of studies utilising the higher-
16 order approach in sport. They have found perfectionistic concerns to be positively associated
17 with avoidance achievement goals and avoidant coping strategies, but found perfectionistic
18 strivings to be positively associated with approach achievement goals and approach coping
19 strategies (Gaudreau & Antl, 2008; Kaye, Conroy & Fifer, 2008; Stoeber, Stoll, Salmi, &
20 Tiikkaja, 2009; Zarghmi, Ghamary, Shabani, & Varzaneh, 2011). Differential outcomes of
21 perfectionistic concerns and perfectionistic strivings are also evident in research outside of
22 sport. For example, researchers have found perfectionistic concerns to be positively
23 associated with distress and avoidant coping, as well as more extreme outcomes such as
24 depression and suicide ideation (Dunkley et al., 2000; Enns, Cox, Sareen, & Freeman, 2001).
25 In contrast, perfectionistic strivings has been found to be negatively related to detrimental

1 outcomes such as general negative affect, self-blame, anxiety, and depression (Bieling et al.,
2 2004; Dunkley, Zuroff, & Blankstein, 2003). In some instances, it has also been found to
3 have more adaptive correlates, such as active coping and conscientiousness (Dunkley et al,
4 2000; Enns et al., 2001). Although researchers have yet to examine the relationship between
5 the two broad dimensions of perfectionism and athlete burnout, based on current evidence, it
6 would be expected that they would also be differentially related to burnout symptoms.

7 A number of theories have been put forward to explain the occurrence of athlete
8 burnout (see Cresswell & Eklund, 2006 for a review). Self-determination theory (Ryan &
9 Deci, 2002) offers a distinctively organismic approach to understanding burnout and may
10 encompass existing theories (Cresswell & Eklund, 2006). Ryan and Deci (2002) contend that
11 humans possess an innate propensity for personal growth and assimilation through
12 internalisation of behaviour in to the self (Ryan & Deci, 2002). The process of internalisation
13 can lead to autonomous regulation of behaviour, where behaviour is fully integrated in to the
14 self, or more controlled forms of motivational regulation, where behaviour is only partially
15 integrated in to the self (Hodgins & Knee, 2002). Within this theory, more autonomous
16 motivational regulation is posited to lead to better psychological adjustment and well-being,
17 whereas more controlled regulation is associated with poorer psychological adjustment and
18 ill-being. This assertion has been supported in a number of empirical studies (see Ryan &
19 Deci, 2007 for review). This theory has recently been used to explain the development of
20 athlete burnout (e.g., Cresswell & Eklund, 2005; Hodge, Lonsdale, & Ng, 2008; Lemyre,
21 Treasure & Roberts, 2006). From this perspective athlete burnout is a state of ill-being that is
22 characterised by a distinct pattern of motivational regulation (Cresswell & Eklund, 2005).

23 Within self-determination theory multiple forms of motivation are differentiated.
24 Intrinsic regulation is the most autonomous form of motivation and entails participating for
25 inherent knowledge, enjoyment, and stimulation (Pelletier, Fortier, Vallerand, Tuson, Briere,

1 & Blais, 1995). Extrinsic motivation, on the other hand, includes four forms of regulation that
2 differ in the extent to which the behaviour is internalised in to the self. External regulation
3 can either be more controlled, when based on external controls (extrinsic regulation) or
4 internal contingencies (introjected regulation), or more autonomous, when underpinned by
5 instrumental value (identified regulation) or personal values (integrated regulation). The
6 model also includes amotivation which reflects a lack of motivation and is indicative of
7 helplessness. Based on this approach to understanding behaviour in sport, a number of
8 theorists (e.g., Cresswell & Eklund, 2005; Lemyre, et al., 2006) have suggested that athlete
9 burnout may have a motivational ‘signature’ characterised by lower levels of intrinsic
10 regulation and higher levels of amotivation or, when considered across the entire spectrum,
11 lower levels of autonomous motivation (intrinsic, integrated, and identified regulation) and
12 higher levels of controlled motivation (introjected and external regulation) (Lonsdale, Hodge,
13 & Rose, 2009).

14 Researchers have found support for this approach to describing athlete burnout. In
15 particular, lower intrinsic regulation and higher amotivation appear to be the motivational
16 regulations most strongly related to burnout symptoms (e.g., Cresswell & Eklund, 2005;
17 Raedeke & Smith, 2001). More recent research suggests that other regulations also appear to
18 predict burnout symptoms but to a lesser degree (Lonsdale, et al., 2009). Further support for
19 this approach is also provided by research which has utilised a weighted combination of
20 motivation regulations to create a relative autonomy index. Although this approach has a
21 number of limitations (see Koestner & Losier, 2002), the use of the index has consistently
22 supported the notion that more autonomous motivation is negatively associated with burnout
23 in athletes (Lemyre, Roberts, & Stray-Gundersen, 2007; Lonsdale, et al., 2009). Furthermore,
24 shifts from high autonomous motivation to more controlled motivation assessed using the
25 index has been found to be positively associated with athlete burnout during the competitive

1 season (Lemyre, et al., 2006). Collectively, this research suggests that burnout is more likely
2 when athletes report less autonomous and more controlled motivation for their participation
3 in sport.

4 *Perfectionism, motivational regulation, and athlete burnout*

5 From a self-determination theory perspective, the association between perfectionistic
6 strivings and perfectionistic concerns with motivational regulation (i.e., lower autonomous
7 motivation and higher controlled motivation) offers an explanation of their possible
8 relationships with athlete burnout. Perfectionistic concerns include sub-dimensions that are
9 theoretically closely related to controlled motivation. For instance, pursuit of socially
10 prescribed standards in order to obtain external approval is similar to controlled forms of
11 regulation such as introjected and external regulation. Direct support for this possibility has
12 been provided by Gaudreau and Antl (2008) in their research with athletes. They found that
13 perfectionistic concerns predicted higher levels of a non-self-determined (i.e., more
14 controlled) motivation composite (extrinsic regulation and amotivation) but was not
15 associated with a self-determined (i.e., more autonomous) motivation composite (intrinsic
16 regulation and identified regulation). In addition, there is evidence that the individual
17 intrapersonal (i.e. concern over mistakes and doubts about action) and interpersonal (i.e.
18 socially prescribed perfectionism) sub-dimensions of perfectionistic concerns are positively
19 associated with controlled motivation and unrelated to autonomous motivation in sport
20 (McArdle & Duda, 2004; Mouratidis & Michou, 2011)

21 In comparison to perfectionistic concerns, perfectionistic strivings appears to be more
22 motivationally complex. On one hand, its sub-dimensions are likely to be associated with a
23 greater sense of personal control and choice that is likely to contribute to more autonomous
24 motivation in sport (Dunkley et al., 2000). On the other hand, perfectionistic strivings may be
25 underpinned by more controlling factors, such as the fulfilment of contingencies of self-worth

1 (DiBartolo, Frost, Chang, LaSota & Grills, 2004; Hill, Hall, & Appleton, 2011).
2 Consequently, perfectionistic strivings may be associated with higher levels of both
3 autonomous motivation and controlled motivation in sport. This possibility is again supported
4 by Gaudreau and Antl (2008) who found that athletes' perfectionistic strivings were
5 positively correlated with a composite of self-determined motivation and, to a lesser degree, a
6 composite of non-self-determined motivation. This pattern of relationships has also been
7 found by researchers who have examined the association between personal standards and
8 self-oriented perfectionism sub-dimensions with composites of autonomous motivation
9 (intrinsic, integrated, and identified regulation) versus controlled motivation (introjected and
10 external regulation), as well as the regulations individually (McArdle & Duda, 2004;
11 Mouratidis & Michou, 2011)

12 In further support of the notion that autonomous and controlled motivation may
13 mediate the perfectionism-burnout relationship, research suggests that the association
14 between perfectionism and other outcomes are typically indirect. For example, Dunkley et al.
15 (2000) found that the association between perfectionistic concerns and distress was mediated
16 by hassles, avoidant coping, and perceived social support. This is also the case in terms of the
17 perfectionism-athlete burnout relationship with multiple indirect pathways being identified
18 that include different achievement motives (validation versus growth-seeking) and coping
19 tendencies (Hill, Hall, & Appleton, 2010; Hill, Hall, Appleton, & Murray, 2010). The pattern
20 of motivation associated with athletes' perfectionism is an especially likely additional
21 pathway. Not only because of the theoretical and empirical links between motivation and
22 athlete burnout (Cresswell & Eklund, 2005; Lemyre et al., 2006) but also because recent
23 research suggests that controlled and autonomous motivation may mediate the relationship
24 between perfectionism and other outcomes. In particular, Mouratidis & Michou (2011)
25 recently found that controlled and autonomous motivation mediated the associations between

1 sub-dimensions of perfectionism and several coping skills in adolescent athletes. Similarly,
2 Gaudreau and Antl (2008) found that non-self-determined (i.e., more controlled) motivation
3 and self-determined (i.e. more autonomous) motivation mediated the association between the
4 broader perfectionism dimensions and situational coping.

5 *The present study*

6 In summary, the purpose of the study was to examine the relationship between
7 perfectionistic strivings and perfectionistic concerns with athlete burnout, and whether these
8 relationships were partially mediated by autonomous motivation and controlled motivation.
9 Based on the preceding argument, it was hypothesised that the perfectionistic concerns-
10 burnout relationship would be partially mediated by a positive association with controlled
11 motivation. In contrast, the perfectionistic strivings-burnout relationship would be partially
12 mediated by a positive association with both autonomous motivation and controlled
13 motivation (figure 1). Partial mediation rather than full mediation was hypothesised due to
14 evidence of multiple mediators of the perfectionism-athlete burnout relationship (Gaudreau &
15 Antl, 2008; Hill, Hall, & Appleton, 2010; Hill, Hall, Appleton, & Murray, 2010; Mouratidis
16 & Michou, 2011).

17 Method

18 *Participants and Procedure*

19 Participants were 211 junior athletes recruited from sports clubs and organisations
20 across Northern England. This included 161 males and 50 females whose mean age was
21 15.61 years ($s = 1.73$ years). They competed in their sport at club ($n = 45$), academy ($n = 120$)
22 or regional ($n = 46$) level. Sports included football ($n = 105$), cricket ($n = 39$), netball ($n =$
23 38), and swimming ($n = 29$). On average participants trained and competed for 12.28 hours
24 per week ($s = 7.47$ hours).

25 *Instruments*

1 *Athlete Burnout*. The athlete burnout questionnaire (ABQ; Raedeke & Smith, 2001)
2 was used in the current study to assess athlete burnout. The ABQ is a 15-item inventory made
3 up of three 5-item subscales: reduced sense of accomplishment (e.g. 'I am not achieving
4 much in sport'), perceived emotional and physical exhaustion (e.g. 'I feel so tired from my
5 training that I have trouble finding the energy to do other things'); and athlete's devaluation
6 of their sport (e.g. 'The effort I spend in sport would be better spent doing other things'). The
7 subscales were measured on a 5 point Likert (1 = almost never to 5 = almost always).
8 Evidence has been provided to support the validity and the reliability of the subscales. This
9 includes factor structure, internal consistency ($\alpha \geq .85$), and test-retest reliability ($r \geq .86$) (see
10 Raedeke & Smith, 2001). In the current study athlete burnout was represented as a latent
11 variable indicated by its three observed subscales. Previous composite reliability estimates in
12 $\rho_c \geq .75$; Hill, Hall, & Appleton, 2010) support the utility of this approach.

13 *Sport Multidimensional Perfectionism*. The Sport Multidimensional Perfectionism
14 Scale (SMPS-2; Gotwals & Dunn, 2009) is an adapted, sport specific version of Frost et al.
15 (1990) multidimensional perfectionism scale. The current study utilised the S-MPS-2 7-item
16 personal standards subscale (e.g. "I hate being less than the best at things in my sport"), the 8-
17 item concern over mistakes subscale (e.g. "If I fail in competition I feel like a failure as a
18 person") and the 6-item doubts about actions subscale (e.g. "I usually feel unsure about the
19 adequacy of my pre-competition practices"). All three subscales were measured on a 5 point
20 Likert scale (1 = strongly disagree to 5 = strongly agree). Evidence has been provided to
21 support the validity and reliability of the scale. This includes factor structure (via multiple
22 exploratory factor analyses) and internal consistency ($\alpha \geq .74$) (see Gotwals & Dunn, 2009;
23 Gotwals, Dunn, Causgrove-Dunn, & Gamache, 2010).

24 *Multidimensional Perfectionism*. The Cox et al. (2002) shortened version of Hewitt
25 and Flett's (1991) Multidimensional Perfectionism Scale (H-MPS) was used to assess self-

1 oriented perfectionism, (e.g., “One of my goals is to be perfect in everything I do.”) and
2 socially prescribed perfectionism (e.g., “People expect nothing less than perfection from
3 me.”). The instructions (“The following items are statements concerning personal
4 characteristics that some people demonstrate when they are training or playing their sport”) and the stem of the instrument were modified (“In my sport...”) in order to account for the
5 potential domain specificity of perfectionism (see Dunn, Gotwals, & Causgrove Dunn, 2005).
6 Each subscale of the shortened H-MPS contains 5-items measured on a seven-point Likert
7 scale (1 = strongly disagree to 7 = strongly agree). Reliability analyses have supported the
8 internal consistency of the subscales ($\alpha \geq .79$). Confirmatory factor analyses have supported
9 the factor structure of the shortened scales and correlations between the shortened H-MPS
10 and original H-MPS subscales are extremely high ($r_s \geq .94$) (Cox, et al., 2002)

12 *Motivational Regulation.* The Behavioural Regulation in Sport Questionnaire (BRSQ;
13 Lonsdale, Hodge & Rose, 2008) was used to assess motivation. The BRSQ includes the stem:
14 “I participate in my sport...”, and is made up of six 4-item subscales measured on a 7 point
15 Likert scale (1 = strongly disagree to 7 = strongly agree). The subscales including intrinsic
16 motivation (e.g. “because I enjoy it”), integrated regulation (e.g. “because it’s part of who I
17 am”), identified regulation (e.g. “because the benefits of sport are important to me”),
18 introjected regulation (e.g. “because I would feel ashamed if I quit”), external regulation (e.g.
19 “because if I don’t other people will not be pleased with me”), and amotivation (e.g. “but I
20 wonder what’s the point”). Evidence has been provided to support the validity of the
21 measure, as well as the reliability of the subscales, in the form of internal consistency $\alpha \geq .76$,
22 and test-retest reliability ($r \geq .73$) (Lonsdale et al, 2008).

23 Results

24 *Preliminary analyses*

1 Following the procedure outlined by Tabachnick and Fidell (2007), participants with
2 more than 5% missing data ($n = 13$) were removed from the analysis. The remaining sample
3 consisted of 118 complete cases and 80 incomplete cases. These incomplete cases displayed a
4 very small amount of missing items ($M = 1.71$, $SD = 0.87$, range = 1 – 4). Due to the small
5 amount of missing data, these remaining missing values were replaced using the mean of the
6 non-missing items from the relevant subscale in each individual case (see Graham, Cumsille,
7 & Elek-Fisk, 2003). The univariate and multivariate distribution of data was analysed
8 following procedures outlined by Tabachnick and Fidell (2007). Five univariate outliers,
9 outside the standardized z score range (± 3.29 , $p < .001$), were identified and removed.
10 Similarly, 2 multivariate outliers, with Mahalanobis distance above $\chi^2_{(16)} = 39.25$ ($p < .001$),
11 were identified and removed. Subsequently, the data were considered approximately
12 univariate normal (absolute skewness $M = 0.43$, $SD = 0.31$, $SE = 0.18$, absolute kurtosis $M =$
13 0.37 , $SD = 0.20$, $SE = 0.35$) and multivariate normal (Mardia's normalized coefficient =
14 2.74). Reliability analyses assessing internal consistency of the subscales supported use of the
15 individual subscales ($\alpha \geq .68$). Results are displayed in Table 1.

16 *Descriptive analyses*

17 Means and standard deviations are displayed in Table 1. They indicate that the
18 athletes demonstrated moderate-to-high scores on the sub-dimensions of perfectionistic
19 strivings and moderate-to-low scores on the sub-dimensions of perfectionistic concerns.
20 These findings are consistent with Gaudreau and Antl (2008) in demonstrating that junior
21 athletes tend to display higher levels of perfectionistic strivings than perfectionistic concerns.
22 In addition the athletes' scores generally reflected a more autonomous pattern of motivational
23 regulation because athletes reported high levels of intrinsic motivation, slightly lower levels
24 of integrated regulation and identified regulation, moderate-low levels of introjected
25 regulation and external regulation, and low levels of amotivation. Consistent with previous

1 research with junior athlete samples (e.g. Raedeke & Smith, 2001), the athletes in the current
2 study also displayed moderate-to-low levels of athlete burnout symptoms.

3 *Structural equation modelling*

4 Measurement model: Following the two step procedure outlined by Anderson and
5 Gerbing (1988), confirmatory factor analysis using AMOS 18.0 (Arbuckle, 2009) with
6 maximum likelihood estimation (ML) was employed to test the measurement model prior to
7 testing the structural relationships. ML has advantages over other methods of parameter
8 estimation. For example, ML has demonstrated less biased parameter estimates than
9 asymptotic distribution-free estimation, better theoretical fit than weighted least squares and
10 generalised least squares, and is relatively robust to deviations from normality (Finch, West,
11 & MacKinnon, 1997; Olsson, Foss, Troye, & Howell, 2000; Yuan & Bentler, 1997). The
12 measurement model consisted of 5 inter-related latent variables including perfectionistic
13 strivings, perfectionistic concerns, autonomous motivation, controlled motivation, and athlete
14 burnout. The same approach to modelling perfectionistic striving and perfectionistic concerns
15 utilised by Dunkley et al (2000) was adopted here. Specifically, personal standards and self-
16 oriented perfectionism were used as indicators of perfectionistic strivings, and concern over
17 mistakes, doubts about actions and socially prescribed perfectionism were indicators of
18 perfectionistic concerns. Autonomous and controlled motivation were modelled in the same
19 manner as Mouratidis and Michou (2011). Intrinsic regulation, integrated, and identified
20 regulation were used as indicators of autonomous motivation, and introjected regulation and
21 external regulation were indicators of controlled motivation. Reduced sense of
22 accomplishment, sport devaluation, and physical and emotional exhaustion were used as
23 indicators of athlete burnout.

24 Consistent with the recommendation of Byrne (2001), the fit of the measurement
25 model and structural model were assessed using a combination of absolute and incremental

1 fit indices. The assessment of model fit is a source of considerable debate with some
2 researchers suggesting that stringent cut-off criteria may be unsuitable (e.g., Marsh, Hau, &
3 Wen, 2004). In accord, criteria were used in the current study that acknowledged the potential
4 for acceptable (χ^2/df ratio < 3.00 , IFI and CFI $> .90$, SRMR $< .10$, RMSEA $< .08$) and
5 excellent fit (χ^2/df ratio < 2.00 , IFI and CFI $> .95$, SRMR $< .08$, RMSEA $< .06$; Marsh, Hau
6 & Wen, 2004).

7 The results of this analysis indicated that the measurement model provided a poor fit
8 to the data (χ^2/df ratio = 3.45, IFI = .87, CFI = .86, SRMR = .10, RMSEA = .11, 90% CI =
9 .10 - .13). Examination of the measurement model revealed autonomous and controlled
10 motivation to be the main source of ill-fit in the model. Consequently, a revised model was
11 formulated using an approach adopted by Gaudreau and Antl (2008) to model autonomous
12 motivation and controlled motivation. This was an item-level modelling approach that
13 entailed creating four composite indicators of autonomous motivation and controlled
14 motivation where each composite was formed by summing the first items from each of the
15 relevant motivational regulation subscales. This procedure was repeated using items two,
16 three, and four from each subscale to account for every item. This revised measurement
17 model provided acceptable-to-excellent fit to the observed data (χ^2/df ratio = 2.03, IFI = .94,
18 CFI = .94, SRMR = .07, RMSEA = .07, 90% CI = .06 to .09). Standardised factor loadings
19 from indicator variables to relevant latent variables were all significant (personal standards
20 =.83 and self-oriented perfectionism =.77; concern over mistakes = .78, doubts about action =
21 .47, and socially prescribed perfectionism .71; autonomous motivation indicators = .83, .84,
22 .82, and .77; controlled motivation indicators = .81, .89, .73, and .84; reduced sense of
23 accomplishment = .79, emotional and physical exhaustion = .52, and sport devaluation .82).
24 In addition, composite reliabilities were calculated and supported the revised measurement
25 model. These are reported in table 2 along with the error-free correlations.

1 Structural model: Structural equation modelling using maximum likelihood estimation
2 was conducted to test the proposed structural relationships between perfectionism,
3 autonomous motivation, controlled motivation and athlete burnout. Support for the
4 hypothesised model was found as the fit indices exceeded those indicative of acceptable fit
5 (χ^2/df ratio = 2.05, IFI = .94, CFI = .93, SRMR = .07, RMSEA = .07, 90% CI = .059 to .089).
6 Path coefficients are shown in figure 2. Perfectionistic concerns and perfectionistic strivings
7 accounted for 30% of the variance in autonomous motivation. Perfectionistic concerns and
8 perfectionistic strivings accounted for 37% of the variance in controlled motivation. The
9 combination of perfectionism and the two motivations accounted for 58% of the variance in
10 athlete burnout.

11 Full versus partial mediation: To test the hypothesis that motivation would partially
12 mediate the perfectionism-athlete burnout relationship, a full mediation model and partial
13 mediation model were compared using a chi-square difference test. The full mediation model
14 includes indirect pathways only. In contrast the partial mediation model includes both
15 indirect pathways and direct pathways. The results of this comparison indicated that while
16 both models provided adequate fit (full mediation model: χ^2/df ratio = 2.17, IFI = .93, CFI =
17 .92, SRMR = .08, RMSEA = .08, 90% CI = .06 to .09; AIC = 320.65; partial mediation
18 model: χ^2/df ratio = 2.05, IFI = .94, CFI = .93, SRMR = .07, RMSEA = .07, 90% CI = .06 to
19 .09; AIC = 308.34), the chi-square difference test indicated that the inclusion of direct paths
20 significantly improved fit $:\Delta\chi^2_{(2)} = 16.31, p < .01$. Consequently, the partial mediation model
21 was supported. The final model is displayed in figure 2.

22 Assessment of mediation: In a separate analysis, the size and statistical significance of
23 the specific indirect effects of dimensions of perfectionism on athlete burnout via motivation
24 were assessed. To do so, indirect effects were calculated along with their 95% confidence
25 intervals using a distribution of products method in the *PRODCLIN* programme (MacKinnon,

1 Fritz, Williams, & Lockwood, 2007). The specific indirect effect of perfectionistic concerns
2 on athlete burnout via controlled motivation excluded zero and was therefore significant (ab
3 = .15, 95% CI = .05 to .26, SE = .06); however, via autonomous motivation included zero and
4 was therefore non-significant (ab = .05, 95% CI = -.01 to .13, SE = .03). The specific indirect
5 effect of perfectionistic strivings on athlete burnout via autonomous motivation also excluded
6 zero and was therefore significant (ab = -.22, 95% CI = -.36 to -.11, SE = .06); however, via
7 controlled motivation included zero and was therefore non-significant (ab = -.02, 95% CI = -
8 .12 to .07, SE = .05). Consequently, the association between perfectionistic concerns and
9 athlete burnout can be considered to be partially mediated by controlled motivation; whereas,
10 the association between perfectionistic strivings and athlete burnout can be considered to be
11 partially mediated by autonomous motivation.

12 *Assessment of suppression*

13 Comparison between the error-free correlations (table 2) and the parameter estimates
14 in the final structural model suggested the presence of suppression. Suppression is evident
15 when an association between a predictor and an outcome is substantially increased or changes
16 direction when another predictor is added to the model (Cohen, Cohen, Aiken, & West,
17 2003). In the current study, when perfectionistic concerns were controlled for (i.e., included
18 as a predictor of controlled motivation), the significant positive association between
19 perfectionistic strivings and controlled motivation became non-significant and negative. In
20 addition, when perfectionistic strivings were controlled for (i.e., included as a predictor of
21 autonomous motivation), the non-significant positive association between perfectionistic
22 concerns and autonomous motivation changed in direction. Whether this suppression was
23 significant was assessed using the Sobel (1986) test. This indicated that perfectionistic
24 concerns suppressed the effect of perfectionistic strivings on controlled motivation (z = 2.40,
25 SE = .16, p < .05), and that perfectionistic strivings suppressed the effect of perfectionistic

1 concerns on autonomous motivation ($z = 3.95$, $SE = .09$, $p < .001$). The implications of this
2 suppression for interpretation of the findings are explained in the discussion.

3 Discussion

4 The current study had two purposes. The first purpose was to examine the
5 relationships between perfectionistic concerns and perfectionistic strivings with athlete
6 burnout. The second purpose was to examine whether autonomous motivation and controlled
7 motivation partially mediated these relationships. It was predicted that perfectionistic
8 concerns would be positively related to athlete burnout. In contrast, it was predicted that
9 perfectionistic strivings would be negatively related to athlete burnout. It was also expected
10 that the perfectionistic concerns-burnout relationship would be partially mediated by a
11 positive association with controlled motivation only. In contrast, it was expected that the
12 perfectionistic strivings-burnout relationship would be partially mediated by a positive
13 association with both autonomous motivation and controlled motivation (figure 1). The final
14 model generally provided support for the hypotheses. The only exception was that the
15 perfectionistic strivings-burnout relationship was not mediated by controlled motivation.
16 These effects sizes were large and comparable to previous studies investigating other
17 mediators of the perfectionism-athlete burnout relationship (e.g., Hill, Hall, & Appleton,
18 2010; Hill, Hall, Appleton, & Murray, 2010).

19 *Dimensions of perfectionism and athlete burnout.*

20 Perfectionistic concerns and perfectionistic strivings were expected to have a
21 divergent relationship with athlete burnout. This was in part expected because these broad
22 dimensions encompass sub-dimensions that are theoretically and empirically related to
23 burnout in an opposing manner (Gotwals, 2011). By identifying that these findings generalise
24 to broad dimensions, the findings both support and extend previous research examining the
25 perfectionism-burnout relationship. The findings also provide support more broadly for the

1 general proposition that perfectionistic concerns may have considerable psychological costs
2 for athletes, while perfectionistic strivings are less problematic (Stoeber & Otto, 2006).
3 Elsewhere, this has been found in relation to other outcomes in sport such as life satisfaction,
4 coping, and achievement goals (Gaudreau & Antl, 2008; Kaye, Conroy & Fifer, 2008;
5 Zarghmi et al., 2010). The current research suggests that this may also be the case for athlete
6 burnout.

7 *The mediating roles of autonomous and controlled motivation*

8 The findings provided support for the mediating roles of autonomous motivation and
9 controlled motivation in the perfectionism-burnout relationship. The relationship between
10 perfectionistic concerns and athlete burnout was partly explained by the prominence of
11 controlled motivation. As was expected, the findings suggest that perfectionistic concerns is
12 primarily characterised by motivation that is only partially internalised in to the self
13 (introjected and external regulation). This is consistent with researchers who have reported a
14 similar pattern of relationships amongst perfectionistic concerns and its sub-dimensions with
15 motivation regulation and burnout (e.g., Gaudreau & Antl, 2008; Lonsdale et al., 2009).
16 Perfectionistic concerns appear to promote participation that is largely energised by a sense
17 of coercion, external pressure, and internal contingencies. Within self-determination theory,
18 this is likely to contribute to sub-optimal functioning and ill-being that includes burnout.

19 As expected, the relationship between perfectionistic strivings and athlete burnout
20 was partially mediated by higher levels of autonomous motivation. This suggests that
21 perfectionistic strivings may facilitate a greater degree of integration of sport participation in
22 to the self (Gaudreau & Thompson, 2010). Unlike perfectionistic concerns, the reasons for
23 sport participation are more adaptive and include enjoyment and personal affinity to sport.
24 Within self-determination theory, this pattern of motivation is thought to contribute to more
25 optimal functioning and well-being, which is the antithesis of burnout. This again supports

1 the wider literature in this area which has typically highlighted the potential for
2 perfectionistic strivings to be unproblematic, and even adaptive, when controlling for
3 perfectionistic concerns (Stoeber & Otto, 2006).

4 Unexpectedly, the relationship between perfectionistic strivings and athlete burnout
5 was not mediated by a positive association with controlled motivation. Instead, the pathway
6 from perfectionistic strivings to controlled motivation was non-significant and the indirect
7 effect was non-significant. Partial mediation via the two motivational pathways was initially
8 hypothesised because the sub-dimensions of perfectionistic strivings have been suggested to
9 elicit a mixed pattern of motivation that includes controlled motivation (DiBartolo, et al.,
10 2004; Hill et al., 2011). Moreover, there is also some empirical evidence that suggests that
11 this is the case (e.g., Gaudreau & Antl, 2008; McArdle & Duda, 2004; Mouratidis & Michou,
12 2011). It is possible that the current finding may be indicative of suppression. Specifically,
13 the error-free correlation between perfectionistic strivings and controlled motivation was
14 small-to-moderate, positive and significant. However, following the inclusion of
15 perfectionistic concerns as a predictor in this model, the path coefficient became small,
16 negative and non-significant. A similar effect was evident when comparing the association
17 between perfectionistic concerns and autonomous motivation. These findings highlight the
18 necessity to consider both the overall (unpartialled) and unique (partialled) contributions of
19 perfectionism dimensions. With this in mind, the findings suggest that *pure* perfectionistic
20 striving may be inversely related to controlled motivation, whereas perfectionistic strivings
21 may be more complex (DiBartolo, et al., 2004).

22 *Practical Implications*

23 Given the large effects of perfectionism and motivational regulation on athlete
24 burnout, the findings from the current study have meaningful implications for those who wish
25 to promote positive youth sport experiences. In particular, in order to avoid disaffection,

1 practitioners should seek to reduce perfectionistic concerns among junior athletes. The
2 current findings suggest that this may have a sizable impact on the sense of coercion and
3 pressure that characterises the motivation associated with burnout and will allow athletes to
4 continue to enjoy sport and fulfil their athletic potential. Utilising self-determination theory
5 may offer a means to do so by addressing feelings of contingent self-worth at the heart of
6 perfectionism via basic psychological need satisfaction (c.f. Hall, Hill and Appleton, 2012).
7 Basic psychological needs are also considered central to the development of athlete burnout
8 and autonomous motivation (see Lonsdale et al., 2009). Consequently, encouraging coaches
9 and parents to adopt strategies that support these needs, such as the provision of choice,
10 offering rationales for decisions, acknowledging and valuing athletes' feelings, holds the
11 potential to impact each part of the process modelled in the current study and safeguard
12 junior participants from burnout.

13 *Limitations and Future Directions*

14 The current study has a number of limitations that should be considered. The
15 approach to modelling the broad dimensions of perfectionism in the current study replicated
16 Dunkley et al. (2000). However, other researchers have included additional sub-dimensions
17 when modelling broad factors (e.g., Gaudreau & Thompson, 2010; Mallinson & Hill, 2011).
18 Notably, the approach here focuses largely on intrapersonal dimensions. This should be
19 considered when the findings of this study and the findings of others are compared. Similarly,
20 in order to build directly on previous research, the approach to modelling motivation was
21 based on recent work in this area which has combined individual regulations to indicate
22 autonomous and controlled motivation (Mouratidis & Michou, 2011). A further future
23 direction would be to examine the unique contribution of individual regulations in mediating
24 the perfectionism-burnout relationship.

1 Another limitation is the reliance on self-report measures. This mono-method bias (or
2 common-method variance) is likely to inflate the relationship among variables and partly
3 explain the large observed effects. Consequently, future research could consider adopting
4 other sources of measurement (e.g., behavioural and observer sources) to assess these
5 relationships. A final noteworthy limitation is the inability of the cross-sectional design
6 employed to capture the developmental aspects of the modelled relationships. This is
7 important because the proposed motivational deterioration associated with burnout will be
8 best observed over time (Cresswell & Eklund, 2006). Only one study to date has examined
9 the relationship between perfectionism and burnout longitudinally (Chen, Kee, & Tsai, 2009);
10 consequently, further research of this type is warranted.

11 *Conclusions*

12 The current study adds to the increasing body of research that highlights the role of
13 perfectionism in the development of athlete burnout. It suggests that when considered as
14 higher-order factors, perfectionistic strivings and perfectionistic concerns have opposing
15 relationships with athlete burnout in a similar manner to when key sub-dimensions are
16 assessed. In addition, the current findings indicate that divergent motivational pathways can
17 in part explain these relationships. When their unique effects are considered, perfectionistic
18 concerns appear to encompass a pattern of motivational regulation which contributes to the
19 occurrence of athlete burnout. In contrast, perfectionistic strivings encompass a pattern of
20 motivational regulation inversely associated with athlete burnout.

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1 Table 1. Descriptive Statistics and Reliability Estimates

	Range	<i>M</i>	<i>SD</i>	<i>α</i>
Athlete burnout				
Reduced sense of accomplishment	1-5	2.20	0.63	.68
Emotional and physical exhaustion	1-5	2.41	0.80	.84
Sport devaluation	1-5	1.79	0.78	.82
Global burnout	1-5	2.13	0.32	.83
Perfectionistic strivings				
Personal standards	1-5	3.70	0.65	.80
Self-oriented perfectionism	1-7	5.61	0.88	.80
Perfectionistic Concerns				
Concern over mistakes	1-5	3.10	0.71	.80
Doubts about actions	1-5	2.70	0.74	.78
Socially prescribed perfectionism	1-7	3.59	1.10	.75
Autonomous motivation				
Intrinsic motivation	1-7	6.06	0.88	.76
Integrated regulation	1-7	5.63	0.95	.75
Identified regulation	1-7	5.53	1.00	.72
Controlled motivation				
Introjected regulation	1-7	3.95	1.65	.81
External regulation	1-7	3.26	1.57	.84

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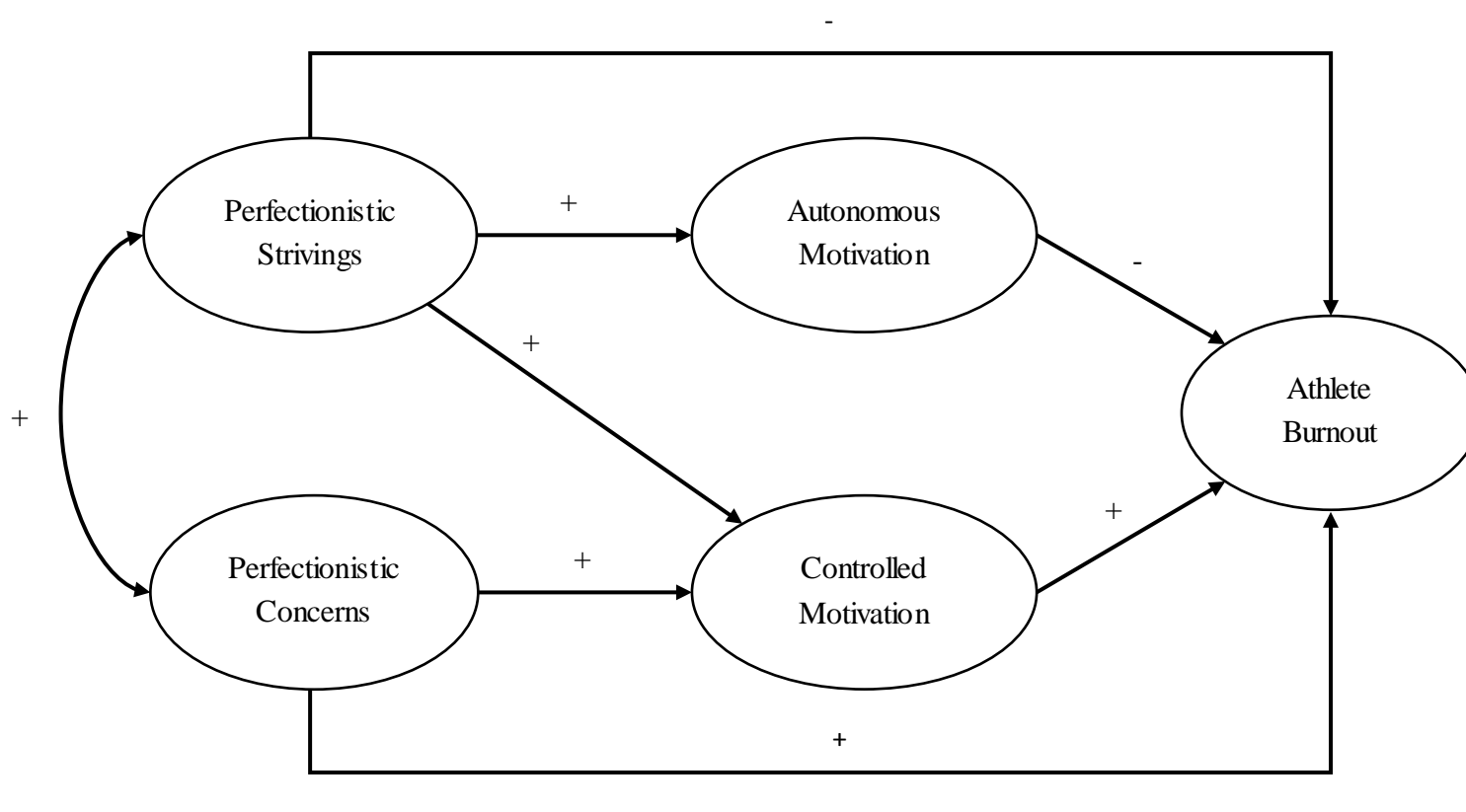
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1 Table 2. Composite reliabilities and error free correlations between the latent variables in the
 2 measurement model

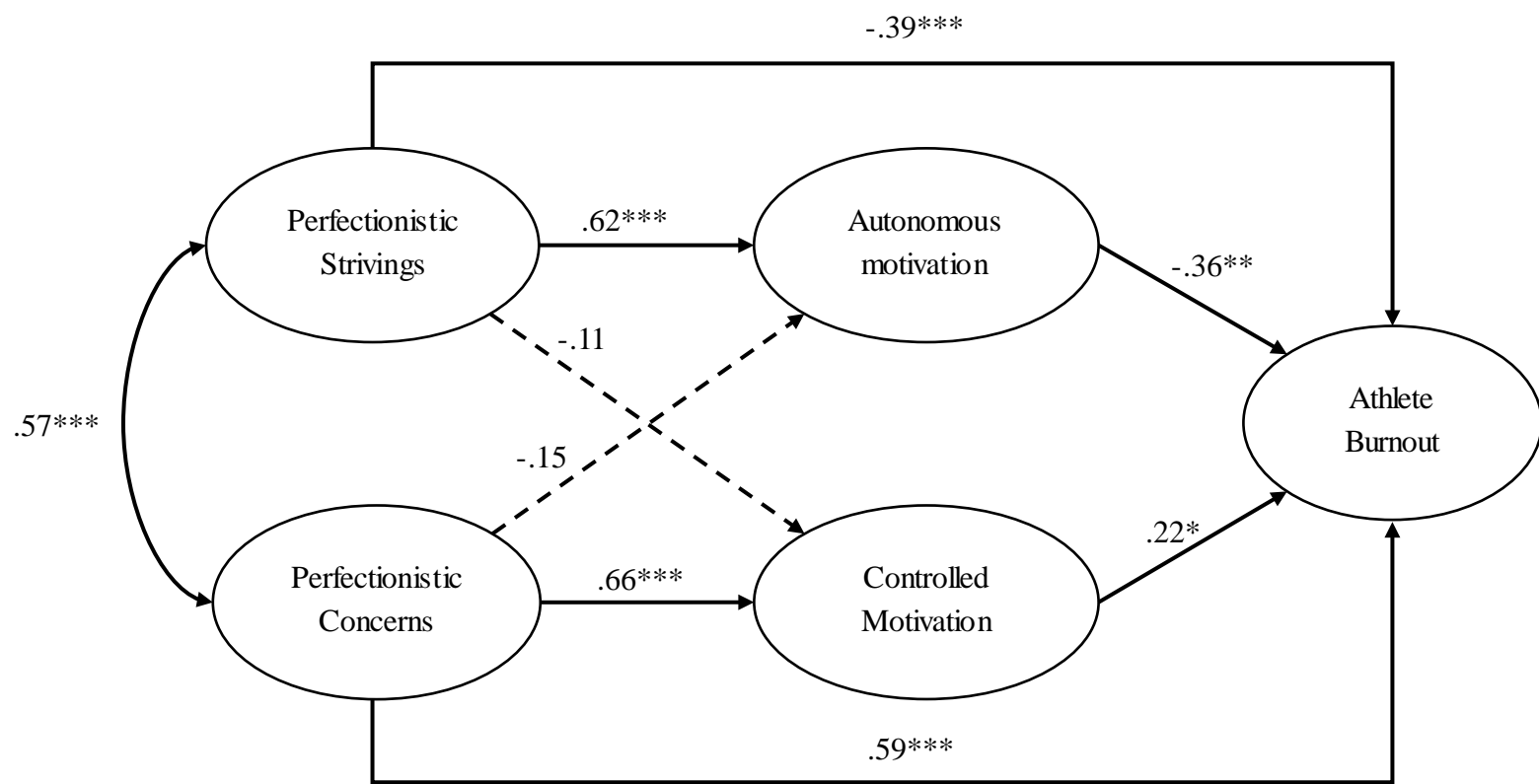
	ρ_c	1.	2.	3.	4.	5.
1. Perfectionistic concerns	.69	-				
2. Perfectionistic strivings	.78	.58***	-			
3. Controlled motivation	.80	.61***	.25**	-		
4. Autonomous motivation	.81	.18	.54***	.17*	-	
5. Athlete burnout	.76	.44***	-.19*	.41***	-.42***	-

3 Note: $p < .001$ ***, $p < .01$ ** , $p < .05$ *



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14 Figure 1. Hypothesised model of the associations between broad factors of perfectionism, autonomous motivation, controlled motivation and
15 athlete burnout.



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Figure 2. Final Structural Equation Model: The partial mediating influence of autonomous motivation and controlled motivation on the relationships between broad dimensions of perfectionism and athlete burnout. *Note* All pathways are standardized, $n = 191$, Dashed line *ns*, $*p < .05$, $p < .01^{**}$, $p < .001^{***}$.

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