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Perfectionism, Burnout, and Engagement in Dance: The Moderating Role of Autonomy Support

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Abstract

Previous findings highlight the relationships between 2×2 perfectionism and burnout in dancers, but researchers are yet to examine the relationships between 2×2 perfectionism and, the opposing outcome of, engagement in dance. Similarly, we know little about the factors that may moderate these relationships. We therefore sought to extend previous research by examining the relationships between 2×2 perfectionism and both burnout and engagement in dancers, and by assessing whether autonomy support moderated the relationships between subtypes of perfectionism and the two opposing outcomes. Adolescent dancers ($N = 244$, female $n = 198$, M age = 15.00 years, $SD = 2.90$ years) completed measures capturing four subtypes of perfectionism (pure personal standards perfectionism, pure evaluative concerns perfectionism, mixed perfectionism, and non-perfectionism), burnout dimensions (reduced sense of accomplishment, emotional/physical exhaustion, devaluation), engagement dimensions (confidence, dedication, vigour, enthusiasm), and autonomy support provided by their dance teacher. Moderated regression analyses supported all four hypotheses of the 2×2 perfectionism model for burnout (all dimensions) and dedication, vigour, and enthusiasm, and supported three hypotheses for confidence (Hypotheses 1a, 2 and 3). In addition, autonomy support moderated the relationships between subtypes of perfectionism and burnout (reduced accomplishment and devaluation) and engagement (all dimensions). The findings suggest that providing autonomy support offers a potential strategy to prevent burnout and promote engagement in perfectionistic dancers.

Keywords: youth dancers; burnout; engagement; self-determination theory; dance teacher autonomy support

1 The 2 × 2 Model of Perfectionism, Burnout and Engagement in Dance:

2 The Moderating Role of Autonomy Support

3 Becoming a professional dancer requires substantial training and high levels of
4 performance over many years (Aujla, Nordin-Bates, & Redding, 2014). For some young dancers,
5 this process can be a deeply rewarding experience that sets them on a pathway to long term
6 participation (Aujla et al., 2014). Yet, for others, the demands can become overwhelming, leading
7 to negative experiences and disaffection (Walker, Nordin-Bates, & Redding, 2012). These
8 contrasting experiences arise, in part, due to characteristics of the dancers as well as features of the
9 dance environment. If dancers strive for success in a flexible manner, view setbacks as
10 opportunities for development, and others reinforce this approach, we might reasonably expect
11 dancers to have more positive experiences. Conversely, if dancers engage in compulsive striving
12 and tie their self-worth to unattainable standards set by themselves or others, negative experiences
13 are likely to ensue (Hall & Hill, 2012). In the present study, we tested these assertions by examining
14 the relationships between perfectionism, engagement and burnout in dancers, and whether
15 autonomy support provided by dance teachers moderated these relationships.

16 Burnout can be generally defined as a cognitive-affective syndrome (Gustafsson, DeFreese,
17 & Madigan, 2017). In dance and sport research, burnout is most typically assessed by measuring
18 three core symptoms; a reduced sense of accomplishment, emotional/physical exhaustion, and
19 devaluation based on Raedeke & Smith (2001). Reduced sense of accomplishment reflects
20 perceived decline in performance and achievements. Emotional/physical exhaustion reflects
21 perceived depletion of emotional and physical resources stemming from practice and performance.
22 Finally, devaluation reflects a cynical attitude toward dance participation. Attesting to the
23 maladaptive role of burnout, these symptoms are related to a range of negative outcomes including
24 anxiety (Cresswell & Eklund, 2006), reduced performance (Cresswell & Eklund, 2007), and
25 dropout (Goodger, Gorely, Lavalley, & Harwood, 2007).

1 A directly opposing cognitive-affective experience is engagement (Schaufeli & Bakker,
2 2004). Engagement consists of four dimensions; confidence, vigour, dedication, and enthusiasm
3 (Lonsdale, Hodge, & Jackson, 2007). Confidence is belief in one's ability to maintain high levels of
4 performance and pursue goals. Dedication is desire, investment and effort directed toward pursuing
5 goals. Vigour is feelings of mental and physical liveliness. Finally, enthusiasm is feelings of
6 excitement and enjoyment. In contrast to burnout symptoms, these dimensions are positively
7 associated to other desirable outcomes such as self-regulation (Martin & Malone, 2013), work-life
8 balance (DeFreese & Smith, 2013), and flow (Hodge, Lonsdale, & Jackson, 2009).

9 Several theories have been proposed to explain the onset of burnout including stress,
10 commitment, and identity perspectives, self-determination theory (SDT), and the integrated model
11 (see Gustafsson et al., 2017 for a review). Of these, SDT (Ryan & Deci, 2018) offers an
12 encompassing framework that can also be used to explain engagement. From the SDT perspective,
13 engagement is more likely when motivation for dancing is autonomous (i.e., personally valued and
14 well assimilated with other needs and values). Autonomous motivation emerges when basic
15 psychological needs for autonomy (i.e., sense of choice and volition), competence (i.e., sense of
16 effectiveness), and relatedness (i.e., sense of belonging in one's environment) are supported. By
17 contrast, in SDT, burnout is more likely when motivation for dancing is controlled (i.e., dependent
18 on punishment and reward and contingent self-worth). Controlled motivation occurs in
19 environments that do not support, or actively thwart, basic psychological needs. In support of these
20 ideas, researchers have found that need satisfaction and autonomous motivation are related to
21 engagement, whereas need thwarting and controlled motivation are related to burnout (Jowett, Hill,
22 Hall, & Curran, 2013, 2016).

23 **Multidimensional Perfectionism and the 2 × 2 Model**

24 One factor that appears to influence the motivational processes outlined in SDT is
25 perfectionism. Perfectionism is a multidimensional personality trait characterised by striving for

1 exceedingly high standards accompanied by harsh criticism (Frost, Marten, Lahart, & Rosenblate,
2 1990). Striving for perfection may underpin personally important accomplishments that align with
3 one's values, and therefore relate to other adaptive outcomes. However, unremitting criticism and
4 self-worth tied to achievement mean that perfectionism may also undermine the quality of dancers'
5 motivation and underpin psychological difficulties (Hall & Hill, 2012). These core components of
6 perfectionism can be captured by differentiating two positively related higher-order factors;
7 personal standards perfectionism (PSP) and evaluative concerns perfectionism (ECP; Dunkley,
8 Zuroff, & Blankstein, 2006).

9 Examining two higher-order factors of perfectionism involves combining dimensions and
10 subscales from existing instruments (Hill, Mallinson-Howard, & Jowett, 2018). PSP consists of
11 dimensions that capture the personal pursuit of perfection including personal standards and self-
12 oriented perfectionism. ECP consists of dimensions that capture evaluative components of
13 perfectionism such as concern over mistakes, doubts about actions and socially prescribed
14 perfectionism (Gotwals & Dunn, 2009; Hewitt & Flett, 1991). There is evidence for the contrasting
15 effects of ECP and PSP in relation to burnout in dancers. Specifically, ECP is positively related to
16 emotional/physical exhaustion, whereas PSP is unrelated (Cumming & Duda, 2012). To date, there
17 is no evidence in relation to engagement in dancers, but findings from youth sport suggest that PSP
18 is related to engagement whereas ECP is unrelated (Jowett et al., 2016). Given similarities in the
19 achievement-oriented domains of dance and sport (e.g., high intensity training, focus on skill
20 acquisition, competition for leading roles/starting positions), we might reasonably expect equivalent
21 relationships to emerge in youth dancers.

22 Recently, researchers have begun to examine the interactions between ECP and PSP in
23 relation to psychological outcomes. Doing so allows researchers to test the relative importance of
24 different combinations of ECP and PSP in the 2×2 model of perfectionism (Gaudreau, 2016). The
25 model includes four perfectionism sub-types; pure PSP (high PSP and low ECP), pure ECP (high

1 ECP and low PSP), mixed perfectionism (high PSP and high ECP), and non-perfectionism (low
2 PSP and low ECP). Gaudreau (2016) formalised the differences between the subtypes using four
3 hypotheses. Due to the equivocal effects of PSP, three versions of Hypothesis 1 were proposed;
4 pure PSP would be associated with better (Hypothesis 1a), worse (Hypothesis 1b), or equivalent
5 outcomes (Hypothesis 1c) in comparison to non-perfectionism. Hypothesis 2 stated that pure ECP
6 would be associated with worse outcomes than non-perfectionism. Hypothesis 3 stated that pure
7 ECP would be associated with worse outcomes than mixed perfectionism. Hypothesis 4 stated that
8 mixed perfectionism would be associated with worse outcomes than pure PSP. Applying this
9 functional hierarchy to burnout and engagement, we anticipated that pure ECP would be associated
10 with the lowest levels of engagement and highest levels of burnout (Hypotheses 2 and 3), followed
11 by mixed perfectionism (Hypothesis 4), then non-perfectionism, and finally – based on Hypothesis
12 1a – pure PSP.

13 The 2×2 perfectionism model in relation to burnout in dancers has been examined in two
14 previous studies. First, Cumming and Duda (2012) examined emotional/physical exhaustion and
15 found that dancers with pure PSP reported lower levels of this symptom of burnout than dancers
16 with mixed perfectionism (Hypothesis 4). Second, Nordin-Bates, Raedeke, and Madigan (2017)
17 examined all burnout symptoms and found that dancers with pure ECP reported higher reduced
18 sense of accomplishment, devaluation, and emotional/physical exhaustion than dancers with non-
19 perfectionism (Hypothesis 2), and that dancers with mixed perfectionism reported higher reduced
20 sense of accomplishment than in dancers with pure PSP (Hypothesis 4). Researchers are yet to
21 examine the 2×2 model in relation to engagement in dancers. However, findings from Quested et
22 al. (2014) suggest some support for the model in relation to similar outcomes in dancers.
23 Specifically, they found that dancers with pure PSP reported higher levels of intrinsic motivation
24 than dancers with non-perfectionism (Hypothesis 1a) and higher levels of self-esteem than dancers
25 with mixed perfectionism (Hypothesis 4). Therefore, there is at least indirect evidence that the

1 perfectionism subtypes within the 2×2 model may explain aspects of the adaptive outcome of
2 engagement in dancers. The present study was the first to formally examine this possibility.

3 **The Moderating Role of Teacher Autonomy Support**

4 Another key but underdeveloped area of research is the identification of factors that
5 moderate the perfectionism-burnout and perfectionism-engagement relationships. Distinct from a
6 mediator that explains the relationship between predictor and a criterion variable, a moderator
7 affects the strength and/or direction of the relationship between a predictor and a criterion variable
8 (Baron & Kenny, 1986). Investigating moderators is important because it allows us to understand
9 when a relationship can be altered, providing a potential target for intervention. The structure of the
10 performance environment may be particularly important in this regard (Hall & Hill, 2012). Dance
11 teachers are often best placed to structure dancers' performance environments, and it appears that
12 this constitutes a moderating factor of the relationship between dancers' characteristics and well-
13 being outcomes. Specifically, Draugelis, Martin, and Garn (2014) found that when dancers
14 perceived that their teacher provided a task-oriented environment (i.e., where success is measured
15 by personal improvement and effort), this provided protection against anxiety and worry by
16 maintaining the dedication and confidence dimensions of engagement.

17 Alongside task-oriented environments, the performance environment can also be
18 characterized by the extent to which dance teachers provide autonomy support or control.
19 Autonomy supportive environments are evident when teachers nurture volition, interests, and
20 values by adopting the dancers' perspectives, encouraging problem-solving, and providing choices
21 (Ryan & Deci, 2018). Autonomy support facilitates satisfaction of autonomy, competence and
22 relatedness, and encourages true self-esteem (i.e. self-worth that does not depend upon specific
23 achievements; Ryan & Brown, 2003). Therefore, autonomy support may challenge the
24 contingencies of self-worth that characterise perfectionism, and increase engagement, and reduce
25 burnout (Hall & Hill, 2012). By contrast, teachers may instead create controlling environments that

1 emphasise normative comparisons and rely on external rewards and threats of punishment (Ryan &
2 Deci, 2018). Controlling environments thwart autonomy, competence and relatedness, and
3 encourage contingent self-esteem (i.e. self-worth that depends on continually meeting standards).
4 Emphasising such contingencies of self-worth may strengthen the link between perfectionism and
5 burnout, and weaken the link between perfectionism and engagement.

6 Researchers are yet to establish whether autonomy support moderates the influence of
7 perfectionism, but some of their findings attest to the positive influence of autonomy support. For
8 example, autonomy support was found to negatively correlate with burnout and positively correlate
9 with optimal functioning (e.g., intrinsic motivation, self-esteem) via basic psychological needs
10 satisfaction in dancers (Quested & Duda, 2010; Quested & Duda, 2011). Furthermore, longitudinal
11 findings from sport suggested that autonomy support provided by coaches predicted lower
12 emotional/physical exhaustion and higher subjective vitality in adolescent footballers over two
13 seasons (Adie, Duda, & Ntoumanis, 2012).

14 Regarding perfectionism, there is some evidence that situational factors can moderate its
15 effects. For example, Crocker, Gaudraeau, Mosewich, and Kljajic (2014) found that perceived goal
16 progress moderated the relationships between 2×2 perfectionism, control appraisal and avoidance
17 coping. Specifically, they found that when goal progress was lower (but not when higher), athletes
18 with pure ECP reported higher control appraisals and avoidance coping than athletes with non-
19 perfectionism (Hypothesis 2). By contrast, when goal progress was higher (but not when lower),
20 athletes with pure PSP reported lower levels of control appraisals and avoidance coping than
21 athletes with mixed perfectionism (Hypothesis 4).

22 **The Present Study**

23 Based on the theoretical and empirical arguments outlined above, the aims of the study
24 were to (a) examine the 2×2 model of perfectionism in relation to engagement, (b) re-examine the
25 2×2 model in relation to burnout, and (c) assess whether autonomy support moderated these

1 relationships in dancers. Hypotheses 1a, 2, 3 and 4 from the 2×2 model were posed in relation to
2 aims (a) and (b), and in relation to aim (c) we hypothesised that autonomy support would buffer the
3 relationships between perfectionism subtypes and all burnout dimensions and enhance the
4 relationships between perfectionism subtypes and all engagement dimensions. That is, autonomy
5 support would buffer against the relationships between pure ECP and burnout, and mixed
6 perfectionism and burnout (i.e. reduced support for Hypotheses 2 and 3 at higher compared to
7 lower levels of autonomy support); and would enhance the relationships between pure PSP and
8 engagement (i.e. increased support for Hypotheses 1a and 4 at higher compared to lower levels of
9 autonomy support).

10 **Method**

11 **Participants and Procedure**

12 Following institutional ethical approval, 244 dancers were recruited from 53 dance
13 organizations in the UK. Between one and 42 dancers represented each school. These included 198
14 females and 46 males whose mean age was 15.00 ($SD = 2.90$) years. Dancers completed measures
15 in the presence of the lead author either before or after class. On average, they took part in 8.11 (SD
16 $= 5.30$) classes per week which constituted 15.41 ($SD = 10.83$) hours dancing per week. They
17 described their main dance genre as ballet ($n = 183$), contemporary ($n = 35$), jazz ($n = 6$), street ($n =$
18 14), or tap ($n = 2$), with four non-respondents. On average, participants rated their involvement in
19 dance as very important in comparison to other activities in their life ($M = 6.53$, $SD = .72$: 1 = *not*
20 *important at all* to 9 = *extremely important*), and when asked how much they had enjoyed dancing
21 that year, they generally responded very positively ($M = 4.74$, $SD = 0.56$: 1 = *not at all* to 5 = *very*
22 *much*).

23 **Instruments**

24 **Burnout.** The Athlete Burnout Questionnaire (ABQ; Raedeke & Smith, 2001) was used in
25 the present study to assess burnout in dancers. The ABQ includes 15 items which were adapted in

1 line with Quested and Duda (2011) to reflect the dance context. These items are used to measure
2 three five-item subscales: reduced sense of accomplishment (e.g., 'I am not achieving much in
3 dance'), perceived emotional/ physical exhaustion (e.g., 'I feel so tired from my training that I have
4 trouble finding the energy to do other things'); and devaluation (e.g., 'The effort I spend in dance
5 would be better spent doing other things'). The instructions ("The following items are concerned
6 with how you feel at the moment about your dancing...") were adapted to reflect the dance context.
7 The subscales were measured on a five-point scale (1 = *Almost never* to 5 = *Almost always*).
8 Researchers have found support for the validity and the reliability of the subscale scores. This
9 includes factor structure, internal consistency ($\alpha \geq .85$), and test-retest reliability ($r \geq .86$) (see
10 Raedeke & Smith, 2001). Previous studies have supported the use of adapted ABQ in the dance
11 context (e.g. Quested & Duda, 2011).

12 **Engagement.** The Athlete Engagement Questionnaire (AEQ; Lonsdale, et al., 2007) was
13 used in the present study to assess engagement in dance. The AEQ includes four four-item
14 subscales: confidence (e.g., 'I am confident in my abilities'), dedication (e.g., 'I am dedicated to
15 achieving my goals'), vigour (e.g., 'I feel really alive'), and enthusiasm (e.g., 'I am enthusiastic').
16 The stem ("When I participate in dance...") was adapted to reflect the dance context. The subscales
17 were measured on a five-point Likert scale (1 = *Almost never* to 5 = *Almost always*). Researchers
18 have found support for the validity and reliability of the AEQ subscale scores in athletes and
19 dancers. This includes support for the factor structure of the scale via confirmatory factor analysis
20 (CFA), and internal consistency (internal reliability coefficient $\geq .80$, Draugelis et al., 2014; $\alpha \geq$
21 $.84$, Lonsdale, et al., 2007).

22 **Multidimensional perfectionism.** Following the recommendations of Stoeber (2014), and
23 factor analytic studies highlighting the common higher-order structure of perfectionism dimensions
24 across different measures (e.g., Bieling, Israeli, & Antony, 2004; Cox, Enns, & Clara 2002),
25 multiple measures were used to capture PSP and ECP. Two subscales were used to capture

1 dancers' PSP. These were the seven-item personal standards subscale (e.g., "I hate being less than
2 the best at things in dance.") from the Sport Multidimensional Perfectionism Scale (SMPS-2;
3 Gotwals & Dunn, 2009), and the five-item self-oriented perfectionism subscale (e.g., "One of my
4 goals is to be perfect in everything I do.") from the short version of the Multidimensional
5 Perfectionism Scale (HMPS-SF; Cox, Enns, & Clara, 2002). Three subscales were used to capture
6 dancers' ECP. These were the eight-item concern over mistakes subscale (e.g., "If I fail in
7 competition I feel like a failure as a person.") and the six-item doubts about actions subscale (e.g.,
8 "I usually feel unsure about the adequacy of my pre-performance practices.") from the SMPS-2,
9 and the five-item socially prescribed perfectionism subscale (e.g., "People expect nothing less than
10 perfection from me.") from the HMPS-SF. To account for the potential domain specificity of
11 perfectionism, instructions, items and the stems of the SMPS-2 and the HMPS-SF were amended to
12 reflect the dance context, for example, the word 'sport' was changed to 'dance' for items in the
13 SMPS-2. Evidence has been provided to support the internal consistency (SMPS-2, $\alpha \geq .74$;
14 HMPS-SF, $\alpha \geq .79$) of the subscale scores (Cox et al., 2002; Gotwals, Dunn, Causgrove Dunn, &
15 Gamache, 2010).

16 **Teacher autonomy support.** The Sport Climate Questionnaire (SCQ; Deci, 2001) was
17 used to assess dancers' perceptions of autonomy support provided by their teachers (e.g., 'I feel that
18 my teacher provides me with choices and options). The instructions ("... Teachers have different
19 styles in dealing with dancers, and we would like to know more about how you have felt about your
20 encounters with your teacher...") were adapted to reflect the dance context. The SCQ contains 15
21 items measured on a seven-point Likert scale (1 = *Strongly disagree* to 7 = *Strongly agree*). The
22 items were also amended to reflect the dance context e.g. 'sport' was replaced with 'dance' and
23 'coach' was replaced with 'teacher'. Evidence has been provided in to support the internal
24 consistency of the scale scores ($\alpha = .81$, Jõesaar, Hein, & Hagger, 2012).

25 **Analytical Strategy**

1 Analyses comprised four stages. First, following the procedures outlined by Tabachnick
2 and Fidell (2013), data were screened for out of range values, missing data, and univariate and
3 multivariate outliers, and internal consistencies were calculated for each subscale. Second,
4 descriptive statistics and bivariate correlations were calculated. Third, procedures for testing the $2 \times$
5 2 perfectionism model were followed (Gaudreau, 2012). Moderated regression analyses were
6 conducted using PROCESS Model 1 (Hayes, 2013). PSP and ECP and their interaction term were
7 entered as predictors of each criterion variable. Significant interactions were probed by examining
8 two sets of simple slopes at relatively lower (-1 SD) and relatively higher (+1 SD) levels of the
9 moderator (Aiken & West, 1991). Assessment of simple slopes enables examination of the 2×2
10 model hypotheses by indicating contrasts between the predicted values of the different
11 perfectionism subtypes (Gaudreau & Thompson, 2010). Fourth, moderated regressions were run
12 using PROCESS Model 3 (Hayes, 2013) to test the moderating role of autonomy support on the
13 perfectionism-engagement and perfectionism-burnout relationships. PSP, ECP, autonomy support,
14 and interaction terms were entered as predictors. Again, simple slopes were then probed, this time
15 at relatively lower (-1 SD) and relatively higher (+1 SD) levels of autonomy support. In stages three
16 and four, factor scores based on CFA item loadings for each scale were used as predictor and
17 criterion. This approach was adopted to account for measurement error in each subscale (Hair,
18 Black, Babin, & Anderson, 2013). Power analysis (GPower version 3.1.9.2; Faul, Erdfelder,
19 Buchner, & Lang, 2009) based on the number of predictors ($k = 8$) in the three-way models and
20 small incremental effect sizes from the only other previous examination of three-way interactions
21 involving perfectionism in a performance context ($\Delta R^2 = .049$, Crocker, et al., 2014), power ($1 - \beta$)
22 = .80 and $\alpha = .05$, indicated that a total sample size of $N = 155$ would be sufficient for the three-way
23 moderated regressions.

1 **Results**

2 **Preliminary Analyses and Data Screening**

3 Participants with more than 5% missing data ($n = 3$) were removed from the analysis
4 (Tabachnick & Fidell, 2013). The remaining participants had either no missing data ($n = 200$) or
5 very small amounts of missing data ($n = 41$, M number of missing items = 1.34, $SD = 0.69$, range 1-
6 4). Therefore, missing values were replaced using the mean of the non-missing items from the
7 relevant subscale in each individual case (see Graham, Cumsille, & Elek-Fiske, 2003). Univariate
8 outlier screening indicated 17 cases with values outside the standardized z score range (± 3.29 , $p <$
9 $.001$), which were removed. Subsequently, no values exceeded Kline's (2011) recommended cut-
10 offs for absolute skewness (< 3) and absolute kurtosis (< 10). Mahalanobis distance: $\chi^2(10) = 29.59$,
11 $p < .001$, indicated six multivariate outliers, which were removed. On completion of outlier
12 removal, $n = 218$ participants were retained for the subsequent analyses. Internal consistencies were
13 $\alpha \geq .71$ and composite reliabilities were $\rho_c \geq .73$ (see Table 1).

14 **Descriptive Statistics and Bivariate Correlations**

15 Descriptive statistics and bivariate correlations are displayed in Table 1¹. Bivariate
16 correlations indicated that PSP shared a medium positive correlation with ECP, small positive
17 correlations with autonomy support, confidence, and vigour, medium positive correlations with
18 dedication and enthusiasm, a small negative correlation with reduced sense of accomplishment, and
19 a medium negative correlation with devaluation. ECP shared small negative correlations with
20 autonomy support, confidence and enthusiasm, a small positive correlation with devaluation, and
21 medium positive correlations with reduced sense of accomplishment and exhaustion. Autonomy
22 support shared medium positive correlations with confidence, dedication, vigour and enthusiasm,
23 and medium negative correlations with reduced sense of accomplishment, exhaustion, and
24 devaluation.

1 **Moderated Regression Analyses: Testing the 2 × 2 Model of Perfectionism**

2 Significant PSP×ECP interactions were found in relation to reduced accomplishment,
3 devaluation, confidence, dedication, and enthusiasm. All significant interactions constituted small
4 effects, denoted by ΔR^2 . Non-significant PSP × ECP interactions were found in relation to
5 emotional/physical exhaustion and vigour.

6 **Reduced sense of accomplishment.** The PSP×ECP interaction was significant in relation
7 to reduced sense of accomplishment. Simple slopes were significant for: PSP at lower ECP, $b = -$
8 $.10, p < .01, 95\% \text{ CI } [-.34, -.10]$; PSP at higher ECP, $b = -.19, p < .01, 95\% \text{ CI } [-.25, -.13]$; ECP at
9 lower PSP, $b = .28, p < .01, 95\% \text{ CI } [.20, .36]$; and ECP at higher PSP, $b = .16, p < .01, 95\% \text{ CI}$
10 $[.09, .23]$. These results supported Hypotheses 1a, 2, 3 and 4.

11 **Emotional/physical exhaustion.** PSP was a significant negative predictor of emotional
12 and/physical exhaustion; whereas, ECP was a significant positive predictor of emotional/physical
13 exhaustion. These main effects supported Hypotheses 1a, 2, 3 and 4.

14 **Devaluation.** The PSP×ECP interaction was significant in relation to devaluation.
15 Significant simple slopes were evident for: PSP at lower ECP, $b = -.11, p < .01, 95\% \text{ CI } [-.17, -.05]$;
16 PSP at higher ECP, $b = -.22, p < .01, 95\% \text{ CI } [-.29, -.16]$; ECP at lower PSP, $b = .25, p < .01, 95\%$
17 $\text{CI } [.16, .33]$; and ECP at higher PSP, $b = .10, p = .01, 95\% \text{ CI } [.02, .17]$. These results supported
18 Hypotheses 1a, 2, 3, and 4.

19 **Confidence.** The PSP×ECP interaction was significant in relation to confidence. Simple
20 slopes were significant for: PSP at lower ECP, $b = .15, p = .01, 95\% \text{ CI } [.04 \text{ to } .27]$; PSP at higher
21 ECP: $b = .40, p < .01, 95\% \text{ CI } [.28, .51]$; ECP at lower PSP, $b = -.43, p < .01, 95\% \text{ CI } [-.60, -.27]$;
22 and non-significant for ECP at higher PSP, $b = -.13, p = .08, 95\% \text{ CI } [-.26, .02]$. These results
23 supported Hypotheses 1a, 2, and 3.

24 **Dedication.** The PSP×ECP interaction in relation to dedication was significant. Simple
25 slopes were significant for: PSP at lower ECP, $b = .26, p < .01, 95\% \text{ CI } [.17, .35]$; PSP at higher

1 ECP, $b = .42, p < .01, 95\% \text{ CI } [.33, .51]$; ECP at lower PSP, $b = -.36, p < .01, 95\% \text{ CI } [-.49, -.23]$;
2 and ECP at higher PSP, $b = -.15, p < .01, 95\% \text{ CI } [-.26, -.04]$. These results supported Hypotheses
3 1a, 2, 3, and 4.

4 **Vigour.** PSP was a significant positive predictor of vigour. ECP was a significant negative
5 predictor of vigour. These main effects supported Hypotheses 1a, 2, 3 and 4.

6 **Enthusiasm.** The PSP×ECP interaction in relation to enthusiasm was significant. Simple
7 slopes were significant for: PSP at lower ECP, $b = .25, p < .01, 95\% \text{ CI } [.15, .36]$; PSP at higher
8 ECP $b = .40, p < .01, 95\% \text{ CI } [.29, .50]$; ECP at lower PSP, $b = -.35, p < .01, 95\% \text{ CI } [-.50, -.21]$;
9 and ECP at higher PSP, $b = -.17, p < .01, 95\% \text{ CI } [-.29, -.04]$. These results supported Hypotheses
10 1a, 2, 3, and 4.

11 Together these results indicated support for all four hypotheses of the 2×2 model in
12 relation to all burnout dimensions and the dedication, vigor, and enthusiasm dimensions of
13 engagement. For confidence Hypotheses 1a, 2, and 3 were supported but Hypothesis 4 was refuted.

14 **The Moderating Role of Autonomy Support**

15 Three-way PSP × ECP × Autonomy Support interactions were evident in relation to
16 reduced sense of accomplishment, devaluation, confidence, dedication, vigour, and enthusiasm (see
17 Table 2 and Table 3). All significant interactions constituted small effects, denoted by $R^2\Delta$. The
18 PSP × ECP × Autonomy Support interaction was non-significant in relation to emotional and
19 physical exhaustion. Table 4 presents a summary of whether the simple slopes support the 2×2
20 hypotheses at relatively lower and relatively higher levels of autonomy support.

21 **Reduced sense of accomplishment.** The PSP × ECP × Autonomy Support interaction was
22 significant in relation to reduced sense of accomplishment. At lower levels of autonomy support,
23 simple slopes were non-significant for PSP at lower ECP, $b = -.05, p = .30, 95\% \text{ CI } [-.15, .05]$;
24 significant for PSP at higher ECP, $b = -.23, p < .001, 95\% \text{ CI } [-.32, -.16]$; significant for ECP at
25 lower PSP, $b = .31, p < .001, 95\% \text{ CI } [.22, .40]$; and non-significant for ECP at higher PSP: $b = .06,$

1 $p = .44$, 95% CI [-.09, .20]. At higher levels of autonomy support, simple slopes were significant for
 2 PSP at lower ECP, $b = -.11$, $p = .01$, 95% CI [-.18, -.03]; non-significant for PSP at higher ECP, $b =$
 3 $-.04$, $p = .42$, 95% CI [-.12, .05]; non-significant for ECP at lower PSP, $b = .08$, $p = .15$, 95% CI [-
 4 $.03$, .20]; and significant for ECP at higher PSP, $b = .17$, $p < .01$, 95% CI [.08, .26]. These results
 5 supported Hypotheses 1c, 2 and 3 at lower levels of autonomy support, and supported Hypotheses
 6 1a and 4 at higher levels of autonomy support.

7 **Devaluation.** The PSP \times ECP \times Autonomy Support interaction was significant in relation
 8 to devaluation. At lower levels of autonomy support, simple slopes were non-significant for PSP at
 9 lower ECP, $b = -.06$, $p = .24$, 95% CI [-.17, .04]; significant for PSP at higher ECP, $b = -.29$, $p <$
 10 $.01$, 95% CI [-.37, -.20]; significant for ECP at lower PSP, $b = .30$, $p < .01$, 95% CI [.20, .39]; and
 11 non-significant for ECP at higher levels of PSP, $b = -.01$, $p = .90$, 95% CI [-.16, .14]. At higher
 12 levels of autonomy support, simple slopes were significant for PSP at lower ECP, $b = -.12$, $p < .01$,
 13 95% CI [-.20, -.04]; non-significant for PSP at higher ECP: $b = -.05$, $p = .24$, 95% CI [-.31, .08];
 14 non-significant for ECP at lower PSP: $b = .02$, $p = .76$, 95% CI [-.10, .14]; and significant for ECP
 15 at higher PSP, $b = .10$, $p = .03$, 95% CI [.01, .19]. These results supported Hypotheses 1c, 2 and 3 at
 16 lower levels of autonomy support, and supported Hypotheses 1a and 4 at higher levels of autonomy
 17 support.

18 **Confidence.** The PSP \times ECP \times Autonomy Support interaction was significant in relation to
 19 confidence. At lower levels of autonomy support, simple slopes were: non-significant for PSP at
 20 lower ECP, $b = -.05$, $p = .66$, 95% CI [-.25, .16]; significant for PSP at higher ECP: $b = .37$, $p < .01$,
 21 95% CI [.21, .53]; significant for ECP at lower PSP, $b = -.41$, $p < .01$, 95% CI [-.60, -.23]; and non-
 22 significant for ECP at higher levels of PSP, $b = -.12$, $p = .38$, 95% CI [-.15, .39]. At higher levels of
 23 autonomy support, simple slopes were significant for PSP at lower ECP, $b = .22$, $p = .01$, 95% CI
 24 [.07, .38]; significant for PSP at higher ECP, $b = .25$, $p < .01$, 95% CI [.08, .43]; non-significant for
 25 ECP at lower PSP, $b = -.21$, $p = .09$, 95% CI [-.44, .03]; and non-significant for ECP at higher PSP:

1 $b = -.17, p = .06, 95\% \text{ CI } [-.34, .01]$. These results indicate support for Hypotheses 1c, 2 and 3 at
2 lower levels of autonomy support, and support for Hypotheses 1a and 3 at higher levels of
3 autonomy support.

4 **Dedication.** The PSP \times ECP \times Autonomy Support interaction was significant in relation to
5 dedication. At lower levels of autonomy support, simple slopes were: significant for PSP at lower
6 ECP, $b = .18, p = .02, 95\% \text{ CI } [.03, .34]$; significant for PSP at higher ECP, $b = .46, p < .01, 95\% \text{ CI }$
7 $[.34, .58]$; significant for ECP at lower PSP, $b = -.37, p < .01, 95\% \text{ CI } [-.51, -.23]$; and non-
8 significant for ECP at higher levels of PSP, $b = -.01, p = .93, 95\% \text{ CI } [-.21, .20]$. At higher levels of
9 autonomy support, simple slopes were significant for PSP at lower ECP, $b = .22, p = .01, 95\% \text{ CI }$
10 $[.07, .38]$; significant for PSP at higher ECP, $b = .25, p < .01, 95\% \text{ CI } [.08, .43]$; non-significant for
11 ECP at lower PSP, $b = -.11, p = .22, 95\% \text{ CI } [-.29, .07]$; and significant for ECP at higher PSP, $b = -$
12 $.15, p = .03, 95\% \text{ CI } [-.29, -.02]$. These results indicate support for Hypotheses 1a, 2 and 3 at lower
13 levels of autonomy support, and support for Hypotheses 1a, 3 and 4 at higher levels of autonomy
14 support.

15 **Vigour.** The PSP \times ECP \times Autonomy Support interaction was significant in relation to
16 vigour. At lower levels of autonomy support, simple slopes were non-significant for PSP at lower
17 ECP, $b = -.02, p = .89, 95\% \text{ CI } [-.23, .20]$; significant for PSP at higher ECP: $b = .34, p < .01, 95\%$
18 $\text{CI } [.17, .51]$; significant for ECP at lower PSP: $b = -.29, p < .01, 95\% \text{ CI } [-.48, -.09]$; and non-
19 significant for ECP at higher levels of PSP: $b = .16, p = .27, 95\% \text{ CI } [-.13, .45]$. At higher levels of
20 autonomy support, simple slopes were significant for PSP at lower ECP, $b = .26, p < .01, 95\% \text{ CI }$
21 $[.09, .42]$; non-significant for PSP at higher ECP, $b = .15, p = .11, 95\% \text{ CI } [-.04, .34]$; non-
22 significant for ECP at lower PSP, $b = -.08, p = .52, 95\% \text{ CI } [-.34, .17]$; and significant for ECP at
23 higher PSP, $b = -.22, p = .02, 95\% \text{ CI } [-.40, -.03]$. These results supported Hypotheses 1c, 2 and 3 at
24 lower levels of autonomy support, and supported Hypotheses 1a and 4 at higher levels of autonomy
25 support

1 **Enthusiasm.** The PSP \times ECP \times Autonomy Support interaction was significant in relation
2 to enthusiasm. At lower levels of autonomy support, simple slopes were non-significant for PSP at
3 lower ECP, $b = .11$, $p = .20$, 95% CI [-.06, .29]; significant for PSP at higher ECP, $b = .43$, $p < .01$,
4 95% CI [.30, .57]; significant for ECP at lower PSP, $b = -.34$, $p < .01$, 95% CI [-.50, -.18]; and non-
5 significant for ECP at higher levels of PSP, $b = -.07$, $p = .57$, 95% CI [-.17, .30]. At higher levels of
6 autonomy support, simple slopes were significant for PSP at lower ECP, $b = .25$, $p < .01$, 95% CI
7 [.12, .38]; significant for PSP at higher ECP, $b = .20$, $p = .01$, 95% CI [.06, .35]; non-significant for
8 ECP at lower PSP, $b = -.08$, $p = .43$, 95% CI [-.29, .12]; and significant for ECP at higher PSP, $b = -$
9 $.20$, $p = .01$, 95% CI [-.35, -.05]. These results supported Hypotheses 1c, 2 and 3 at lower levels of
10 autonomy support, and supported Hypotheses 1a, 3 and 4 at higher levels of autonomy support.

11 In summary, as displayed in Table 4: Hypothesis 1a was supported in 1/6 analyses at lower
12 autonomy support (i.e., dedication) and in 6/6 analyses at higher autonomy support; Hypothesis 2
13 was supported in 6/6 analyses at lower levels of autonomy support and in 0/6 analyses at higher
14 levels of autonomy support; Hypothesis 3 was supported in 6/6 analyses at lower autonomy support
15 and in 3/6 analyses at higher autonomy support (i.e., confidence, dedication, enthusiasm), and
16 Hypothesis 4 was supported in 0/6 analyses at lower autonomy support and in 5/6 analyses at
17 higher autonomy support with confidence being the exception.

18 **Discussion**

19 In this study we aimed to (a) provide the first test of the 2×2 model of perfectionism in
20 relation to engagement, (b) re-examine the 2×2 model in relation to burnout, and (c) assess
21 whether autonomy support moderated these relationships in dancers. Consistent with the
22 hypotheses outlined in the 2×2 model we found that: pure PSP was associated with higher
23 engagement (all dimensions) and lower burnout (all dimensions) relative to non-perfectionism
24 (Hypothesis 1a); pure ECP was associated with lower engagement (all dimensions) and higher
25 burnout (all dimensions) relative to non-perfectionism (Hypothesis 2); pure ECP was associated

1 with lower engagement (all dimensions) and higher burnout (all dimensions) relative to mixed
2 perfectionism (Hypothesis 3); and mixed perfectionism was associated with lower engagement (all
3 dimensions except confidence) and higher burnout (all dimensions) relative to pure PSP
4 (Hypothesis 4). We also found that autonomy support moderated the 2×2 perfectionism-
5 engagement relationships (all dimensions), and the 2×2 perfectionism-burnout relationships (all
6 dimensions except emotional/physical exhaustion).

7 **Perfectionism and Burnout in Dancers**

8 We found support for Hypotheses 1a, 2, 3 and 4 in relation to all burnout dimensions. This
9 aligns with the 2×2 model (Gaudreau, 2016) by indicating that pure ECP is the subtype of
10 perfectionism most likely to relate to debilitating outcomes. From an SDT perspective, this may be
11 because pure ECP contributes to perceptions of need thwarting and controlled motivation for dance,
12 which underpin burnout. Dancers displaying pure ECP may also be more likely to measure their
13 self-worth against unattainable external standards, and therefore encounter burnout symptoms when
14 they inevitably fail to meet standards imposed by others (Hall & Hill, 2012). One further critical
15 factor in determining the development of burnout may be that, despite the strain placed on athletes
16 by pure ECP, it embeds a rigid form of psychological commitment that manifests in dancers feeling
17 entrapped in dance and as though they *have to* continue (Raedeke, 1997). This may mean that
18 burnout, rather than dropout, is likely for many perfectionistic young dancers.

19 In contrast to pure ECP, our findings suggest that pure PSP is negatively associated with
20 burnout dimensions. This may be because pure PSP contributes to perceptions of need satisfaction
21 and autonomous motivation, which negate burnout. Researchers have found support for SDT
22 mechanisms explaining the relationships between perfectionism dimensions and burnout in
23 previous studies (e.g., Jowett et al., 2013; 2016). Relative to other perfectionism subtypes, dancers
24 reporting pure PSP may place less emphasis on self-worth being measured against dance
25 achievement. Alternatively, it may be the case that dancers in the present study reporting pure PSP,

1 did measure self-worth by their achievements but perceive themselves to be performing well. In
2 accord, an interesting future research direction would be to examine the relationship between pure
3 PSP and burnout under conditions of relative success and adversity (e.g., performance slumps,
4 transition from vocational youth dancer to senior professional, injury). Under conditions of
5 adversity all dimensions of perfectionism may confer vulnerability to maladaptive outcomes such
6 as burnout (Flett & Hewitt, 2016).

7 Our findings regarding 2×2 perfectionism and burnout are partly consistent with previous
8 studies in dance. Nordin-Bates et al. (2017) found support for Hypotheses 2 and 4 only in relation to
9 emotional/physical exhaustion. However, unlike in our study, Nordin-Bates et al. (2017) found no
10 support for Hypothesis 3 in relation to reduced sense of accomplishment or devaluation, and
11 Cumming and Duda (2012) found no support for Hypothesis 1a in relation to emotional/physical
12 exhaustion. The discrepancies across these studies may be due in part to the use of a variable-
13 centred or person-centred approach. We adopted a variable-centred approach to examine the 2×2
14 model, whereas Cumming and Duda (2012) and Nordin-Bates et al. (2017) adopted a person-
15 centred approach. Variable-centred approaches do not enable identification of specific subgroups of
16 people in a population. However, by examining interactions between PSP and ECP and unique
17 main effects we were able to compare predicted outcomes at distinct intersecting points along the
18 continuous distributions of PSP and ECP (Gaudreau, Franche, Kljajic, & Martinelli, 2018).
19 Moreover, relative to variable-centred approaches, person-centred approaches are more
20 problematic when examining 2×2 perfectionism because the groups clustered to represent
21 different perfectionism subtypes can vary across different studies, and so can the degree to
22 which the groups accurately capture subtypes consistent with the 2×2 model (Gaudreau et
23 al., 2018). This was evidenced by the differences in the mean perfectionism dimension scores
24 for 2×2 clusters between Cumming and Duda (2012) and Nordin-Bates et al. (2017).
25 Moreover, mean scores of PSP in Cumming and Duda (2012) were higher for the mixed

1 perfectionism cluster than for the pure PSP cluster, when according to the model, the mean
2 scores should be equivalent.

3 **Perfectionism and Engagement in Dancers**

4 We found support for Hypotheses 1a, 2, 3 and 4 in relation to dedication, vigour, and
5 enthusiasm. These findings lent credence to the functional hierarchy within the 2×2 model,
6 whereby pure PSP is the subtype most likely to relate to optimal functioning, followed by non-
7 perfectionism, then mixed perfectionism, and finally pure ECP. They also partly corroborated
8 recent examinations of 2×2 perfectionism in relation to other adaptive outcomes including positive
9 affect (Hypothesis 4; Cumming & Duda, 2012) and intrinsic motivation (Hypothesis 1a; Quested et
10 al., 2014). It therefore appears that for dancers, different perfectionism subtypes underpin
11 contrasting SDT processes and outcomes in the form of burnout on one hand, and engagement on
12 the other. Regarding engagement, the self-imposed striving which characterises PSP may contribute
13 to more autonomous motivation for dance, and higher basic need satisfaction. Conversely, the
14 externally imposed standards which characterize ECP may undermine engagement via controlled
15 motivation and lower basic need satisfaction or active need thwarting.

16 We found support for Hypotheses 1a, 2 and 3 but no support for Hypothesis 4 in regard to
17 confidence. This lack of distinction between pure PSP and mixed perfectionism may be due to the
18 relatively weak relationship between PSP and confidence highlighted in a recent meta-analysis (see
19 Hill et al., 2018). Inconsistency in the perfectionism-confidence relationship may be due to
20 confidence being one of the less stable elements of engagement. Based on previous findings, the
21 relationship between perfectionism and confidence certainly appears to be situation dependent, for
22 example, the positive correlation between PSP and confidence appears to weaken in the lead up to
23 competition (Hall, Kerr, & Matthews, 1998). Therefore, much like examining conditions of success
24 and adversity seem important in terms of the relationships between perfectionism and burnout, so
25 too do the relationships between perfectionism and confidence.

1 **The Moderating Role of Autonomy Support**

2 The most novel contribution of the present study is the evidence that autonomy support
3 moderated the perfectionism-engagement and perfectionism-burnout relationships for all
4 engagement dimensions and for the reduced sense of accomplishment and devaluation dimensions
5 of burnout. The effect of autonomy support was most pronounced in relation to reduced sense of
6 accomplishment and devaluation. These findings suggest that when autonomy support levels are
7 higher, the negative relationships that pure PSP shares with reduced accomplishment and
8 devaluation are stronger, and the positive relationships that pure ECP shares with these burnout
9 dimensions are weaker. These findings align with previous studies by highlighting the potential
10 protective quality of autonomy support in relation to burnout (Adie et al., 2012). Extending
11 previous research, our findings indicate that the protective quality of autonomy support in terms of
12 burnout extends to perfectionistic dancers.

13 Regarding engagement, the moderating effects of autonomy support were evident but more
14 complex than for burnout. The enhancing effect of autonomy support on pure PSP was evident for
15 confidence (Hypothesis 1a), dedication (Hypothesis 4), and vigour and enthusiasm (Hypothesis 1a
16 and 4), and the buffering effect on pure ECP was evident for all engagement dimensions in relation
17 to Hypothesis 2 but only for vigour in relation to Hypothesis 3. Therefore, although autonomy
18 support appears to enhance the relationships between perfectionism and all engagement
19 dimensions, it is the relationships between perfectionism subtypes and dancers' sense of liveliness
20 where this is most pronounced. As such, when dance teachers nurture volition, and emphasise self-
21 initiation and problem-solving, this appears to protect dancers against evaluative concerns and
22 encourages less extreme striving which manifests in enhanced engagement, particularly in the form
23 of vigour. Again, these findings align with, and extend, previous studies that have shown a positive
24 relationship between autonomy support and other positively valenced affective outcomes (e.g.,
25 subjective vitality, Adie et al., 2012; positive affect, Quested & Duda, 2010).

1 **Practical Implications**

2 Researchers have argued that a ‘culture of perfection’ exists in dance that has harmful
3 consequences for dancer well-being (Hamilton, 1997). Our findings suggest that the detrimental
4 relationships shared between perfectionism and burnout may be buffered when dance teachers
5 provide autonomy support. The potential benefits in terms of reduced burnout and improved
6 engagement suggest that teachers should acknowledge their dancers’ perspectives and encourage
7 problem solving. For example, adapted from strategies outlined by Cheon, Reeve, Lee and Lee
8 (2015), when a dancer makes a mistake, rather than criticise them for making the error, teachers
9 could try to understand the underpinning cause by accepting and acknowledging what is happened
10 (e.g., “I notice that you had some difficulty with falling out of your pirouette .”), acknowledging
11 why from the dancers’ perspective it has occurred (e.g., “Yes it has been a long week and this is a
12 tough routine isn’t it.”), and then inviting the dancer to find a solution (Okay, so how can we help
13 you to focus on spotting? Any suggestions?). Although intervention studies are yet to be conducted
14 in dance, findings by Cheon et al. (2015) in Paralympic sport suggest that educating coaches about
15 how to create an autonomy supportive environment for their athletes, can protect athletes against
16 declines in motivation, performance.

17 **Limitations and Future Directions**

18 The cross-sectional design means that temporal precedence was not established. It is
19 possible that burnout and engagement dimensions predict perfectionism and perceptions of
20 autonomy support, although this is unlikely given findings which suggest that perfectionism
21 predicts burnout over time, rather than vice versa (e.g. Madigan, Stoeber, & Passfield, 2015).
22 Nonetheless, longitudinal research is required which establishes the temporal precedence of the
23 relationships examined in the present study. Further, our assessment of autonomy support was
24 limited to dancers’ perceptions. Although dancers’ perceptions of the environment are influential in
25 shaping their experiences, dance teachers’ perspectives could be measured in future research to

1 provide a more rounded assessment of the motivational climate. Moreover, we did not give dancers
2 guidance on which dance teacher to complete the questionnaire in relation to, and it is possible that
3 the dancers had multiple dance teachers. In future, researchers may want ask dancers to consider the
4 extent to which different teachers create autonomy supportive environments. Another limitation
5 was the use of sport-specific measures in the dance environment. We adapted sport-specific
6 measures and they demonstrated reasonable internal consistency and composite reliability, but
7 measures developed for the dance context would be preferable. However, no dance-specific
8 measures of any of the variables were available at the time of study. The current findings will need
9 to be replicated once these are established.

10 **Conclusions**

11 The present study built on previous research in dance by demonstrating that the effects of 2
12 \times 2 perfectionism for burnout extend to engagement, and by highlighting the moderating role of
13 autonomy support in regard to both engagement and burnout. Our findings align with the 2 \times 2
14 model in highlighting pure ECP as the most problematic subtype and by suggesting pure PSP is
15 comparatively less problematic for burnout and engagement. The moderating effects of autonomy
16 support found here suggest that autonomy support may be a potentially fruitful target for
17 interventions designed to manage dancers' perfectionistic tendencies.

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1 Footnotes

2 ¹See supplementary material for findings in relation to total index scores of burnout and
3 engagement. They are not included in the main body of the manuscript as they were largely
4 consistent with the findings in relation to respective dimensions of burnout and engagement.

1 Table 1. Descriptive Statistics, Bivariate Correlations, Internal Consistencies, and Composite Reliabilities.

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. PSP	.84									
2. ECP	.39***	.81								
3. Autonomy Support	.16*	-.19**	.89							
4. Reduced Acc.	-.18**	.34***	-.42***	.74						
5. Exhaustion	.01	.29***	-.40***	.42***	.88					
6. Devaluation	-.34***	.15*	-.37***	.57***	.38***	.71				
7. Confidence	.23**	-.16*	.33***	-.61***	-.38***	-.41***	.81			
8. Dedication	.48***	-.11	.40***	-.54***	-.34***	-.59***	.57***	.80		
9. Vigour	.25***	-.13	.36***	-.48***	-.51***	-.43***	.60***	.56***	.84	
10. Enthusiasm	.30***	-.18**	.43***	-.56***	-.44***	-.62***	.56***	.71***	.71***	.76
<i>M</i>	4.95	3.45	5.87	1.96	2.38	1.51	3.91	4.46	4.16	4.52
<i>SD</i>	0.81	0.76	0.84	0.67	0.89	0.58	0.74	0.55	0.65	0.51
ρ_c	.84	.82	.93	.75	.89	.73	.81	.81	.84	.76

2 Note: $n = 218$. PSP = personal standards perfectionism, ECP = evaluative concerns perfectionism. Cronbach's alphas are reported on the diagonal. * $p <$

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

1 Table 2. Main and Interactive Effects of Perfectionism and Autonomy Support on Burnout.

	Reduced accomplishment		Exhaustion		Devaluation	
	$R^2 (R^2\Delta)$	B	$R^2 (R^2\Delta)$	B	$R^2 (R^2\Delta)$	B
2 × 2 interaction	.26 (.02*)		.10 (.00)		.24 (.03**)	
PSP		-0.15***		-0.17**		-0.17***
ECP		0.22***		0.40***		0.17***
PSP×ECP		-0.07*		-0.06		-0.09**
3-way interaction	.40 (.03**)		.22 (.01)		.37 (.04***)	
PSP		-0.11***		-0.07		-0.13***
ECP		0.16***		0.26**		0.10**
Autonomy support		-0.16***		-0.39***		-0.15***
PSP×ECP×AS		0.13**		0.14		0.15***

2 Note: $n = 218$. PSP = personal standards perfectionism, ECP = evaluative concerns perfectionism. * $p < .05$, ** $p < .01$, *** $p < .001$

1 Table 3. Main and Interactive Effects of Perfectionism and Autonomy Support on Engagement.

	Confidence		Dedication		Vigour		Enthusiasm	
	$R^2 (R^2\Delta)$	B	$R^2 (R^2\Delta)$	B	$R^2 (R^2\Delta)$	B	$R^2 (R^2\Delta)$	B
2 × 2 interaction	.20 (.04**)		.33 (.02**)		.15 (.01)		.26 (.02*)	
PSP		0.27***		0.34***		0.27***		0.33***
ECP		-0.28***		-0.25***		-0.23***		-0.26***
PSP×ECP		0.18**		0.12**		0.11		0.11*
3-way interaction	.29 (.02*)		.44 (.02*)		.27 (.03**)		.39 (.03**)	
PSP		0.20***		0.28***		0.18***		0.25***
ECP		-0.17**		-0.16**		-0.11		-0.14**
Autonomy support		0.28***		0.24***		0.33***		0.30***
PSP×ECP×AS		-0.20*		-0.16*		-0.24**		-0.21**

2 Note: $n = 218$. PSP = Personal standards perfectionism, ECP = Evaluative concerns perfectionism. * $p < .05$, ** $p < .01$, *** $p < .001$.

1 Table 4. Summary of Support for 2×2 Hypotheses Based on Simple Slopes at Lower (-1 SD) and Higher (+1 SD) Autonomy Support

	PSP at Lower ECP (H1)		ECP at Lower PSP (H2)		PSP at Higher ECP (H3)		ECP at Higher PSP (H4)	
	Lower AS	Higher AS	Lower AS	Higher AS	Lower AS	Higher AS	Lower AS	Higher AS
Reduced accomplishment	H1c	H1a	H2 ✓	H2 ns	H3 ✓	H3 ns	H4 ns	H4 ✓
Devaluation	H1c	H1a	H2 ✓	H2 ns	H3 ✓	H3 ns	H4 ns	H4 ✓
Confidence	H1c	H1a	H2 ✓	H2 ns	H3 ✓	H3 ✓	H4 ns	H4 ns
Dedication	H1a	H1a	H2 ✓	H2 ns	H3 ✓	H3 ✓	H4 ns	H4 ✓
Vigour	H1c	H1a	H2 ✓	H2 ns	H3 ✓	H3 ns	H4 ns	H4 ✓
Enthusiasm	H1c	H1a	H2 ✓	H2 ns	H3 ✓	H3 ✓	H4 ns	H4 ✓

2 Note: PSP = Personal standards perfectionism, ECP = evaluative concerns perfectionism, AS = autonomy support. Emotional/physical
 3 exhaustion omitted due to nonsignificant 3-way interaction.

4