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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 nonperfectionism), 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

5   dancers, this process can be a deeply rewarding experience that sets them on a pathway to

6   long term participation (Aujla et al., 2014). Yet, for others, the demands can become

7   overwhelming, leading to negative experiences and disaffection (Walker, Nordin-Bates, &

8   Redding, 2012). These contrasting experiences arise, in part, due to characteristics of the

9   dancers as well as features of the dance environment. If dancers strive for success in a

10   flexible manner, view setbacks as opportunities for development, and others reinforce this

11   approach, we might reasonably expect dancers to have more positive experiences.

12   Conversely, if dancers engage in compulsive striving and tie their self-worth to unattainable

13   standards set by themselves or others, negative experiences are likely to ensue (Hall & Hill,

14   2012). In the present study, we tested these assertions by examining the relationships between

15   perfectionism, engagement and burnout in dancers, and whether autonomy support provided

16   by dance teachers moderated these relationships.

17   Burnout can be generally defined as a cognitive-affective syndrome (Gustafsson,

18   DeFreese, & Madigan, 2017). In dance and sport research, burnout is most typically assessed

19   by measuring three core symptoms; a reduced sense of accomplishment, emotional/physical

20   exhaustion, and devaluation based on Raedeke & Smith (2001). Reduced sense of

21   accomplishment reflects perceived decline in performance and achievements.

22   Emotional/physical exhaustion reflects perceived depletion of emotional and physical

23   resources stemming from practice and performance. Finally, devaluation reflects a cynical

24   attitude toward dance participation. Attesting to the maladaptive role of burnout, these

25   symptoms are related to a range of negative outcomes including anxiety (Cresswell &

26   Eklund, 2006), reduced performance (Cresswell & Eklund, 2007), and dropout (Goodger,

27   Gorely, Lavallee, & Harwood, 2007).

28   A directly opposing cognitive-affective experience is engagement (Schaufeli &
29   Bakker,

30   2004). Engagement consists of four dimensions; confidence, vigour, dedication, and
31   enthusiasm

32   (Lonsdale, Hodge, & Jackson, 2007). Confidence is belief in one's ability to maintain high

33   levels of performance and pursue goals. Dedication is desire, investment and effort directed

34   toward pursuing goals. Vigour is feelings of mental and physical liveliness. Finally,

35   enthusiasm is feelings of excitement and enjoyment. In contrast to burnout symptoms, these

36   dimensions are positively associated to other desirable outcomes such as self-regulation

37   (Martin & Malone, 2013), work-life balance (DeFreese & Smith, 2013), and flow (Hodge,

38   Lonsdale, & Jackson, 2009).

39   Several theories have been proposed to explain the onset of burnout including stress,

40   commitment, and identity perspectives, self-determination theory (SDT), and the integrated

41   model

42   (see Gustafsson et al., 2017 for a review). Of these, SDT (Ryan & Deci, 2018) offers an

43   encompassing framework that can also be used to explain engagement. From the SDT

44   perspective, engagement is more likely when motivation for dancing is autonomous (i.e.,

45   personally valued and well assimilated with other needs and values). Autonomous motivation

46   emerges when basic psychological needs for autonomy (i.e., sense of choice and volition),

47   competence (i.e., sense of effectiveness), and relatedness (i.e., sense of belonging in one's

48   environment) are supported. By contrast, in SDT, burnout is more likely when motivation for

49   dancing is controlled (i.e., dependent on punishment and reward and contingent self-worth).

50   Controlled motivation occurs in environments that do not support, or actively thwart, basic

51   psychological needs. In support of these ideas, researchers have found that need satisfaction

52   and autonomous motivation are related to engagement, whereas need thwarting and

53   controlled motivation are related to burnout (Jowett, Hill,

54   Hall, & Curran, 2013, 2016).

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

56   One factor that appears to influence the motivational processes outlined in SDT is

57   perfectionism. Perfectionism is a multidimensional personality trait characterised by striving

58   for exceedingly high standards accompanied by harsh criticism (Frost, Marten, Lahart, &

59   Rosenblate, 1990). Striving for perfection may underpin personally important

60   accomplishments that align with one's values, and therefore relate to other adaptive

61   outcomes. However, unremitting criticism and self-worth tied to achievement mean that

62   perfectionism may also undermine the quality of dancers' motivation and underpin

63   psychological difficulties (Hall & Hill, 2012). These core components of perfectionism can

64   be captured by differentiating two positively related higher-order factors; personal standards

65   perfectionism (PSP) and evaluative concerns perfectionism (ECP; Dunkley, Zuroff, &

66   Blankstein, 2006).

67   Examining two higher-order factors of perfectionism involves combining dimensions

68   and subscales from existing instruments (Hill, Mallinson-Howard, & Jowett, 2018). PSP

69   consists of dimensions that capture the personal pursuit of perfection including personal

70   standards and selforiented perfectionism. ECP consists of dimensions that capture evaluative

71   components of perfectionism such as concern over mistakes, doubts about actions and

72   socially prescribed perfectionism (Gotwals & Dunn, 2009; Hewitt & Flett, 1991). There is

73   evidence for the contrasting effects of ECP and PSP in relation to burnout in dancers.

74   Specifically, ECP is positively related to emotional/physical exhaustion, whereas PSP is

75   unrelated (Cumming & Duda, 2012). To date, there is no evidence in relation to engagement

76   in dancers, but findings from youth sport suggest that PSP is related to engagement whereas

77   ECP is unrelated (Jowett et al., 2016). Given similarities in the achievement-oriented domains

78   of dance and sport (e.g., high intensity training, focus on skill acquisition, competition for

79   leading roles/starting positions), we might reasonably expect equivalent relationships to

80   emerge in youth dancers.

81   Recently, researchers have begun to examine the interactions between ECP and PSP

82   in relation to psychological outcomes. Doing so allows researchers to test the relative

83   importance of different combinations of ECP and PSP in the 2×2 model of perfectionism

84   (Gaudreau, 2016). The model includes four perfectionism sub-types; pure PSP (high PSP and

85   low ECP), pure ECP (high ECP and low PSP), mixed perfectionism (high PSP and high

86   ECP), and non-perfectionism (low PSP and low ECP). Gaudreau (2016) formalised the

87   differences between the subtypes using four hypotheses. Due to the equivocal effects of PSP,

88   three versions of Hypothesis 1 were proposed; pure PSP would be associated with better

89   (Hypothesis 1a), worse (Hypothesis 1b), or equivalent outcomes (Hypothesis 1c) in

90   comparison to non-perfectionism. Hypothesis 2 stated that pure ECP would be associated

91   with worse outcomes than non-perfectionism. Hypothesis 3 stated that pure ECP would be

92   associated with worse outcomes than mixed perfectionism. Hypothesis 4 stated that mixed

93   perfectionism would be associated with worse outcomes than pure PSP. Applying this

94   functional hierarchy to burnout and engagement, we anticipated that pure ECP would be

95   associated with the lowest levels of engagement and highest levels of burnout (Hypotheses 2

96   and 3), followed by mixed perfectionism (Hypothesis 4), then non-perfectionism, and finally

97   – based on Hypothesis 1a – pure PSP.

98   The 2×2 perfectionism model in relation to burnout in dancers has been examined in

99   two previous studies. First, Cumming and Duda (2012) examined emotional/physical

100 exhaustion and found that dancers with pure PSP reported lower levels of this symptom of

101 burnout than dancers with mixed perfectionism (Hypothesis 4). Second, Nordin-Bates,

102 Raedeke, and Madigan (2017) examined all burnout symptoms and found that dancers with

103 pure ECP reported higher reduced sense of accomplishment, devaluation, and

104 emotional/physical exhaustion than dancers with nonperfectionism (Hypothesis 2), and that

105 dancers with mixed perfectionism reported higher reduced sense of accomplishment than in

106 dancers with pure PSP (Hypothesis 4). Researchers are yet to examine the 2×2 model in

107 relation to engagement in dancers. However, findings from Quested et al. (2014) suggest

108 some support for the model in relation to similar outcomes in dancers. Specifically, they

109 found that dancers with pure PSP reported higher levels of intrinsic motivation than dancers

110 with non-perfectionism (Hypothesis 1a) and higher levels of self-esteem than dancers with

111 mixed perfectionism (Hypothesis 4). Therefore, there is at least indirect evidence that the

112 perfectionism subtypes within the 2×2 model may explain aspects of the adaptive outcome

113 of engagement in dancers. The present study was the first to formally examine this

114 possibility.

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

116   Another key but underdeveloped area of research is the identification of factors that

117 moderate the perfectionism-burnout and perfectionism-engagement relationships. Distinct

118 from a mediator that explains the relationship between predictor and a criterion variable, a

119 moderator affects the strength and/or direction of the relationship between a predictor and a

120 criterion variable (Baron & Kenny, 1986). Investigating moderators is important because it

121 allows us to understand when a relationship can be altered, providing a potential target for

122   intervention. The structure of the performance environment may be particularly important in

123   this regard (Hall & Hill, 2012). Dance teachers are often best placed to structure dancers'

124   performance environments, and it appears that this constitutes a moderating factor of the

125   relationship between dancers' characteristics and wellbeing outcomes. Specifically,

126   Draugelis, Martin, and Garn (2014) found that when dancers perceived that their teacher

127   provided a task-oriented environment (i.e., where success is measured by personal

128   improvement and effort), this provided protection against anxiety and worry by maintaining

129   the dedication and confidence dimensions of engagement.

130   Alongside task-oriented environments, the performance environment can also be

131   characterized by the extent to which dance teachers provide autonomy support or control.

132   Autonomy supportive environments are evident when teachers nurture volition, interests, and

133   values by adopting the dancers' perspectives, encouraging problem-solving, and providing

134   choices (Ryan & Deci, 2018). Autonomy support facilitates satisfaction of autonomy,

135   competence and relatedness, and encourages true self-esteem (i.e. self-worth that does not

136   depend upon specific achievements; Ryan & Brown, 2003). Therefore, autonomy support

137   may challenge the contingencies of self-worth that characterise perfectionism, and increase

138   engagement, and reduce burnout (Hall & Hill, 2012). By contrast, teachers may instead create

139   controlling environments that emphasise normative comparisons and rely on external rewards

140   and threats of punishment (Ryan & Deci, 2018). Controlling environments thwart autonomy,

141   competence and relatedness, and encourage contingent self-esteem (i.e. self-worth that

142   depends on continually meeting standards). Emphasising such contingencies of self-worth

143   may strengthen the link between perfectionism and burnout, and weaken the link between

144   perfectionism and engagement.

145   Researchers are yet to establish whether autonomy support moderates the influence of

146   perfectionism, but some of their findings attest to the positive influence of autonomy support.

147   For example, autonomy support was found to negatively correlate with burnout and positively

148   correlate with optimal functioning (e.g., intrinsic motivation, self-esteem) via basic

149   psychological needs satisfaction in dancers (Quested & Duda, 2010; Quested & Duda, 2011).

150   Furthermore, longitudinal findings from sport suggested that autonomy support provided by

151   coaches predicted lower emotional/physical exhaustion and higher subjective vitality in

152   adolescent footballers over two seasons (Adie, Duda, & Ntoumanis, 2012).

153   Regarding perfectionism, there is some evidence that situational factors can moderate

154   its effects. For example, Crocker, Gaudraeau, Mosewich, and Kljajic (2014) found that

155   perceived goal progress moderated the relationships between 2×2 perfectionism, control

156   appraisal and avoidance coping. Specifically, they found that when goal progress was lower

157   (but not when higher), athletes with pure ECP reported higher control appraisals and

158   avoidance coping than athletes with nonperfectionism (Hypothesis 2). By contrast, when goal

159   progress was higher (but not when lower), athletes with pure PSP reported lower levels of

160   control appraisals and avoidance coping than athletes with mixed perfectionism (Hypothesis

161   4).

162   **The Present Study**

163   Based on the theoretical and empirical arguments outlined above, the aims of the

164   study were to (a) examine the 2×2 model of perfectionism in relation to engagement, (b) re-

165   examine the

166   2×2 model in relation to burnout, and (c) assess whether autonomy support moderated these

167   relationships in dancers. Hypotheses 1a, 2, 3 and 4 from the 2×2 model were posed in

168   relation to aims (a) and (b), and in relation to aim (c) we hypothesised that autonomy support

169 would buffer the relationships between perfectionism subtypes and all burnout dimensions

170 and enhance the relationships between perfectionism subtypes and all engagement

171 dimensions. That is, autonomy support would buffer against the relationships between pure

172 ECP and burnout, and mixed perfectionism and burnout (i.e. reduced support for Hypotheses

173 2 and 3 at higher compared to lower levels of autonomy support); and would enhance the

174 relationships between pure PSP and engagement (i.e. increased support for Hypotheses 1a

175 and 4 at higher compared to lower levels of autonomy support).

176 **Method**

177 **Participants and Procedure**

178 Following institutional ethical approval, 244 dancers were recruited from 53 dance

179 organizations in the UK. Between one and 42 dancers represented each school. These

180 included 198 females and 46 males whose mean age was 15.00 ($SD = 2.90$) years. Dancers

181 completed measures in the presence of the lead author either before or after class. On

182 average, they took part in 8.11 ($SD = 5.30$) classes per week which constituted 15.41 ($SD = $

183 10.83) hours dancing per week. They described their main dance genre as ballet ($n = 183$),

184 contemporary ($n = 35$), jazz ($n = 6$), street ($n = 14$), or tap ($n = 2$), with four non-respondents.

185 On average, participants rated their involvement in dance as very important in comparison to

186 other activities in their life ($M = 6.53$, $SD = .72$: 1 = *not important at all* to 9 = *extremely*

187 *important*), and when asked how much they had enjoyed dancing that year, they generally

188 responded very positively ($M = 4.74$, $SD = 0.56$: 1 = *not at all* to 5 = *very much*).

189 **Instruments**

190 **Burnout.** The Athlete Burnout Questionnaire (ABQ; Raedeke & Smith, 2001) was

191 used in the present study to assess burnout in dancers. The ABQ includes 15 items which

192 were adapted in line with Quested and Duda (2011) to reflect the dance context. These items

193   are used to measure three five-item subscales: reduced sense of accomplishment (e.g., 'I am

194   not achieving much in dance'), perceived emotional/ physical exhaustion (e.g., 'I feel so tired

195   from my training that I have trouble finding the energy to do other things'); and devaluation

196   (e.g., 'The effort I spend in dance would be better spent doing other things'). The instructions

197   ("The following items are concerned with how you feel at the moment about your

198   dancing…") were adapted to reflect the dance context.

199   The subscales were measured on a five-point scale (1 = *Almost never* to 5 = *Almost always*).

200   Researchers have found support for the validity and the reliability of the subscale scores. This

201   includes factor structure, internal consistency ($\alpha \geq .85$), and test-retest reliability ($r \geq .86$) (see

202   Raedeke & Smith, 2001). Previous studies have supported the use of adapted ABQ in the

203   dance context (e.g. Quested & Duda, 2011).

204   **Engagement.** The Athlete Engagement Questionnaire (AEQ; Lonsdale, et al.,2007)

205   was used in the present study to assess engagement in dance. The AEQ includes four four-

206   item subscales: confidence (e.g., 'I am confident in my abilities'), dedication (e.g., 'I am

207   dedicated to achieving my goals'), vigour (e.g., 'I feel really alive'), and enthusiasm (e.g., 'I

208   am enthusiastic').

209   The stem ("When I participate in dance…") was adapted to reflect the dance context. The

210   subscales were measured on a five-point Likert scale (1 = *Almost never* to 5 = *Almost*

211   *always*). Researchers have found support for the validity and reliability of the AEQ subscale

212   scores in athletes and dancers. This includes support for the factor structure of the scale via

213   confirmatory factor analysis

214   (CFA), and internal consistency (internal reliability coefficient $\geq .80$, Draugelis et al., 2014;

215    $\alpha \geq .84$, Lonsdale, et al., 2007).

216   **Multidimensional perfectionism.** Following the recommendations of Stoeber (2014),

217   and factor analytic studies highlighting the common higher-order structure of perfectionism

218   dimensions across different measures (e.g., Bieling, Israeli, & Antony, 2004; Cox, Enns, &

219   Clara 2002), multiple measures were used to capture PSP and ECP. Two subscales were used

220   to capture dancers' PSP. These were the seven-item personal standards subscale (e.g., "I hate

221   being less than the best at things in dance.") from the Sport Multidimensional Perfectionism

222   Scale (SMPS-2; Gotwals & Dunn, 2009), and the five-item self-oriented perfectionism subscale

223   (e.g., "One of my goals is to be perfect in everything I do.") from the short version of the

224   Multidimensional Perfectionism Scale (HMPS-SF; Cox, Enns, & Clara, 2002). Three subscales

225   were used to capture dancers' ECP. These were the eight-item concern over mistakes subscale

226   (e.g., "If I fail in competition I feel like a failure as a person.") and the six-item doubts about

227   actions subscale (e.g.,

228   "I usually feel unsure about the adequacy of my pre-performance practices.") from the

229   SMPS-2, and the five-item socially prescribed perfectionism subscale (e.g., "People expect

230   nothing less than perfection from me.") from the HMPS-SF. To account for the potential

231   domain specificity of perfectionism, instructions, items and the stems of the SMPS-2 and the

232   HMPS-SF were amended to reflect the dance context, for example, the word 'sport' was

233   changed to 'dance' for items in the SMPS-2. Evidence has been provided to support the

234   internal consistency (SMPS-2, $\alpha \geq .74$; HMPS-SF, $\alpha \geq .79$) of the subscale scores (Cox et al.,

235   2002; Gotwals, Dunn, Causgrove Dunn, & Gamache, 2010).

236   **Teacher autonomy support.** The Sport Climate Questionnaire (SCQ; Deci, 2001)

237   was used to assess dancers' perceptions of autonomy support provided by their teachers (e.g.,

238   'I feel that my teacher provides me with choices and options). The instructions ("… Teachers

239   have different styles in dealing with dancers, and we would like to know more about how you

240   have felt about your encounters with your teacher…") were adapted to reflect the dance

241   context. The SCQ contains 15 items measured on a seven-point Likert scale (1 = *Strongly*

242   *disagree* to 7 = *Strongly agree*). The items were also amended to reflect the dance context

243   e.g. 'sport' was replaced with 'dance' and 'coach' was replaced with 'teacher'. Evidence has

244   been provided in to support the internal consistency of the scale scores (α = .81, Jõesaar,

245   Hein, & Hagger, 2012).

Analytical Strategy

247   Analyses comprised four stages. First, following the procedures outlined by

248   Tabachnick and Fidell (2013), data were screened for out of range values, missing data, and

249   univariate and multivariate outliers, and internal consistencies were calculated for each

250   subscale. Second, descriptive statistics and bivariate correlations were calculated. Third,

251   procedures for testing the 2×2 perfectionism model were followed (Gaudreau, 2012).

252   Moderated regression analyses were conducted using PROCESS Model 1 (Hayes, 2013). PSP

253   and ECP and their interaction term were entered as predictors of each criterion variable.

254   Significant interactions were probed by examining two sets of simple slopes at relatively

255   lower (-1 SD) and relatively higher (+1 SD) levels of the moderator (Aiken & West, 1991).

256   Assessment of simple slopes enables examination of the 2×2 model hypotheses by

257   indicating contrasts between the predicted values of the different perfectionism subtypes

258   (Gaudreau & Thompson, 2010). Fourth, moderated regressions were run using PROCESS

259   Model 3 (Hayes, 2013) to test the moderating role of autonomy support on the perfectionism-

260   engagement and perfectionism-burnout relationships. PSP, ECP, autonomy support, and

261   interaction terms were entered as predictors. Again, simple slopes were then probed, this time

262   at relatively lower (-1 SD) and relatively higher (+1 SD) levels of autonomy support. In

263   stages three and four, factor scores based on CFA item loadings for each scale were used as

264   predictor and criterion. This approach was adopted to account for measurement error in each

265   subscale (Hair, Black, Babin, & Anderson, 2013). Power analysis (GPower version 3.1.9.2;

266   Faul, Erdfelder, Buchner, & Lang, 2009) based on the number of predictors ($k = 8$) in the

267   three-way models and small incremental effect sizes from the only other previous

268   examination of three-way interactions involving perfectionism in a performance context (ΔR^2

269    $= .049$, Crocker, et al., 2014), power $(1 - \beta) = .80$ and $\alpha = .05$, indicated that a total sample

270   size of $N = 155$ would be sufficient for the three-way moderated regressions.

<div align="center">

Results

</div>

Preliminary Analyses and Data Screening

273   Participants with more than 5% missing data (n = 3) were removed from the analysis

274   (Tabachnick & Fidell, 2013). The remaining participants had either no missing data (n = 200)

275   or very small amounts of missing data (n = 41, M number of missing items = 1.34, $SD = 0.69$,

276   range 14). Therefore, missing values were replaced using the mean of the non-missing items

277   from the relevant subscale in each individual case (see Graham, Cumsille, & Elek-Fiske,

278   2003). Univariate outlier screening indicated 17 cases with values outside the standardized z

279   score range $(+/- 3.29, p < .001)$, which were removed. Subsequently, no values exceeded

280   Kline's (2011) recommended cutoffs for absolute skewness (< 3) and absolute kurtosis $(<$

281   10). Mahalanobis distance: $\chi^2(10) = 29.59, p < .001$, indicated six multivariate outliers, which

282   were removed. On completion of outlier removal, $n = 218$ participants were retained for the

283   subsequent analyses. Internal consistencies were $\alpha \geq .71$ and composite reliabilities were $\rho_c \geq$

284   .73 (see Table 1).

Descriptive Statistics and Bivariate Correlations

286   Descriptive statistics and bivariate correlations are displayed in Table 1[1]. Bivariate

287   correlations indicated that PSP shared a medium positive correlation with ECP, small positive

288   correlations with autonomy support, confidence, and vigour, medium positive correlations

289   with dedication and enthusiasm, a small negative correlation with reduced sense of

290   accomplishment, and a medium negative correlation with devaluation. ECP shared small

291   negative correlations with autonomy support, confidence and enthusiasm, a small positive

292   correlation with devaluation, and medium positive correlations with reduced sense of

293   accomplishment and exhaustion. Autonomy support shared medium positive correlations

294   with confidence, dedication, vigour and enthusiasm, and medium negative correlations with

295   reduced sense of accomplishment, exhaustion, and devaluation.

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

297   Significant PSP×ECP interactions were found in relation to reduced accomplishment,

298   devaluation, confidence, dedication, and enthusiasm. All significant interactions constituted

299   small effects, denoted by ΔR^2. Non-significant PSP × ECP interactions were found in relation

300   to emotional/physical exhaustion and vigour.

Reduced sense of accomplishment. The PSP×ECP interaction was significant in

302   relation to reduced sense of accomplishment. Simple slopes were significant for: PSP at

303   lower ECP, $b = .10$, $p < .01$, 95% CI [-.34, -.10]); PSP at higher ECP, $b = -.19$, $p < .01$, 95%

304   CI [-.25, -.13]; ECP at lower PSP, $b = .28$, $p < .01$, 95% CI [.20, .36]; and ECP at higher PSP,

305    $b = .16$, $p < .01$, 95% CI [.09, .23]. These results supported Hypotheses 1a, 2, 3 and 4.

Emotional/physical exhaustion. PSP was a significant negative predictor of

307   emotional and/physical exhaustion; whereas, ECP was a significant positive predictor of

308   emotional/physical exhaustion. These main effects supported Hypotheses 1a, 2, 3 and 4.

Devaluation. The PSP×ECP interaction was significant in relation to devaluation.

310   Significant simple slopes were evident for: PSP at lower ECP, $b = -.11$, $p < .01$, 95% CI [-.17,
311   -.05];

312   PSP at higher ECP, $b = -.22$, $p < .01$, 95% CI [-.29, -.16]; ECP at lower PSP, $b = .25$, $p < .01$,

313   95% CI [.16, .33]; and ECP at higher PSP, $b = .10$, $p = .01$, 95% CI [.02, .17]. These results

314   supported Hypotheses 1a, 2, 3, and 4.

315   **Confidence.** The PSP×ECP interaction was significant in relation to confidence.

316   Simple slopes were significant for: PSP at lower ECP, $b = .15$, $p = .01$, 95% CI [.04 to .27];

317   PSP at higher ECP: $b = .40$, $p < .01$, 95% CI [.28, .51]; ECP at lower PSP, $b = -.43$, $p < .01$,

318   95% CI [-.60, -.27]; and non-significant for ECP at higher PSP, $b = -.13$, $p = .08$, 95% CI [-

319   .26, .02]. These results supported Hypotheses 1a, 2, and 3.

320   **Dedication.** The PSP×ECP interaction in relation to dedication was significant.

321   Simple slopes were significant for: PSP at lower ECP, $b = .26$, $p < .01$, 95% CI [.17, .35];

322   PSP at higher ECP, $b = .42$, $p < .01$, 95% CI [.33, .51; ECP at lower PSP, $b = -.36$, $p < .01$,

323   95% CI [-.49, -.23]; and ECP at higher PSP, $b = -.15$, $p < .01$, 95% CI [-.26, -.04]. These

324   results supported Hypotheses 1a, 2, 3, and 4.

325   **Vigour.** PSP was a significant positive predictor of vigour. ECP was a significant

326   negative predictor of vigour. These main effects supported Hypotheses 1a, 2, 3 and 4.

327   **Enthusiasm.** The PSP×ECP interaction in relation to enthusiasm was significant.

328   Simple slopes were significant for: PSP at lower ECP, $b = .25$, $p < .01$, 95% CI [.15, .36];

329   PSP at higher ECP $b = .40$, $p < .01$, 95% CI [.29, .50]; ECP at lower PSP, $b = -.35$, $p < .01$,

330   95% CI [-.50, -.21]; and ECP at higher PSP, $b = -.17$, $p < .01$, 95% CI [-.29, -.04]. These

331   results supported Hypotheses

332   1a, 2, 3, and 4.

333   Together these results indicated support for all four hypotheses of the 2 × 2 model in

334   relation to all burnout dimensions and the dedication, vigor, and enthusiasm dimensions of

335 engagement. For confidence Hypotheses 1a, 2, and 3 were supported but Hypothesis 4 was

336 refuted.

337 **The Moderating Role of Autonomy Support**

338 Three-way PSP × ECP × Autonomy Support interactions were evident in relation to reduced

339 sense of accomplishment, devaluation, confidence, dedication, vigour, and enthusiasm (see

340 Table 2 and Table 3). All significant interactions constituted small effects, denoted by $R^2\Delta$.

341 The PSP × ECP × Autonomy Support interaction was non-significant in relation to emotional

342 and physical exhaustion. Table 4 presents a summary of whether the simple slopes support

343 the 2 x 2 hypotheses at relatively lower and relatively higher levels of autonomy support.

344   **Reduced sense of accomplishment.** The PSP × ECP × Autonomy Support interaction

345 was significant in relation to reduced sense of accomplishment. At lower levels of autonomy

346 support, simple slopes were non-significant for PSP at lower ECP, $b = -.05$, $p = .30$, 95% CI

347 [-.15, .05]; significant for PSP at higher ECP, $b = -.23$, $p < .001$, 95% CI [-.32, -.16];

348 significant for ECP at lower PSP, $b = .31$, $p < .001$, 95% CI [.22, .40]; and non-significant for

349 ECP at higher PSP: $b = .06$, $p = .44$, 95% CI [-.09, .20]. At higher levels of autonomy

350 support, simple slopes were significant for PSP at lower ECP, $b = -.11$, $p = .01$, 95% CI [-.18,

351 -.03]; non-significant for PSP at higher ECP, $b =$

352 -.04, $p = .42$, 95% CI [-.12, .05]; non-significant for ECP at lower PSP, $b = .08$, $p = .15$, 95%

353 CI [.03, .20]; and significant for ECP at higher PSP, $b = .17$, $p < .01$, 95% CI [.08, .26]. These

354 results supported Hypotheses 1c, 2 and 3 at lower levels of autonomy support, and supported

355 Hypotheses 1a and 4 at higher levels of autonomy support.

356   **Devaluation.** The PSP × ECP × Autonomy Support interaction was significant in

357 relation to devaluation. At lower levels of autonomy support, simple slopes were non-

358 significant for PSP at lower ECP, $b = -.06$, $p = .24$, 95% CI [-.17, .04]; significant for PSP at

359   higher ECP, $b = -.29$, $p < .01$, 95% CI [-.37, -.20]; significant for ECP at lower PSP, $b = .30$,

360    $p < .01$, 95% CI [.20, .39]; and non-significant for ECP at higher levels of PSP, $b = -.01$, $p =$

361   .90, 95% CI [-.16, .14]. At higher levels of autonomy support, simple slopes were significant

362   for PSP at lower ECP, $b = -.12$, $p < .01$, 95% CI [-.20, -.04]; non-significant for PSP at higher

363   ECP: $b = -.05$, $p = .24$, 95% CI [-.31, .08]; non-significant for ECP at lower PSP: $b = .02$, $p =$

364   .76, 95% CI [-.10, .14]; and significant for ECP at higher PSP, $b = .10$, $p = .03$, 95% CI [.01,

365   .19]. These results supported Hypotheses 1c, 2 and 3 at lower levels of autonomy support,

366   and supported Hypotheses 1a and 4 at higher levels of autonomy support.

367   **Confidence.** The PSP $\times$ ECP $\times$ Autonomy Support interaction was significant in

368   relation to confidence. At lower levels of autonomy support, simple slopes were: non-

369   significant for PSP at lower ECP, $b = -.05$, $p = .66$, 95% CI [-.25, .16]; significant for PSP at

370   higher ECP: $b = .37$, $p < .01$, 95% CI [.21, .53]; significant for ECP at lower PSP, $b = -.41$, p

371    $< .01$, 95% CI [-.60, -.23]; and nonsignificant for ECP at higher levels of PSP, $b = -.12$, $p =$

372   .38, 95% CI [-.15, .39]. At higher levels of autonomy support, simple slopes were significant

373   for PSP at lower ECP, $b = .22$, $p = .01$, 95% CI [.07, .38]; significant for PSP at higher ECP,

374    $b = .25$, $p < .01$, 95% CI [.08, .43]; non-significant for

375   ECP at lower PSP, $b = -.21$, $p = .09$, 95% CI [-.44, .03]; and non-significant for ECP at higher

376   PSP: $b = -.17$, $p = .06$, 95% CI [-.34, .01]. These results indicate support for Hypotheses 1c, 2

377   and 3 at lower levels of autonomy support, and support for Hypotheses 1a and 3 at higher levels

378   of autonomy support.

379   **Dedication.** The PSP $\times$ ECP $\times$ Autonomy Support interaction was significant in

380   relation to dedication. At lower levels of autonomy support, simple slopes were: significant

381   for PSP at lower

382   ECP, b = .18, p = .02, 95% CI [.03, .34]; significant for PSP at higher ECP, b = .46, p < .01,

383   95% CI [.34, .58]; significant for ECP at lower PSP, b = -.37, p < .01, 95% CI [-.51, -.23];

384   and nonsignificant for ECP at higher levels of PSP, b = -.01, p = .93, 95% CI [-.21, .20]. At

385   higher levels of autonomy support, simple slopes were significant for PSP at lower ECP, b =

386   .22, p = .01, 95% CI

387   [.07, .38]; significant for PSP at higher ECP, b = .25, p < .01, 95% CI [.08, .43]; non-
388   significant for

389   ECP at lower PSP, b = -.11, p = .22, 95% CI [-.29, .07]; and significant for ECP at higher

390   PSP, b = .15, p = .03, 95% CI [-.29, -.02]. These results indicate support for Hypotheses 1a, 2

391   and 3 at lower levels of autonomy support, and support for Hypotheses 1a, 3 and 4 at higher

392   levels of autonomy support.

393   **Vigour.** The PSP × ECP × Autonomy Support interaction was significant in relation

394   to vigour. At lower levels of autonomy support, simple slopes were non-significant for PSP at

395   lower

396   ECP, b = -.02, p = .89, 95% CI [-.23, .20]; significant for PSP at higher ECP: b = .34, p < .01,

397   95% CI [.17, .51]; significant for ECP at lower PSP: b = -.29, p < .01, 95% CI [-.48, -.09];

398   and nonsignificant for ECP at higher levels of PSP: b = .16, p = .27, 95% CI [-.13, .45]. At

399   higher levels of autonomy support, simple slopes were significant for PSP at lower ECP, b =

400   .26, p < .01, 95% CI [.09, .42]; non-significant for PSP at higher ECP, b = .15, p = .11, 95%

401   CI [-.04, .34]; nonsignificant for ECP at lower PSP, b = -.08, p = .52, 95% CI [-.34, .17]; and

402   significant for ECP at higher PSP, b = -.22, p = .02, 95% CI [-.40, -.03]. These results

403   supported Hypotheses 1c, 2 and 3 at lower levels of autonomy support, and supported

404   Hypotheses 1a and 4 at higher levels of autonomy support

405   **Enthusiasm.** The PSP × ECP × Autonomy Support interaction was significant in

406   relation to enthusiasm. At lower levels of autonomy support, simple slopes were non-

407   significant for PSP at lower ECP, $b = .11$, $p = .20$, 95% CI [-.06, .29]; significant for PSP at

408   higher ECP, $b = .43$, $p < .01$, 95% CI [.30, .57]; significant for ECP at lower PSP, $b = -.34$, p

409    $< .01$, 95% CI [-.50, -.18]; and nonsignificant for ECP at higher levels of PSP, $b = -.07$, $p =$

410    $.57$, 95% CI [-.17, .30]. At higher levels of autonomy support, simple slopes were significant

411   for PSP at lower ECP, $b = .25$, $p < .01$, 95% CI

412   [.12, .38]; significant for PSP at higher ECP, $b = .20$, $p = .01$, 95% CI [.06, .35]; non-
413   significant for

414   ECP at lower PSP, $b = -.08$, $p = .43$, 95% CI [-.29, .12]; and significant for ECP at higher

415   PSP, $b = .20$, $p = .01$, 95% CI [-.35, -.05]. These results supported Hypotheses 1c, 2 and 3 at

416   lower levels of autonomy support, and supported Hypotheses 1a, 3 and 4 at higher levels of

417   autonomy support.

418   In summary, as displayed in Table 4: Hypothesis 1a was supported in 1/6 analyses at

419   lower autonomy support (i.e., dedication) and in 6/6 analyses at higher autonomy support;

420   Hypothesis 2 was supported in 6/6 analyses at lower levels of autonomy support and in 0/6

421   analyses at higher levels of autonomy support; Hypothesis 3 was supported in 6/6 analyses at

422   lower autonomy support and in 3/6 analyses at higher autonomy support (i.e., confidence,

423   dedication, enthusiasm), and Hypothesis 4 was supported in 0/6 analyses at lower autonomy

424   support and in 5/6 analyses at higher autonomy support with confidence being the exception.

425   **Discussion**

426   In this study we aimed to (a) provide the first test of the 2×2 model of perfectionism

427   in relation to engagement, (b) re-examine the 2×2 model in relation to burnout, and (c)

428   assess whether autonomy support moderated these relationships in dancers. Consistent with

429   the hypotheses outlined in the 2×2 model we found that: pure PSP was associated with

430   higher engagement (all dimensions) and lower burnout (all dimensions) relative to non-

431   perfectionism (Hypothesis 1a); pure ECP was associated with lower engagement (all

432 dimensions) and higher burnout (all dimensions) relative to non-perfectionism (Hypothesis

433 2); pure ECP was associated with lower engagement (all dimensions) and higher burnout (all

434 dimensions) relative to mixed perfectionism (Hypothesis 3); and mixed perfectionism was

435 associated with lower engagement (all dimensions except confidence) and higher burnout (all

436 dimensions) relative to pure PSP (Hypothesis 4). We also found that autonomy support

437 moderated the 2×2 perfectionismengagement relationships (all dimensions), and the 2×2

438 perfectionism-burnout relationships (all dimensions except emotional/physical exhaustion).

439 **Perfectionism and Burnout in Dancers**

440 We found support for Hypotheses 1a, 2, 3 and 4 in relation to all burnout dimensions.

441 This aligns with the 2×2 model (Gaudreau, 2016) by indicating that pure ECP is the subtype

442 of perfectionism most likely to relate to debilitating outcomes. From an SDT perspective, this

443 may be because pure ECP contributes to perceptions of need thwarting and controlled

444 motivation for dance, which underpin burnout. Dancers displaying pure ECP may also be

445 more likely to measure their self-worth against unattainable external standards, and therefore

446 encounter burnout symptoms when they inevitably fail to meet standards imposed by others

447 (Hall & Hill, 2012). One further critical factor in determining the development of burnout

448 may be that, despite the strain placed on athletes by pure ECP, it embeds a rigid form of

449 psychological commitment that manifests in dancers feeling entrapped in dance and as

450 though they *have to* continue (Raedeke, 1997). This may mean that burnout, rather than

451 dropout, is likely for many perfectionistic young dancers.

452 In contrast to pure ECP, our findings suggest that pure PSP is negatively associated

453 with burnout dimensions. This may be because pure PSP contributes to perceptions of need

454 satisfaction and autonomous motivation, which negate burnout. Researchers have found

455 support for SDT mechanisms explaining the relationships between perfectionism dimensions

456   and burnout in previous studies (e.g., Jowett et al., 2013; 2016). Relative to other

457   perfectionism subtypes, dancers reporting pure PSP may place less emphasis on self-worth

458   being measured against dance achievement. Alternatively, it may be the case that dancers in

459   the present study reporting pure PSP, did measure self-worth by their achievements but

460   perceive themselves to be performing well. In accord, an interesting future research direction

461   would be to examine the relationship between pure PSP and burnout under conditions of

462   relative success and adversity (e.g., performance slumps, transition from vocational youth

463   dancer to senior professional, injury). Under conditions of adversity all dimensions of

464   perfectionism may confer vulnerability to maladaptive outcomes such as burnout (Flett &

465   Hewitt, 2016).

466   Our findings regarding 2×2 perfectionism and burnout are partly consistent with

467   previous studies in dance. Nordin-Bates et al. (2017) found support for Hypotheses 2 and 4

468   only in relation to emotional/physical exhaustion. However, unlike in our study, Nordin-Bates

469   et al. (2017) found no support for Hypothesis 3 in relation to reduced sense of accomplishment

470   or devaluation, and Cumming and Duda (2012) found no support for Hypothesis 1a in relation

471   to emotional/physical exhaustion. The discrepancies across these studies may be due in part to

472   the use of a variablecentred or person-centred approach. We adopted a variable-centred

473   approach to examine the 2×2 model, whereas Cumming and Duda (2012) and Nordin-Bates

474   et al. (2017) adopted a personcentred approach. Variable-centred approaches do not enable

475   identification of specific subgroups of people in a population. However, by examining

476   interactions between PSP and ECP and unique main effects we were able to compare predicted

477   outcomes at distinct intersecting points along the continuous distributions of PSP and ECP

478   (Gaudreau, Franche, Kljajic, & Martinelli, 2018). Moreover, relative to variable-centred

479   approaches, person-centred approaches are more problematic when examining 2×2

480   perfectionism because the groups clustered to represent different perfectionism subtypes can

481   vary across different studies, and so can the degree to which the groups accurately capture

482   subtypes consistent with the 2×2 model (Gaudreau et al., 2018). This was evidenced by the

483   differences in the mean perfectionism dimension scores for 2×2 clusters between Cumming

484   and Duda (2012) and Nordin-Bates et al. (2017).

485   Moreover, mean scores of PSP in Cumming and Duda (2012) were higher for the mixed

486   perfectionism cluster than for the pure PSP cluster, when according to the model, the mean

487   scores should be equivalent.

Perfectionism and Engagement in Dancers

489   We found support for Hypotheses 1a, 2, 3 and 4 in relation to dedication, vigour, and

490   enthusiasm. These findings lent credence to the functional hierarchy within the 2×2 model,

491   whereby pure PSP is the subtype most likely to relate to optimal functioning, followed by

492   nonperfectionism, then mixed perfectionism, and finally pure ECP. They also partly

493   corroborated recent examinations of 2×2 perfectionism in relation to other adaptive

494   outcomes including positive affect (Hypothesis 4; Cumming & Duda, 2012) and intrinsic

495   motivation (Hypothesis 1a; Quested et al., 2014). It therefore appears that for dancers,

496   different perfectionism subtypes underpin contrasting SDT processes and outcomes in the

497   form of burnout on one hand, and engagement on the other. Regarding engagement, the self-

498   imposed striving which characterises PSP may contribute to more autonomous motivation for

499   dance, and higher basic need satisfaction. Conversely, the externally imposed standards

500   which characterize ECP may undermine engagement via controlled motivation and lower

501   basic need satisfaction or active need thwarting.

502   We found support for Hypotheses 1a, 2 and 3 but no support for Hypothesis 4 in

503   regard to confidence. This lack of distinction between pure PSP and mixed perfectionism

504   may be due to the relatively weak relationship between PSP and confidence highlighted in a

505   recent meta-analysis (see Hill et al., 2018). Inconsistency in the perfectionism-confidence

506   relationship may be due to confidence being one of the less stable elements of engagement.

507   Based on previous findings, the relationship between perfectionism and confidence certainly

508   appears to be situation dependent, for example, the positive correlation between PSP and

509   confidence appears to weaken in the lead up to competition (Hall, Kerr, & Matthews, 1998).

510   Therefore, much like examining conditions of success and adversity seem important in terms

511   of the relationships between perfectionism and burnout, so too do the relationships between

512   perfectionism and confidence.

513   **The Moderating Role of Autonomy Support**

514   The most novel contribution of the present study is the evidence that autonomy

515   support moderated the perfectionism-engagement and perfectionism-burnout relationships for

516   all engagement dimensions and for the reduced sense of accomplishment and devaluation

517   dimensions of burnout. The effect of autonomy support was most pronounced in relation to

518   reduced sense of accomplishment and devaluation. These findings suggest that when

519   autonomy support levels are higher, the negative relationships that pure PSP shares with

520   reduced accomplishment and devaluation are stronger, and the positive relationships that pure

521   ECP shares with these burnout dimensions are weaker. These findings align with previous

522   studies by highlighting the potential protective quality of autonomy support in relation to

523   burnout (Adie et al., 2012). Extending previous research, our findings indicate that the

524   protective quality of autonomy support in terms of burnout extends to perfectionistic dancers.

525   Regarding engagement, the moderating effects of autonomy support were evident but

526   more complex than for burnout. The enhancing effect of autonomy support on pure PSP was

527   evident for confidence (Hypothesis 1a), dedication (Hypothesis 4), and vigour and

528   enthusiasm (Hypothesis 1a and 4), and the buffering effect on pure ECP was evident for all

529   engagement dimensions in relation to Hypothesis 2 but only for vigour in relation to

530   Hypothesis 3. Therefore, although autonomy support appears to enhance the relationships

531   between perfectionism and all engagement dimensions, it is the relationships between

532   perfectionism subtypes and dancers' sense of liveliness where this is most pronounced. As

533   such, when dance teachers nurture volition, and emphasise selfinitiation and problem-solving,

534   this appears to protect dancers against evaluative concerns and encourages less extreme

535   striving which manifests in enhanced engagement, particularly in the form of vigour. Again,

536   these findings align with, and extend, previous studies that have shown a positive relationship

537   between autonomy support and other positively valanced affective outcomes (e.g., subjective

538   vitality, Adie et al., 2012; positive affect, Quested & Duda, 2010).

539   **Practical Implications**

540   Researchers have argued that a 'culture of perfection' exists in dance that has harmful

541   consequences for dancer well-being (Hamilton, 1997). Our findings suggest that the

542   detrimental relationships shared between perfectionism and burnout may be buffered when

543   dance teachers provide autonomy support. The potential benefits in terms of reduced burnout

544   and improved engagement suggest that teachers should acknowledge their dancers'

545   perspectives and encourage problem solving. For example, adapted from strategies outlined

546   by Cheon, Reeve, Lee and Lee (2015), when a dancer makes a mistake, rather than criticise

547   them for making the error, teachers could try to understand the underpinning cause by

548   accepting and acknowledging what is happened

549   (e.g., "I notice that you had some difficulty with falling out of your pirouette ."),

550   acknowledging why from the dancers' perspective it has occurred (e.g., "Yes it has been a

551   long week and this is a tough routine isn't it."), and then inviting the dancer to find a solution

552   (Okay, so how can we help you to focus on spotting? Any suggestions?). Although

553   intervention studies are yet to be conducted in dance, findings by Cheon et al. (2015) in

554   Paralympic sport suggest that educating coaches about how to create an autonomy supportive

555   environment for their athletes, can protect athletes against declines in motivation,

556   performance.

557   **Limitations and Future Directions**

558   The cross-sectional design means that temporal precedence was not established. It is

559   possible that burnout and engagement dimensions predict perfectionism and perceptions of

560   autonomy support, although this is unlikely given findings which suggest that perfectionism

561   predicts burnout over time, rather than vice versa (e.g. Madigan, Stoeber, & Passfield, 2015).

562   Nonetheless, longitudinal research is required which establishes the temporal precedence of

563   the relationships examined in the present study. Further, our assessment of autonomy support

564   was limited to dancers' perceptions. Although dancers' perceptions of the environment are

565   influential in shaping their experiences, dance teachers' perspectives could be measured in

566   future research to provide a more rounded assessment of the motivational climate. Moreover,

567   we did not give dancers guidance on which dance teacher to complete the questionnaire in

568   relation to, and it is possible that the dancers had multiple dance teachers. In future,

569   researchers may want ask dancers to consider the extent to which different teachers create

570   autonomy supportive environments. Another limitation was the use of sport-specific

571   measures in the dance environment. We adapted sport-specific measures and they

572   demonstrated reasonable internal consistency and composite reliability, but measures

573   developed for the dance context would be preferable. However, no dance-specific measures

574   of any of the variables were available at the time of study. The current findings will need to

575   be replicated once these are established.

576   **Conclusions**

577   The present study built on previous research in dance by demonstrating that the

578   effects of 2×2 perfectionism for burnout extend to engagement, and by highlighting the

579   moderating role of autonomy support in regard to both engagement and burnout. Our findings

580   align with the 2×2

581   model in highlighting pure ECP as the most problematic subtype and by suggesting

582   pure PSP is comparatively less problematic for burnout and engagement. The moderating

583   effects of autonomy support found here suggest that autonomy support may be a potentially

584   fruitful target for interventions designed to manage dancers' perfectionistic tendencies.

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1   Footnotes

2   [1]See 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
M	4.95	3.45	5.87	1.96	2.38	1.51	3.91	4.46	4.16	4.52
SD	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

1

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

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**

1

	-0.16***	-0.39***	-0.15***
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. $*p < .05$, $**p < .01$, $***p < .001$ 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***

1

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

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

1

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