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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  $2 \times 2$  perfectionism and burnout in dancers, but researchers are yet to examine the relationships between  $2 \times 2$  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  $2 \times 2$  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  $2 \times 2$  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, Lavalley, & 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 self-oriented 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  $2 \times 2$  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  $2 \times 2$  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  $2 \times 2$  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  $2 \times 2$  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  $2 \times 2$  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  $2 \times 2$  model of perfectionism in relation to engagement, (b) re-  
165 examine the  
166  $2 \times 2$  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  $2 \times 2$  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 ( $\alpha = .81$ , Jöesaar,  
245 Hein, & Hagger, 2012).

#### 246 **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  $2 \times 2$  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  $2 \times 2$  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 ( $\Delta R^2$   
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.

## 271 Results

### 272 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 ( $\pm 3.29$ ,  $p < .001$ ), 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).

### 285 Descriptive Statistics and Bivariate Correlations

286 Descriptive statistics and bivariate correlations are displayed in Table 1<sup>1</sup>. 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.

### 296 **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  $\Delta R^2$ . Non-significant PSP × ECP interactions were found in relation  
300 to emotional/physical exhaustion and vigour.

301 **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,  $b = .10, p < .01, 95\% \text{ CI } [-.34, -.10]$ ; PSP at higher ECP,  $b = -.19, p < .01, 95\%$   
304  $\text{CI } [-.25, -.13]$ ; ECP at lower PSP,  $b = .28, p < .01, 95\% \text{ CI } [.20, .36]$ ; and ECP at higher PSP,  
305  $b = .16, p < .01, 95\% \text{ CI } [.09, .23]$ . These results supported Hypotheses 1a, 2, 3 and 4.

306 **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.

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

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

312 PSP at higher ECP,  $b = -.22, p < .01, 95\% \text{ CI } [-.29, -.16]$ ; ECP at lower PSP,  $b = .25, p < .01,$   
313  $95\% \text{ CI } [.16, .33]$ ; and ECP at higher PSP,  $b = .10, p = .01, 95\% \text{ CI } [.02, .17]$ . 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,  $b = .15, p = .01, 95\% \text{ CI } [.04 \text{ to } .27]$ ;  
317 PSP at higher ECP:  $b = .40, p < .01, 95\% \text{ CI } [.28, .51]$ ; ECP at lower PSP,  $b = -.43, p < .01,$   
318  $95\% \text{ CI } [-.60, -.27]$ ; and non-significant for ECP at higher PSP,  $b = -.13, p = .08, 95\% \text{ CI } [-$   
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,  $b = .26, p < .01, 95\% \text{ CI } [.17, .35]$ ;  
322 PSP at higher ECP,  $b = .42, p < .01, 95\% \text{ CI } [.33, .51]$ ; ECP at lower PSP,  $b = -.36, p < .01,$   
323  $95\% \text{ CI } [-.49, -.23]$ ; and ECP at higher PSP,  $b = -.15, p < .01, 95\% \text{ CI } [-.26, -.04]$ . 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,  $b = .25, p < .01, 95\% \text{ CI } [.15, .36]$ ;  
329 PSP at higher ECP  $b = .40, p < .01, 95\% \text{ CI } [.29, .50]$ ; ECP at lower PSP,  $b = -.35, p < .01,$   
330  $95\% \text{ CI } [-.50, -.21]$ ; and ECP at higher PSP,  $b = -.17, p < .01, 95\% \text{ CI } [-.29, -.04]$ . These  
331 results supported Hypotheses  
332 1a, 2, 3, and 4.

333 Together these results indicated support for all four hypotheses of the  $2 \times 2$  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  $\times$  ECP  $\times$  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  $\times$  ECP  $\times$  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  $\times$  2 hypotheses at relatively lower and relatively higher levels of autonomy support.

344 **Reduced sense of accomplishment.** The PSP  $\times$  ECP  $\times$  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  $\times$  ECP  $\times$  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,  $b = -.29, p < .01, 95\% \text{ CI } [-.37, -.20]$ ; significant for ECP at lower PSP,  $b = .30,$   
360  $p < .01, 95\% \text{ CI } [.20, .39]$ ; and non-significant for ECP at higher levels of PSP,  $b = -.01, p =$   
361  $.90, 95\% \text{ CI } [-.16, .14]$ . At higher levels of autonomy support, simple slopes were significant  
362 for PSP at lower ECP,  $b = -.12, p < .01, 95\% \text{ CI } [-.20, -.04]$ ; non-significant for PSP at higher  
363 ECP:  $b = -.05, p = .24, 95\% \text{ CI } [-.31, .08]$ ; non-significant for ECP at lower PSP:  $b = .02, p =$   
364  $.76, 95\% \text{ CI } [-.10, .14]$ ; and significant for ECP at higher PSP,  $b = .10, p = .03, 95\% \text{ CI } [.01,$   
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  $\text{PSP} \times \text{ECP} \times \text{Autonomy Support}$  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,  $b = -.05, p = .66, 95\% \text{ CI } [-.25, .16]$ ; significant for PSP at  
370 higher ECP:  $b = .37, p < .01, 95\% \text{ CI } [.21, .53]$ ; significant for ECP at lower PSP,  $b = -.41, p$   
371  $< .01, 95\% \text{ CI } [-.60, -.23]$ ; and nonsignificant for ECP at higher levels of PSP,  $b = -.12, p =$   
372  $.38, 95\% \text{ CI } [-.15, .39]$ . At higher levels of autonomy support, simple slopes were significant  
373 for PSP at lower ECP,  $b = .22, p = .01, 95\% \text{ CI } [.07, .38]$ ; significant for PSP at higher ECP,  
374  $b = .25, p < .01, 95\% \text{ CI } [.08, .43]$ ; non-significant for  
375 ECP at lower PSP,  $b = -.21, p = .09, 95\% \text{ CI } [-.44, .03]$ ; and non-significant for ECP at higher  
376 PSP:  $b = -.17, p = .06, 95\% \text{ CI } [-.34, .01]$ . 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  $\text{PSP} \times \text{ECP} \times \text{Autonomy Support}$  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,  $b = .18, p = .02, 95\% \text{ CI } [.03, .34]$ ; significant for PSP at higher ECP,  $b = .46, p < .01,$   
383  $95\% \text{ CI } [.34, .58]$ ; significant for ECP at lower PSP,  $b = -.37, p < .01, 95\% \text{ CI } [-.51, -.23]$ ;  
384 and nonsignificant for ECP at higher levels of PSP,  $b = -.01, p = .93, 95\% \text{ CI } [-.21, .20]$ . At  
385 higher levels of autonomy support, simple slopes were significant for PSP at lower ECP,  $b =$   
386  $.22, p = .01, 95\% \text{ CI}$   
387  $[.07, .38]$ ; significant for PSP at higher ECP,  $b = .25, p < .01, 95\% \text{ CI } [.08, .43]$ ; non-  
388 significant for  
389 ECP at lower PSP,  $b = -.11, p = .22, 95\% \text{ CI } [-.29, .07]$ ; and significant for ECP at higher  
390 PSP,  $b = .15, p = .03, 95\% \text{ CI } [-.29, -.02]$ . 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  $\times$  ECP  $\times$  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,  $b = -.02, p = .89, 95\% \text{ CI } [-.23, .20]$ ; significant for PSP at higher ECP:  $b = .34, p < .01,$   
397  $95\% \text{ CI } [.17, .51]$ ; significant for ECP at lower PSP:  $b = -.29, p < .01, 95\% \text{ CI } [-.48, -.09]$ ;  
398 and nonsignificant for ECP at higher levels of PSP:  $b = .16, p = .27, 95\% \text{ CI } [-.13, .45]$ . At  
399 higher levels of autonomy support, simple slopes were significant for PSP at lower ECP,  $b =$   
400  $.26, p < .01, 95\% \text{ CI } [.09, .42]$ ; non-significant for PSP at higher ECP,  $b = .15, p = .11, 95\%$   
401  $\text{CI } [-.04, .34]$ ; nonsignificant for ECP at lower PSP,  $b = -.08, p = .52, 95\% \text{ CI } [-.34, .17]$ ; and  
402 significant for ECP at higher PSP,  $b = -.22, p = .02, 95\% \text{ CI } [-.40, -.03]$ . 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  $\times$  ECP  $\times$  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  $2 \times 2$  model of perfectionism  
427 in relation to engagement, (b) re-examine the  $2 \times 2$  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  $2 \times 2$  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  $2 \times 2$  perfectionism-engagement relationships (all dimensions), and the  $2 \times 2$   
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  $2 \times 2$  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  $2 \times 2$  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  $2 \times 2$  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  $2 \times 2$

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  $2 \times 2$  model (Gaudreau et al., 2018). This was evidenced by the  
483 differences in the mean perfectionism dimension scores for  $2 \times 2$  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.

### 488 **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  $2 \times 2$  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  $2 \times 2$  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  $2 \times 2$  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  $2 \times 2$

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 <sup>1</sup>See supplementary material for findings in  
3 relation to total index scores of burnout and  
4 engagement. They are not included in the main  
body of the manuscript as they were largely  
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
$\rho_c$	.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.  $*p < .05$ ,  $**p < .01$ ,  $***p < .001$

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

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  $2 \times 2$  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
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2 Note: PSP = Personal standards perfectionism, ECP = evaluative concerns perfectionism, AS = autonomy support.

Emotional/physical 3 exhaustion omitted due to nonsignificant 3-way interaction.

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