

Est.
1841

YORK
ST JOHN
UNIVERSITY

Jowett, Gareth E. ORCID logoORCID:
<https://orcid.org/0000-0003-4004-2857>, Hill, Andrew P. ORCID
logoORCID: <https://orcid.org/0000-0001-6370-8901>, Curran,
Thomas, Hall, Howard ORCID logoORCID: <https://orcid.org/0000-0002-6550-4408> and Clements, Lucie ORCID logoORCID:
<https://orcid.org/0000-0001-5924-8025> (2021) Perfectionism,
burnout, and engagement in dance: The moderating role of
autonomy support. *Sport, Exercise, and Performance Psychology*,
10 (1). pp. 133-148.

Downloaded from: <https://ray.yorks.ac.uk/id/eprint/5323/>

The version presented here may differ from the published version or version of record. If
you intend to cite from the work you are advised to consult the publisher's version:

<https://doi.org/10.1037/spy0000232>

Research at York St John (RaY) is an institutional repository. It supports the principles of
open access by making the research outputs of the University available in digital form.
Copyright of the items stored in RaY reside with the authors and/or other copyright
owners. Users may access full text items free of charge, and may download a copy for
private study or non-commercial research. For further reuse terms, see licence terms
governing individual outputs. [Institutional Repository Policy Statement](#)

RaY

Research at the University of York St John

For more information please contact RaY at ray@yorks.ac.uk

In Press: Sport, Exercise, and Performance Psychology. Accepted 7th May 2020.

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

Gareth E. Jowett¹, Andrew P. Hill², Thomas Curran³, Howard K. Hall⁴, Lucie Clements⁵

Leeds Beckett University, UK¹, York St. John University, UK², London School of
Economics and Political Science, UK³, Sutton the Forrest, UK⁴, University of Chichester,
UK⁵

Correspondence should be addressed to:

Gareth E. Jowett

202 Fairfax Hall

Carnegie School of Sport

Headingley Campus

Leeds Beckett University

Leeds, United Kingdom

LS6 3QS

Phone: +44 (0) 113 81 22056

E-mail: g.e.jowett@leedsbeckett.ac.uk

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, 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 2×2 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 ($\alpha = .81$, 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 2×2 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.

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 (± 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 1¹. 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 ΔR^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 2×2 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 2×2 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 perfectionism-engagement 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.

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 2×2 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.

585 References

586 Adie, J. W., Duda, J. L., & Ntoumanis, N. (2012). Perceived coach-autonomy support, basic
587 need satisfaction and the well-and ill-being of elite youth soccer players: A longitudinal
588 investigation. *Psychology of Sport and Exercise, 13*(1), 51-59.

589 Aiken, L. S., & West, S. G. (1991). *Multiple Regression: Testing and Interpreting*
590 *Interactions*. Newbury Park, CA: Sage

591 Aujla, I. J., Nordin-Bates, S., & Redding, E. (2014). A qualitative investigation of
592 commitment to dance: findings from the UK Centres for Advanced Training. *Research in*
593 *Dance Education, 15*(2), 138-160.

594 Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social
595 psychological research: Conceptual, strategic, and statistical considerations. *Journal of*
596 *Personality and Social Psychology, 51*, 1173-1182.

597 Bieling, P. J., Israeli, A. L., & Anthony, M. M. (2004). Is perfectionism good, bad, or both?
598 Examining models of the perfectionism construct. *Personality and Individual*
599 *Differences, 36*, 1373-1385.

- 600 Cheon, S. H., Reeve, J., Lee, J., & Lee, Y. (2015). Giving and receiving autonomy support in
601 a high-stakes sport context: A field-based experiment during the 2012 London
602 Paralympic
603 Games. *Psychology of Sport and Exercise, 19*, 59-69.
- 604 Cox, B. J., Enns, M. W., & Clara, I. P. (2002). The multidimensional structure of
605 perfectionism in clinically distressed and college student samples. *Psychological*
606 *Assessment, 14*(3), 365-373.
- 607 Cresswell, S. L., & Eklund, R. C. (2006). The convergent and discriminant validity of
608 burnout measures in sport: A multi-trait/multi-method analysis. *Journal of Sports*
609 *Sciences, 24*(2),
610 209-220.
- 611 Cresswell, S. L., & Eklund, R. C. (2007). Athlete burnout: A longitudinal qualitative study.
612 *The Sport Psychologist, 21*(1), 1-20.
- 613 Crocker, P. R., Gaudreau, P., Mosewich, A. D., & Kljajic, K. (2014). Perfectionism and the
614 stress process in intercollegiate athletes: Examining the 2 × 2 model of perfectionism in sport
615 competition. *International Journal of Sport Psychology, 45*(4), 61-84. Cumming, J., & Duda,
616 J. L. (2012). Profiles of perfectionism, body-related concerns, and indicators of psychological
617 health in vocational dance students: An investigation of the 2 ×
618 2 model of perfectionism. *Psychology of Sport and Exercise, 13*(6), 729-738.
- 619 Curran, T., Hill, A. P., & Niemiec, C. P. (2013). A conditional process model of
620 children's behavioral engagement and behavioral disaffection in sport based on self
621 determination theory. *Journal of Sport and Exercise Psychology, 35*(1), 30-43. Deci, E.
622 L. (2001). *The Sport Climate Questionnaire*. Retrieved from
623 <http://www.selfdeterminationtheory.org/questionnaires/10-questionnaires/84> DeFreese,

- 624 J. D., & Smith, A. L. (2013). Areas of worklife and the athlete burnout engagement
625 relationship. *Journal of Applied Sport Psychology*, 25(2), 180-196.
- 626 Draugelis, S., Martin, J., & Garn, A. (2014). Psychosocial predictors of well-being in
627 collegiate dancers. *The Sport Psychologist*, 28(1), 1-9.
- 628 Dunkley, D. M., Zuroff, D. C., & Blankstein, K. R. (2006). Specific perfectionism
629 components versus self-criticism in predicting maladjustment. *Personality and Individual
630 Differences*, 40(4), 665-676.
- 631 Flett, G. L., & Hewitt, P. L. (2016). Reflections on perfection and the pressure to be perfect in
632 athletes, dancers, and exercisers: A focus on perfectionistic reactivity in key situations and
633 life contexts. In A. P. Hill (Ed.), *The Psychology of Perfectionism in Sport, Dance and
634 Exercise* (pp. 296-319). New York: Routledge.
- 635 Frost, R. O., Marten, P., Lahart, C., & Rosenblate, R. (1990). The dimensions of
636 perfectionism. *Cognitive therapy and research*, 14(5), 449-468.
- 637 Gaudreau, P. (2012). A methodological note on the interactive and main effects of dualistic
638 personality dimensions: An example using the 2×2 model of perfectionism. *Personality
639 and Individual Differences*, 52(1), 26-31.
- 640 Gaudreau, P. (2016). The 2×2 model of perfectionism in sport, dance, and exercise. In A. P.
641 Hill (Ed.), *The psychology of perfectionism in sport, dance and exercise* (pp. 174-200).
642 London:
643 Routledge.
- 644 Gaudreau, P., Franche, V., Kljajic, K., & Martinelli, G. (2018). The 2×2 model of
645 perfectionism:
646 Assumptions, trends, and potential developments. In J. Stoeber (Ed.), *The Psychology of
647 Perfectionism: Theory, Research, Applications* (pp. 44-67). London: Routledge.
- 648 Gaudreau, P., & Thompson, A. (2010). Testing a 2×2 model of dispositional perfectionism.

- 649 *Personality and Individual Differences*, 48(5), 532-537.
- 650 Goodger, K., Gorely, T., Lavallee, D., & Harwood, C. (2007). Burnout in sport: A systematic
651 review. *The Sport Psychologist*, 21, 127-151.
- 652 Gotwals, J. K., & Dunn, J. G. (2009). A multi-method multi-analytic approach to establishing
653 internal construct validity evidence: The Sport Multidimensional Perfectionism Scale
654 2. *Measurement in Physical Education and Exercise Science*, 13(2), 71-92.
- 655 Gotwals, J. K., Dunn, J. G. H., Causgrove Dunn, J., & Gamache, V. (2010).
656 Establishing validity evidence for the Sport Multidimensional Perfectionism Scale-2
657 in intercollegiate sport. *Psychology of Sport and Exercise*, 11, 423-432.
- 658 Graham, J. W., Cumsille, P. E., & Elek-Fisk, E. (2003). Methods for handling missing data.
659 In J. A.
660 Schinka, & W. F. Velicer (Eds.), *Handbook of Psychology* (I. B. Weiner, Editor in Chief):
661 Vol. 2. *Research Methods in Psychology* (pp. 87-114). New York: Wiley.
- 662 Gustafsson, H., DeFreese, J. D., & Madigan, D. J. (2017). Athlete burnout: Review and
663 recommendations. *Current opinion in psychology*, 16, 109-113.
- 664 Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2013). *Multivariate Data Analysis*
665 (7th ed.). NJ: Prentice Hall.
- 666 Hall, H. K., & Hill, A. P. (2012). Perfectionism, dysfunctional achievement striving and
667 burnout in aspiring athletes: The motivational implications for performing artists.
668 *Theatre, Dance and Performance Training*, 3(2), 216-228.
- 669 Hall, H. K., Kerr, A. W., & Matthews, J. (1998). Precompetitive anxiety in sport: The
670 contribution of achievement goals and perfectionism. *Journal of Sport and Exercise*
671 *Psychology*, 20(2),
672 194-217.

- 673 Hamilton, L. H. (1997). *The person behind the mask: A guide to performing arts psychology*.
674 London: Ablex Publishing Corporation.
- 675 Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process*
676 *analysis: A regression-based approach*. New York: Guilford Press.
- 677 Hewitt, P. L., & Flett, G. L. (1991). Perfectionism in the self and social contexts:
678 conceptualization, assessment, and association with psychopathology. *Journal of*
679 *Personality and Social Psychology*, 60(3), 456-470.
- 680 Hill, A. P., Mallinson-Howard, S. H., & Jowett, G. E. (2018). Multidimensional
681 perfectionism in sport: A meta-analytical review. *Sport, Exercise, and Performance*
682 *Psychology*, 7(3), 235-270.
- 683 Hodge, K., Lonsdale, C., & Jackson, S. A. (2009). Athlete engagement in elite sport: An
684 exploratory investigation of antecedents and consequences. *The Sport Psychologist*, 23(2),
685 186-202.
- 686 Jõesaar, H., Hein, V., & Hagger, M. S. (2012). Youth athletes' perception of autonomy
687 support from the coach, peer motivational climate and intrinsic motivation in sport
688 setting: One year effects. *Psychology of Sport and Exercise*, 13(3), 257-262.
- 689 Jowett, G. E., Hill, A. P., Hall, H. K., & Curran, T. (2013). Perfectionism and junior athlete
690 burnout: The mediating role of autonomous and controlled motivation. *Sport,*
691 *Exercise, and Performance Psychology*, 2(1), 48-61.
- 692 Jowett, G. E., Hill, A. P., Hall, H. K., & Curran, T. (2016). Perfectionism, burnout and
693 engagement in youth sport: The mediating role of basic psychological needs. *Psychology of*
694 *Sport and*
695 *Exercise*, 24, 18-26.
- 696 Kline, R. (2011). *Principles and Practice of Structural Equation Modeling* (3rd ed.). New
697 York: The Guilford Press.

- 698 Lonsdale, C., Hodge, K., & Jackson, S. A. (2007). Athlete engagement: II. Development
699 and initial validation of the Athlete Engagement Questionnaire. *International Journal*
700 *of Sport Psychology*, 38(4), 471-492.
- 701 Madigan, D. J., Stoeber, J., & Passfield, L. (2015). Perfectionism and Burnout in Junior
702 Athletes: A Three-Month Longitudinal Study. *Journal of Sport and Exercise*
703 *Psychology*, 37(3), 305-315.
- 704 Martin, J. J., & Malone, L. A. (2013). Elite wheelchair rugby players' mental skills and sport
705 engagement. *Journal of Clinical Sport Psychology*, 7(4), 253-263.
- 706 Nordin-Bates, S. M., Raedeke, T. D., & Madigan, D. J. (2017). Perfectionism, burnout, and
707 motivation in dance: A replication and test of the 2×2 model of perfectionism. *Journal of*
708 *Dance Medicine & Science*, 21(3), 115-122.
- 709 Quested, E., Cumming, J., & Duda, J. L. (2014). Profiles of perfectionism, motivation, and
710 self-evaluations among dancers: An extended analysis of Cumming and Duda
711 (2012). *International Journal of Sport Psychology*, 45(4), 349-368.
- 712 Quested, E., & Duda, J. L. (2010). Exploring the social-environmental determinants of well
713 and ill being in dancers: A test of basic needs theory. *Journal of Sport and Exercise*
714 *Psychology*, 32(1), 39-60.
- 715 Quested, E., & Duda, J. L. (2011). Antecedents of burnout among elite dancers: A
716 longitudinal test of basic needs theory. *Psychology of Sport and Exercise*, 12(2), 159-
717 167.
- 718 Raedeke, T. D. (1997). Is athlete burnout more than just stress? A sport commitment
719 perspective.
720 *Journal of Sport and Exercise Psychology*, 19, 396-417.
- 721 Raedeke, T. D., & Smith, A. L. (2001). Development and preliminary validation of an
722 athlete burnout measure. *Journal of Sport and Exercise Psychology*, 23(4), 281-306.
- 723 Ryan, R. M., & Brown, K. W. (2003). Why we don't need self-esteem: On fundamental

- 724 needs, contingent love, and mindfulness. *Psychological inquiry*, 14(1), 71-76. Ryan, R.
725 M., & Deci, E. L. (2018). *Self-determination theory: Basic psychological needs in*
726 *motivation, development, and wellness*. London, UK: Guilford Press.
- 727 Schaufeli, W. B., & Bakker, A. B. (2004). Job demands, job resources, and their relationship
728 with burnout and engagement: A multi-sample study. *Journal of Organizational*
729 *Behavior*, 25, 293–315. <http://dx.doi.org/10.1002/job.248>
- 730 Stoeber, J. (2014). Perfectionism in sport and dance: A double-edged sword. *International*
731 *Journal of Sport Psychology*, 45(4), 385-394.
- 732 Tabachnick, B. G., & Fidell, L. S. (2013). *Using Multivariate Statistics* (6th ed.). Boston,
733 MA: Pearson.
- 734 Walker, I. J., Nordin-Bates, S. M., & Redding, E. (2012). A mixed methods investigation of
735 dropout among talented young dancers: findings from the UK Centres for Advanced
736 Training. *Journal of Dance Medicine & Science*, 16(2), 65-73.

1 Footnotes

2 ¹See 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
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. $*p < .05$, $**p < .01$, $***p < .001$

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 2×2 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