

The 2x2 model of Perfectionism and Exercise Dependence

Deck, Sarah; Roberts, Ross; Hall, Craig

Personality and Individual Differences

Published: 01/10/2021

Peer reviewed version

Cyswllt i'r cyhoeddiad / Link to publication

Dyfyniad o'r fersiwn a gyhoeddwyd / Citation for published version (APA): Deck, S., Roberts, R., & Hall, C. (2021). The 2×2 model of Perfectionism and Exercise Dependence. Personality and Individual Differences, 180, Article 111001.

Hawliau Cyffredinol / General rights Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

· Users may download and print one copy of any publication from the public portal for the purpose of private study or research.

- You may not further distribute the material or use it for any profit-making activity or commercial gain
 You may freely distribute the URL identifying the publication in the public portal ?

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

4 The 2×2 model of Perfectionism and Exercise Dependence

- 5 Abstract 6 We examined the influence of perfectionism on exercise dependence using the 2×2 model of 7 perfectionism. This model posits that interactions between different forms of perfectionism; self-8 oriented (SOP) and socially prescribed perfectionism (SPP) conduce to different outcomes. 9 Three hundred and seventy-six college students completed an online survey measuring exercise 10 behaviour, dependence and perfectionism. When accounting for participant gender, we failed to 11 find significant interactions between subtypes of perfectionism and exercise dependence. In 12 contrast to our hypotheses and the tenets of the model, the highest levels of exercise dependence were mostly associated with high levels of SOP, as well as high levels of both SOP and SPP. 13 14 This study adds to previous work that has questioned the tenets of the model as they apply to exercise. However, our results still highlight the importance of examining within-person 15 16 combinations of perfectionism. 17 Keywords: Perfectionism, Exercise Dependence, 2×2 Model, Gender, Exercise
- 18

The 2×2 model of Perfectionism and Exercise Dependence

20 Exercise has numerous benefits for physical and psychological heath (CDC, 2020). 21 However, exercise can become problematic when individuals become reliant on it. This state is 22 often referred to as exercise dependence (ED; Hausenblas & Downs, 2002b). When this happens, 23 exercise predicts a number of detrimental physical and psychological outcomes such as burnout 24 and injury (see Hausenblas & Downs, 2002b). In recent years, researchers have begun to explore antecedents of ED, in order to understand the factors that contribute to exercise becoming 25 problematic (Gotwals et al., 2012; Hall et al., 2007). One relevant factor here is perfectionism 26 27 (Flett & Hewitt, 2005). In the past, two types of perfectionism, self-oriented perfectionism (SOP) 28 and socially prescribed perfectionism (SPP), have been studied separately, and have been shown 29 to be associated with various maladaptive exercise behaviors (Hall et al., 2009; Hausenblas & 30 Downs, 2002b). Those higher in either SOP or SPP are more likely to have high rates of ED, as 31 concerns over mistakes and high personal standards can both contribute to demonstrating 32 incompetence and reduce control over achievement (i.e., body image), thus increasing the need 33 to exercise (Hall et al., 2009; Hausenblas & Downs, 2002b; Miller & Mesagno, 2014). More 34 recently, researchers have begun to study these dimensions of perfectionism in combination 35 (Gaudreau, 2013), to understand the influence of different within-person combinations on 36 various outcomes, most notably under the guise of the 2×2 model of perfectionism (MOP; 37 Gaudreau & Thompson, 2010). 38 The 2×2 MOP is based on the premise that SOP and SPP co-exist in individuals

38 The 2×2 MOP is based on the premise that SOP and SPP co-exist in individuals
39 (Gaudreau & Thompson, 2010), and that different within person combinations will conduce to
40 different outcomes. The model posits four subtypes of perfectionism that include Pure SPP (high
41 levels of SPP and low levels of SOP), Pure SOP (high levels of SOP and low levels of SPP),

42 mixed perfectionism (high levels of both SPP and SOP) and non-perfectionism (low levels of 43 both SPP and SOP). Individuals characterized as Pure SPP strive for perfection mainly due to others exerting pressure, whereas those characterized as Pure SOP hold high standards deriving 44 45 from the self and not others. Mixed perfectionists perceive pressure from others and their own 46 personal standards, while non-perfectionists do not perceive either (Gaudreau & Thompson, 47 2010). The model has four theoretically driven hypotheses: H1a) pure SOP is associated with 48 either better, or H1b) poorer, or H1c) comparable outcomes than non-perfectionism; H2), pure SPP is associated with the most detrimental outcomes compared to all other subtypes; H3) mixed 49 50 perfectionism is associated better outcomes than pure SPP; and H4) poorer outcomes than pure 51 SOP.

52 The model has been tested extensively within the sport literature (see Gaudreau, 2016; 53 Hill & Madigan, 2017). This work has demonstrated that Pure SPP is the most detrimental 54 within-person combination of perfectionism (H2; Gaudreau & Verner-Filion, 2012) as it is associated with athlete burnout (Hill, 2013), lower self-esteem (Gotwals et al., 2003), and 55 56 negative affect (Sagar & Stoeber, 2009). Mixed perfectionism has also been shown to predict 57 detrimental outcomes. (Gaudreau, 2016; Hill & Madigan, 2017). In contrast, the effects of Pure 58 SOP are more inconclusive in its relationship to different aspects in the sport domain (Hill & 59 Madigan, 2017). Pure SOP predicts adaptive or positive factors (i.e., positive affect and goal 60 progress; Crocker et al., 2014), but is also associated with exhaustion in dancers (Nordin-Bates et 61 al., 2017). These findings have provided support for understanding the differences in sport experiences for the different within person combinations of perfectionism (Mallinson-Howard et 62 63 al., 2018).

64 Within the exercise domain, limited examinations of the model have been completed. To date only two studies have tested the model in exercise (Deck et al., 2019; 2020). One study 65 investigated the model in relation to enjoyment and boredom in exercise and found a significant 66 67 interaction between SOP and SPP for boredom, but not for enjoyment (Deck et al., 2019). Contrary to the predictions of the model, Pure SOP (and not Pure SPP) was the strongest 68 predictor of boredom. A second study investigated the tenets of the model in relation to social 69 70 physique anxiety (SPA). Significant interactions between SOP and SPP were evident but again 71 these were not in the models' predicted directions (Deck et al., 2020) as the highest levels of 72 SPA were found for those who were characterized as Pure SOP. On the basis of these studies 73 Deck et al. (2019; 2020) tentatively suggested that the model may be better suited for 74 achievement domains, such as academics and sport as opposed to exercise (where the emphasis 75 on achievement is less). However, there are some aspects of exercise that are more akin to achievement settings. Indeed, evidence suggests that ED is more of an achievement situation 76 77 than regular exercise (Hall et al., 2007; Lichtenstein et al., 2014) due to some of the antecedents 78 of ED manifesting from goals and wanting control over the body (Cashmore, 2008).

79 ED is characterized by a craving for leisure time exercise activity that can result in a 80 pattern of exercise behavior that is determinantal (Hausenblas & Downs, 2002b). Symptoms 81 include consistent continuance of exercise, a tolerance for exercise that leads to increased amounts of exercise, lack of control when trying to reduce or discontinue exercise, increased 82 83 time spent in activities, and having intention effects where more exercise is done than intended 84 (Hausenblas & Downs, 2002b). ED has been positively associated with, and also shown to be an 85 outcome of perfectionistic traits (Hall et al., 2009; Hill et al., 2015; Miller & Mesagno, 2014). 86 Despite the perfectionism-dependence relationship being established, it is unclear if the various

within-person combinations will predict ED differently. Understanding the influence of withinperson combinations of perfectionism has important implications for practitioners who may need
to intervene to change exercise dependent behaviors and their associated outcomes. Moreover,
while the 2×2 MOP has produced inconsistent results within the exercise domain (Deck et al.,
2019; 2020), findings for perfectionism and ED may be more similar to findings from the sport
literature. The achievement aspects of ED may shed light on why previous predictions in
exercise were not supported.

94 Given the previously established relationship between perfectionism and ED (Hagan & 95 Hausenblas, 2013; Hill, 2013), in addition to the achievement aspects of ED (Hall et al., 2007; 96 Lichtenstein et al., 2014), we chose in the present research to examine the within person 97 combinations of perfectionism as proposed in the 2×2 MOP and their relationships with ED. As 98 ED has been associated with many negative consequences (Hausenblas & Downs, 2002b), our 99 hypotheses were based on ED being maladaptive in nature. We hypothesized that pure SOP 100 compared to non-perfectionism would be associated to either better (lower ED; H1a), or poorer 101 (higher ED; H1B) or comparable outcomes (H1c). Further, we hypothesized that pure SPP would 102 be associated with higher ED compared to all other subtypes (H2), and that mixed perfectionism 103 would be associated with lower ED than pure SPP (H3) and higher ED than pure SOP (H4). 104 Method

105 **Participants & Procedure**

Following ethics approval, we recruited participants from two second-year undergraduate university classes. Participants completed an online survey, that took ~25 minutes to complete. All participants received a letter of invitation and gave informed consent before proceeding to data collection. Three hundred and seventy-six participants (65% female) took part (*Mage* = 20, 110 SD = 1.4, range 18-26). The majority of the participants were Caucasian (69%), while the

111 remaining participants reported being, Aboriginal (1%), Asian (15%) and other (15%).

112 Measures

113 The Godin Leisure Time Exercise Ouestionnaire (GLETO; Godin & Sheppard, 1985). 114 The GLETQ is a self-report measure of leisure-time exercise habits based on a typical 7-day week. Respondents are asked to indicate the number of times per week they engage in strenuous 115 116 (i.e., running, hockey), moderate (i.e., fast walking, tennis), and mild exercise (i.e., yoga, 117 bowling) at 15-minute intervals. Exercise scores are calculated by multiplying the number of 118 times participants indicated participating in an activity by 15. Weekly exercise minutes are then 119 calculated by adding the number of minutes for mild, moderate and strenuous activity. The 120 GLETQ is considered a valid and reliable instrument for classifying individuals by their exercise 121 behavior (i.e., active or not; see Amireault & Godin, 2015). We included intensity of exercise as 122 a covariate as it has previously shown some influence on both perfectionism and exercise 123 behavior (Hibbard & Walton, 2014; Shanmugam & Davies, 2015). 124 The Multidimensional Perfectionism Scale (MPS; Hewitt & Flett, 1989). The scale comprises three subscales that measure perfectionism. The subscales used in the current study 125 126 were self-oriented perfectionism (SOP), and socially prescribed perfectionism (SPP). 127 Participants rated 30 items (15 per scale) on a 7-point Likert scale, from 1 (agree) to 7 (disagree). Each item from each subscale was added to create a total score for each type of 128 129 perfectionism. Hewitt et al. (1991) have demonstrated adequate reliability and validity for all 130 subscales of the MPS.

Exercise Dependence Scale (EDS; Hausenblas & Downs, 2002a). Participants were asked to
 respond to 21 items (seven subscales with three items each) of ED; withdrawal effects, tolerance,

133 continuance, lack of control, reduction in other activities, time, and intention effects) that ask

134 how each item reflects their current exercise beliefs and behaviors. Items are rated on a 5-point

Likert scale from (1) *Never* to (5) *Always*. An overall total score of all 30 items was used to

136 create an ED total score. Totals of each subscale were also calculated. For reliability, validity and

137 psychometric properties, see Downs et al. (2004).

138 Data Analysis

We screened data for missing values and four cases were deleted due to incomplete data (i.e., missing an entire subscale). The remaining missing values in the data set were determined to be missing at random, thus we replaced these using an expectation maximization algorithm (EM; Tabachnick & Fidell, 2001). Coefficient alphas for all scales of each instrument were

satisfactory; all subscales were >.70.

Based on previous work (Gaudreau, 2012) we tested the predictions of the 2×2 model using moderated hierarchical regression. First, we performed a regression analyses using total ED scores. Next, to examine the differences amongst the various aspects of ED, we conducted regression analyses for each individual subscale of the EDS. We entered gender and exercise intensity as covariates. Gender was found to be significant and kept for each of the models. Exercise intensity was not significant, and was removed.

No interactive effects were found for total ED for any of the ED subscales. Support for the 2x2 MOP can be obtained in the absence of interactive effects by utilizing Gaudreau's (2012) analytical approach. When interactions are not present Gaudreau (2012) recommends running multiple regression analyses with unstandardized values and the interaction term removed and then plotting predicted values as follows:

155 (1) \ddot{Y} of Non-perfectionism = Intercept + (B_{SOP} * low SOP) + (B_{SPP} * low SPP).

- 156 (2) \ddot{Y} of pure SOP = Intercept + (B_{SOP} * High SOP) + (B_{SPP} * low SPP).
- 157 (3) \ddot{Y} of pure SPP = Intercept + (B_{SOP} * Low SOP) + (B_{SPP} * High SPP).
- 158 (4) \ddot{Y} of mixed perfectionism = Intercept + (B_{SOP} * High SOP) + (B_{SPP} * High SPP).
- 159

Results

160 Descriptive Analysis

- 161 Of the participants, 62% indicated during a typical week that they exercised often,
- 162 engaging in mild exercise for more than 15 minutes an average of 6 times (SD = 3.8) or 90
- 163 minutes, moderate exercise 5 times (SD = 3.3) or 75 minutes, and vigorous exercise on average
- 164 3.7 times per week (SD = 2.17) or 55.5 minutes. Participants indicated taking part in a number
- 165 of different exercise activities, at various levels, including but not limited to, running, walking,
- 166 yoga, intramural sports, dance, soccer, rugby, and group fitness classes. Both SOP (M = 67.6)
- 167 and SPP (M = 62.05) were positively correlated with total exercise dependence (M = 61.20); (r

168 (374) = .255, p = .0001) and (r (374) = .174, p = .0001), respectively.

169 Main Analysis

Total Exercise Dependence. Gender had a significant influence on dependence (B = 1.14, β = .38, t = 3.01, p = 0.004) with males reporting higher levels of ED than females. SOP was a significant positive predictor of total ED (B = 3.82, β = .21, t = .95, p = 0.00). SPP was not significant (B = 1.17, β = .94, t = 1.25, p = .22). Based on Gaudreau's (2012) guidelines the predicted values for total ED based are shown in Figure 1. Mixed perfectionism was associated with the highest levels of ED, followed by Pure SOP. Pure SPP and non-perfectionism were associated with lower ED levels.

177 **Figure 1**

178 Total Exercise Dependence







4.1015, p = 0.00) with females reporting higher levels than males. SPP was a significant positive

182 predictor of exercise withdrawal (B = .55, β = .22, t = 2.45, p = 0.02). whilst SOP was not a

183 significant predictor (B = .26, β = .23, t = 1.13, p = 0.26). As with total ED, mixed perfectionism

- 184 was associated with the highest levels of withdrawal (see Figure 2).
- 185 **Figure 2**



186 Exercise Dependence Withdrawal Effects

- *Continuance.* Gender did not have an effect (B = .6146, $\beta = .4353$, t = 1.4118, p = .16). 188
- 189 SOP was a significant predictor of exercise continuance (B = .51, $\beta = .24$, t = 2.14, p = 0.03),
- 190 while the effect of SPP approached significance (B = .45, β = .24, t = 1.91, p = .06). See Figure 3
- 191 for predicted values of each within-person combination of perfectionism.
- 192 Figure 3



193 *Exercise Dependence Continuance*

197 reporting higher levels of tolerance than females. SOP was a significant predictor of exercise



- 199 = 0.15). See Figure 4 for the predicted values.
- 200 Figure 4 – Exercise Dependence Tolerance



202 0.06) with males reporting a greater lack of control than females. Neither SOP (B = .335, β = .19, t = 1.77, p = 0.07) or SPP (B = .28, β = .20, t = 1.47, p = 0.14) were significant predictors of

this subscale.

206 **Reduction in Other Activities.** Gender had significant effect (B = .5844, β = .2626, t =

207 2.225, p = 0.03) with males reporting higher levels than females. Both SOP (B = .37, β = .14, t =

208 2.55, p = 0.01) and SPP (B = .29, β = .14, t = 2.01, p = 0.04) were significant predictors of

209 exercise reduction in other activities. See Figure 5 for predicted values. Consistent with our other

- 210 findings, the highest levels of reduction were associated with mixed perfectionism, followed by
- 211 Pure SOP
- 212 **Figure 5**
- 213 Exercise Dependence Reduction in Activities





223 Exercise Dependence Time





- 226 2.584, p = 0.01) with males reporting higher levels than females. SOP was a significant predictor
- of exercise intention effects (B = ..61, β = .20, t = 3.04, p = 0.00), while SPP was not (B = .30, β 227
- = .20, t = 1.54, p = 0.12).. See Figure 7 for the predicted values. 228
- 229 Figure 7



Exercise Dependence Intention Effects 230

The 2×2 MOP proposes four within-person combinations of dispositional perfectionism, and using this theoretical model, the purpose of this study was to examine the interactive effects of SOP and SPP on ED. As with the previous exercise studies conducted with the model, our findings supported the value of considering within person combinations of perfectionism. However, we failed to find interactions between SOP and SPP on EDs, and the precise nature of the findings do lead to questions regarding some of the theoretical hypotheses of the model as they pertain to exercise.

241 Given that previous research has shown that perfectionism may be a precursor to ED 242 (Hagan & Hausenblas, 2003), and based on the 2×2 MOP, we hypothesized that Pure SPP would 243 be the most detrimental within-person combination of perfectionism and would be positively 244 associated with ED (H2). Contrary to this hypothesis, we found SPP to be associated with lower 245 levels of ED (both at a general and subscale level), particularly in comparison to mixed 246 perfectionism and SOP, although SPP led to higher feelings of withdrawal than non-247 perfectionism. In addition, the higher levels of mixed perfectionism in comparison to Pure SPP 248 are contrary to H3. For some aspects of ED (total ED, withdrawal, continuance, reduction in 249 activities, and intention effects) mixed perfectionism led to higher levels than Pure 250 SOP(supporting H4), yet in contrast to H4 mixed perfectionism was similar to (and indeed 251 slightly lower) than Pure SOP for tolerance and time.

252 Somewhat similar to these findings, Deck et al. (2020) found mixed perfectionism 253 predicted the highest levels of SPA. It may be that, in exercise domains, the combination of both 254 types of perfectionism (pressure from oneself combined with pressure from others), leads to 255 more problematic outcomes, such as ED and SPA. This point is in accord with suggestions by 256 Hausenblas and Downs (2002b) that individuals at risk for ED are more likely to have a

257	combination of both SOP and SPP. Similarly, within academic settings, some studies have also
258	shown higher levels of mixed perfectionism for maladaptive behaviors such as anxiety (Vincent
259	et al., 2019). Vincent et al. (2019) suggest that certain outcomes associated with mixed
260	perfectionism may be caused by the influence of slightly higher levels of one type of
261	perfectionism (either Pure SOP or Pure SPP) and not the other. Indeed, previous work in the
262	exercise domain (Hill et al., 2018) suggests that SOP is problematic in this setting. Thus, in our
263	case, it may be that the high levels of SOP (which did have higher mean scores and a stronger
264	correlation with ED) had greater influence on the (maladaptive) outcomes of mixed
265	perfectionism. Further work disentangling these issues is warranted.
266	Deck et al. (2019; 2020) have suggested that the 2×2 MOP may be most relevant in high
267	achievement/goal-oriented settings. One reason we chose to investigate ED in the present study
268	was because research suggests that ED is more reflective of an achievement situation than
269	regular exercise (Hall et al., 2007; Lichtenstein et al., 2014). Nevertheless, the different within-
270	person combinations of SOP and SPP still failed to elicit the outcomes proposed by the model.
271	The hypotheses of the model have been strongly supported in achievement settings where an
272	emphasis is placed on social comparison processes and/or on surpassing others (e.g., sport).
273	While ED may be more achievement oriented than regular exercise, it still may not have the
274	sufficient properties necessary to fully support all the model's hypotheses.
275	In our study we also considered gender and intensity as possible covariates. Gender, but
276	not intensity, was found to be significant in all models, except for the continuance subscale
277	(referring to one continuing exercise despite a physical or psychological problem that is
278	aggravated by exercise). Similar to previous work (Weik & Hale, 2009), males had higher levels
279	of ED than females. Males also had higher levels on all subscales than females except for

withdrawal. It may be that men view exercise as more competitive or achievement oriented than
females, or that subscale items may be understood or interpreted differently by males and
females (Weik & Hale, 2009). Future research may wish to examine the reasons for gender

283 differences in ED

284 Another variable of interest to consider in future research is motivation for exercise. It is well established that exercise motivation influences exercise behavior (Box et al., 2019; Lewis & 285 286 Sutton, 2011), and previous work has found significant associations between personality and 287 exercise motivations (Lewis & Sutton, 2011). Indeed, in regard to perfectionism, Costa et 288 al.(2016) found that psychological needs thwarting, mediated the relationship between 289 perfectionistic concerns and ED. Using this work as a foundation, exploring the role of 290 motivation in relation to perfectionism and ED from the perspective of the 2×2 model would be 291 worthwhile. Recently, motivational messages to increase exercise behavior have been shown to 292 be successful when tailored to personality (de Vries et al., 2017), therefore we encourage future 293 researchers to consider motivation as a factor that may affect the relationship between 294 personality and exercise behavior.

295 Our study is strengthened by a large sample size, although we acknowledge that we used 296 a convenience sample. A more purposeful (pre-screened for ED) sample of exercisers should be 297 investigated in the future. The work is also limited by the cross-sectional design, and reliance on 298 self-assessment of physical activity engagement by participants. Researchers should consider 299 using objective measures of exercise to capture exercise behavior, as well as a repeated measures 300 design to capture a complete representation of perfectionism and behavior. Future work of this 301 manner will help further the understanding of how the different within-person combinations of 302 perfectionism may be associated with different outcomes in exercise settings.

303	The results of the present study contribute to the critical testing and extension (Valentine
304	et al., 2011) of the 2×2 MOP, and the notion that the model may not be as well suited for the
305	exercise domain, even in situations with some form of more achievement orientation (e.g., ED).
306	Nevertheless, our study results do support the use of the model more broadly and the importance
307	of considering different within-person combinations of perfectionism and their relationship to
308	different behaviors. We believe researchers should continue to explore the model within the
309	exercise domain, in order to understand how the different combinations of perfectionism may
310	influence positive exercise behaviors as this is useful for health care providers when prescribing
311	exercise or intervening to prevent exercise dependent behaviours.

312	References
313	Box, A. G., Feito, Y., Brown, C., & Petruzzello, S. J. (2019). Individual differences influence
314	exercise behavior: how personality, motivation, and behavioral regulation vary among
315	exercise mode preferences. Heliyon, 5(4), e01459.
316	Cashmore, E. (2008). Sport and exercise psychology: The key concepts. Routledge.
317	Centers for Disease Control and Prevention (CDC, 2020). Physical Activity: Benefits of Physical
318	Activity. https://www.cdc.gov/physicalactivity/basics/pa-health/index.htm
319	Costa, S., Coppolino, P., & Oliva, P. (2016). Exercise dependence and maladaptive
320	perfectionism: The mediating role of basic psychological needs. International Journal of
321	Mental Health and Addiction, 14(3), 241-256.
322	Crocker, P. R., Gaudreau, P., Mosewich, A. D., & Kljajic, K. (2014). Perfectionism and the
323	stress process in intercollegiate athletes: Examining the 2×2 model of perfectionism in
324	sport competition. International Journal of Sport Psychology, 45(4), 325-348.
325	de Vries, R. A., Truong, K. P., Zaga, C., Li, J., & Evers, V. (2017). A word of advice: how to
326	tailor motivational text messages based on behavior change theory to personality and
327	gender. Personal and Ubiquitous Computing, 21(4), 675-687.
328	https://doi.org/10.1007/s00779-017-1025-1
329	Downs, D. S., Hausenblas, H. A., & Nigg, C. R. (2004). Factorial validity and psychometric
330	examination of the Exercise Dependence Scale-Revised. Measurement in physical
331	education and exercise science, 8(4), 183-201.
332	https://doi.org/10.1207/s15327841mpee0804_1
333	Flett, G. L., & Hewitt, P. L. (2005). The perils of perfectionism in sports and exercise. Current

- directions in psychological science, 14(1), 14-18. https://doi.org/10.1111/j.0963-
- 335 7214.2005.00326.x
- Gaudreau, P., Louvet, B., & Kljajic, K. (2019). The performance trajectory of physical education
 students differs across subtypes of perfectionism: A piecewise growth curve model of the
- 338 2×2 model of perfectionism. Sport, Exercise, and Performance Psychology, 8(2), 223.
- 339 Gaudreau, P. (2016). The 2x2 model of perfectionism in sport, dance, and exercise. In A. P.
- 340 Hill (Ed.), *The Psychology of Perfectionism in Sport, Dance and Exercise* (pp. 174-200).
- 341 London: Routledge.
- 342 Gaudreau, P. (2012) A methodological note on the interactive and main effects of dualistic
- personality dimensions: An example using the 2x2 model of perfection. *Personality and Individual Differences*, 52, 26-31. doi: 10.1016/j.paid.2012.04.029
- 345 Gaudreau, P., & Verner-Filion, J. (2012). Dispositional Perfectionism and Well-Being: A Test of
- 346 the 2 x 2 Model of Perfectionism in the Sport Domain. Sport, Exercise, and Performance
- 347 *Psychology*, *1*(*1*), 29. https://doi.org/10.1037/a0025747
- 348 Gaudreau, P., & Thompson, A. (2010). Testing a 2×2 model of dispositional
- 349 perfectionism. *Personality and Individual Differences*, 48(5), 532-537.
- 350 https://doi.org/10.1016/j.paid.2009.11.031
- Godin, G., & Shephard, R.J. (1985). A simple method to assess exercise behaviour in the
 community. *Canadian Journal of Applied Sport Sciences*, *10*, 141-146.
- 353 Gotwals, J. K., Dunn, J. G., & Wayment, H. A. (2003). Self-Esteem in Intercollegiate
- 354 Athletes. *Journal of Sport Behavior*, 26(1).
- 355 Gotwals, J. K., Stoeber, J., Dunn, J. G., & Stoll, O. (2012). Are perfectionistic strivings in sport

- adaptive? A systematic review of confirmatory, contradictory, and mixed
- 357 evidence. *Canadian Psychology/Psychologie canadienne*, *53*(4), 263.
- Hagan, A. L., & Hausenblas, H. A. (2003). The relationship between exercise dependence
 symptoms and perfectionism. *American Journal of Health Studies*, *18*, 133. ISSN:
- 360 1090-0500
- Hausenblas, H. A., & Downs, D. S. (2002a). How much is too much? The development and
 validation of the exercise dependence scale. *Psychology and Health*, *17*(4), 387-404.
 https://doi.org/10.1080/0887044022000004894
- Hausenblas, H. A., & Downs, D. S. (2002b). Exercise dependence: A systematic
- 365 review. *Psychology of Sport and Exercise*, *3*(2), 89-123.
- 366 https://doi.org/10.1016/S1469-0292(00)00015-7
- 367 Hall, H. K., Hill, A. P., Appleton, P. R., & Kozub, S. A. (2009). The mediating influence of
- 368 unconditional self-acceptance and labile self-esteem on the relationship between
- 369 multidimensional perfectionism and exercise dependence. *Psychology of Sport and*

370 *Exercise*, *10*(1), 35-44. https://doi.org/10.1016/j.psychsport.2008.05.003

- Hall, H. K., Kerr, A. W., Kozub, S. A., & Finnie, S. B. (2007). Motivational antecedents of
- 372 obligatory exercise: The influence of achievement goals and multidimensional
- 373 perfectionism. *Psychology of Sport and Exercise*, 8(3), 297-316.
- 374 https://doi.org/10.1016/j.psychsport.2006.04.007
- Hewitt, P. L, & Flett, G. L. (1989). The Multidimensional Perfectionism Scale: Development and
 validation. *Canadian Psychology*, *30*, 339
- Hewitt, P. L., Flett, G. L., Turnbull-Donovan, W., & Mikail, S. F. (1991). The

- 378 Multidimensional Perfectionism Scale: Reliability, validity, and psychometric properties
- in psychiatric samples. Psychological Assessment: A Journal of Consulting and Clinical
 Psychology, 3(3), 464. https://doi.org/10.1037/1040-3590.3.3.464
- 381 Hibbard, D. R., & Walton, G. E. (2014). Exploring the development of perfectionism: The
- influence of parenting style and gender. *Social Behavior and Personality: an international journal*, 42(2), 269-278. https://doi.org/10.2224/sbp.2014.42.2.269
- Hill, A. P. (2013). Perfectionism and burnout in junior soccer players: A test of the 2×2 model
- of dispositional perfectionism. *Journal of Sport and Exercise Psychology*, 35I(1), 18-29.
 http://doi.org/10.1123/jsep.35.1.18
- Hill, A., Robson, S., & Stamp, G. (2015). The predictive ability of perfectionistic traits and self
 presentational styles in relation to exercise dependence. *Personality and Individual Differences*, 86, 176–183. https://doi.org/10.1016/j.paid.2015.06.015
- Hill, A. P., & Madigan, D. J. (2017). A short review of perfectionism in sport, dance and
- exercise: out with the old, in with the 2 x 2. *Current Opinion in Psychology*, *16*, 72-77.
 doi: 10.1016/j.copsyc.2017.04.021
- 393 Lewis, M., & Sutton, A. (2011). Understanding Exercise Behaviour: Examining the Interaction
- 394 of Exercise Motivation and Personality in Predicting Exercise Frequency. *Journal of*
- 395 Sport Behavior, 34(1). https://www.lib.uwo.ca/cgi-
- 396 bin/ezpauthn.cgi?url=http://search.proquest.com/scholarly-journals/understanding-
- 397 exercise-behaviour-examining/docview/853642879/se-2?accountid=15115
- 398 Lichtenstein, M. B., Christiansen, E., Elklit, A., Bilenberg, N., & Støving, R. K. (2014). Exercise

- addiction: a study of eating disorder symptoms, quality of life, personality traits and
- 400 attachment styles. *Psychiatry research*, 215(2), 410-416.
- 401 DOI: 10.1016/j.psychres.2013.11.010
- 402 Miller, K. J., & Mesagno, C. (2014). Personality traits and exercise dependence: Exploring the
- 403 role of narcissism and perfectionism. *International Journal of Sport and Exercise*

404 *Psychology*, *12*(4), 368-381. DOI: 10.1080/1612197X.2014.932821

- 405 Nordin-Bates, S. M., Raedeke, T. D., & Madigan, D. J. (2017). Perfectionism, burnout, and
- 406 motivation in dance: A replication and test of the 2×2 model of perfectionism. *Journal of*
- 407 *Dance Medicine & Science*, 21(3), 115-122. https://doi.org/10.12678/1089-
- 408 313X.21.3.115
- Sagar, S. S., & Stoeber, J. (2009). Perfectionism, fear of failure, and affective responses to
 success and failure: The central role of fear of experiencing shame and

411 embarrassment. *Journal of Sport and Exercise Psychology*, *31*(5), 602-627.

- 412 Shanmugam, V., & Davies, B. (2015). Clinical perfectionism and eating psychopathology in
- 413 athletes: The role of gender. *Personality and individual differences*, 74, 99-105.
- 414 https://doi.org/10.1016/j.paid.2014.09.047
- 415 Tabachnick, B., & Fidell, L. (2001). Using Multivariate Statistics (5th ed.). Boston, MA:
 416 Pearson/Allyn & Bacon.
- 417 Vicent, M., Gonzálvez, C., Sanmartín, R., Fernández-Sogorb, A., Cargua-García, N. I., &
- 418 García-Fernández, J. M. (2019). Perfectionism and school anxiety: More evidence about
- 419 the 2×2 model of perfectionism in an Ecuadorian population. *School Psychology*
- 420 *International*, 40(5), 474-492.

421

- 422 Weik, M., & Hale, B. D. (2009). Contrasting gender differences on two measures of exercise
- 423 dependence. British Journal of Sports Medicine, 43(3), 204-207.