A comprehensive model of disordered eating among aesthetic athletic girls: Exploring the role of body image-related cognitive fusion and perfectionistic self- presentation

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Abstract

The incidence of disordered eating among athlete populations is considerably higher than in the general population. Less well understood is the body image-related emotional processes that might lead to disordered eating attitudes and behaviours, specifically among aesthetic athletic girls. Thus, the aim of the present study was to explore the role that body image-related cognitive fusion plays in disordered eating, and the mediating role of body image-related perfectionist self-presentation on this relationship, in aesthetic athletic girls. This study comprised 142 young female athletes from aesthetic sports, who completed self-report measures. A path analysis was conducted to explore the proposed theoretical model, while controlling for age and zBMI. The path model revealed an excellent fit and explained 71% of the severity of disordered eating. Results showed that body image-related cognitive fusion influences disordered eating behaviours, through the mechanism of body image-related perfectionist self-presentation, even when controlling for age and zBMI. Findings suggested that, in aesthetic athletic girls, the entanglement in body image-related thoughts may be associated with the need to present a perfect body image to others, which may lead to disordered eating attitudes and behaviours, adopted as a means to control weight and body shape. The present study highlights the relevance of body image-related processes in disordered eating and suggests the importance of educational programmes that target the development of more adaptive emotion regulation strategies concerning body image in athletes, particularly from aesthetic sports.

Introduction

Sports participation is widely recognized as a health promotion strategy (World Health Organization, 2011), due to its association with physical, psychological, and emotional well-being (Bartholomew, Morrison, & Ciccolo, 2005; Lee, Pope, & Gao, 2018; Vella, Gardner, Kemp, Schweickle, & Cliff, 2019). Nonetheless, some studies have suggested that athletes are at higher risk of presenting eating disorder symptoms, when compared to non-athletes (Giel et al., 2016; Krentz & Warschburger, 2013). Even in subclinical forms, these types of difficulties are characterized by a significant level of physical, psychological, and social impairment (Petrie & Greenleaf, 2007). Several studies suggest that some conditions associated with sport context might put athletes, especially female athletes, at risk for the development of disordered eating attitudes and/or behaviours (Kerr, Berman, & Souza, 2006).

For athletes, the body is the vehicle to perform and to achieve in sports (Byrne & McLean, 2002). Especially in sports that emphasize leanness and weight, body image has a crucial role in achievement, which might put significant pressure on athletes concerning their body, weight and eating behaviours (Byrne & McLean, 2002). In the case of aesthetic sports, physical appearance is especially viewed as having an impact on performance (Sundgot-Borgen et al., 2013;

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Thomas, Keel, & Heatherton, 2005). In aesthetic modalities (such as gymnastics, artistic skating, classic ballet, and dance), athletes tend to believe that "thin is going to win" (De Bruin, Oudejans, & Bakker, 2007). Particularly in adolescence, this mindset seems to be associated with body image-related difficulties and with the adoption of unhealthy weight control strategies (Currie, 2010; Kong & Harris, 2015). Indeed, adolescence is marked by a certain vulnerability to emotional difficulties, which is related to the physical, physiological, psychological, and social changes that characterize this developmental period (Robins, Trzesniewski, Tracy, Gosling, & Potter, 2002). For these reasons, there has been an increased interest concerning the body and eating attitudes in young athletes, especially aesthetic athletes.

Several studies have shown that aesthetic athletic girls tend to report high levels of disordered eating (Sundgot-Borgen et al., 2013; Tiggemann, Gardiner, & Slater, 2000; Voelker & Reel, 2018). Duffy (2008) suggested that competitive gymnastic girls may engage in disordered eating behaviours in order to change their physical appearance and to appear physically perfect to others.

Perfectionist self-presentation is defined by Hewitt, Flett, and Ediger (1995) as a maladaptive self-presentational style that reflects the need to appear perfect to others. There is now a consistent body of evidence that associates perfectionistic self-presentation with body image dissatisfaction and pathological dieting (Cockell et al., 2002; Hewitt et al., 1995; McGee, Hewitt, Sherry, Parkin, & Flett, 2005). Nevertheless, empirical studies that examine the relationship between perfectionist self-presentation and disordered eating in female aesthetic athletes, have provided inconsistent results (Duffy, 2008; Heller, 2013).

Since body image is an important issue in sports, especially in aesthetic sports, the need to present a perfect physical appearance seems to be particularly relevant in this context. According to Ferreira, Marta-Simões, and Trindade (2016), body image-related perfectionist self-presentation (defined as the need to present a perfect physical appearance to others) is positively linked with depressive symptomatology (Marta-Simões & Ferreira, 2016) and with disordered eating (Ferreira et al., 2016; Ferreira, Duarte, Pinto-Gouveia, & Lopes, 2018a, Ferreira, Mendes, & Trindade, 2018b; Ferreira, Ornelas, & Trindade, 2015a, Ferreira, Trindade, Duarte, & Pinto-Gouveia, 2015b). Nevertheless, body image-related perfectionist self-presentation remains unexplored in aesthetic athletes.

Eating psychopathology has been considered an illness of psychological inflexibility (Merwin et al., 2010), intrinsically linked to cognitive fusion (Ferreira, Palmeira, & Trindade, 2014; Hayes & Gifford, 1997). Cognitive fusion is an emotional process that refers to an excessive attachment to the content of one's thoughts, which are

perceived as facts, rather than subjective and transitory interpretations of reality (Gillanders et al., 2014). This emotional process may occur in relation to a specific domain, like body image (Ferreira, Ornelas, & Trindade, 2015a; Ferreira, Trindade, et al., 2015b). When this happens, individuals tend to get entangled with disturbing body image-related inner events, assuming them as unquestionable facts, instead of experiencing them as subjective and transitory events (Trindade & Ferreira, 2015). Research has shown that body image-related cognitive fusion is strongly associated with disordered eating and seems to be a good predictor of eating disorders (Ferreira et al., 2014; Melo, Oliveira, & Ferreira, 2019; Scardera, Sacco, Di Sante, & Booij, 2020; Trindade & Ferreira, 2014; Trindade & Ferreira, 2015;). In fact, body image-related cognitive fusion may foster maladaptive efforts to avoid or control these unwanted experiences (Trindade & Ferreira, 2014). Nonetheless, the specific impact of body image-related cognitive fusion in athletes (namely from aesthetic sports) on disordered eating attitudes and behaviours was never examined.

Studies have shown that athletes from aesthetic sports tend to demonstrate more disordered eating (such as pathological diet) (Giel et al., 2016; Krentz & Warschburger, 2013). However, it remains unclear which body image-related emotional processes are involved in this relationship. Therefore, the main aim of this study was to clarify the relationship of body image-related cognitive fusion with disordered eating in aesthetic athletic girls, and whether body image-related perfectionist self-presentation acts on this association. It was hypothesized that athletes from aesthetic sports who struggle with their thoughts regarding body image may engage in disordered eating attitudes and behaviours partially due to a need to present a perfect body image to others.

Methods

Participants

The sample of this study comprised 142 Portuguese young female athletes of aesthetic sports from gymnastic ($n = 50$), skating ($n = 40$) and dance ($n = 52$), with ages ranging from 12 to 18 years old ($M = 13.97$; $SD = 1.67$). Regarding their years of education, participants presented an average of 9.18 ($SD = 1.76$).

All participants are active in their sport and presented a mean of 6.3 ($SD = 3.55$) years of sport practice. Participants reported an avarage of 4.5 ($SD = 3.84$) hours of training per week. Concerning body mass index (z scores), 7 participants (4.9%) were underweight, 98 (69.1%) had a normal weight, 29 (20.4%) presented as overweight and 8 (5.6%) presented obesity.

Materials

Participants reported demographic data (sex, age, education level, current height, and weight), sports data (type of sport, years of practice and hours of training per/week) and completed the Portuguese validated versions of the following instruments:

Body Mass Index z Scores (zBMI) Participants' BMI z scores values were calculated by macros available by the World Health Organization (WHO; Onis et al., 2007) to analyse growth data for the age group among 5–19 years, through weight and height provided by the athletes.

Cognitive Fusion Questionnaire Body Image (CFQ-BI; Ferreira, Ornelas, & Trindade, 2015a, Ferreira, Trindade, et al., 2015b) CFQ-BI is a 10-item self-report measure designed to assess body image related-cognitive fusion (e.g., "I struggle with my thoughts related to my body or physical appearance"). Participants are asked to rate their accordance with each statement using a 7-point scale (1 = "Never true" to 7 = "Always true"), with higher scores indicating a higher level of cognitive fusion. The CFQ-BI presented an excellent internal consistency in its original study ($\alpha = .96$) and in the current study ($\alpha = .97$).

Perfectionistic Self-Presentation Scale-Body Image (PSPS-BI; Ferreira et al., 2016) The PSPS-BI is a 19-item self-report questionnaire which measures the need to present a perfect body image to others (e.g., "It is very important for me to present myself (my physical appearance) perfectly in social situations"). This is a 7-point scale (1 = "Strongly disagree"; 7 = "Strongly Agree"), where higher scores indicate greater perfectionist self-presentation. The PSPS-BI revealed an excellent internal consistency in the original ($\alpha = .93$) and in the current study ($\alpha = .93$).

Eating Disorder Examination (EDE-Q; Fairburn & Beglin, 1994; Machado et al., 2014) EDE-Q is a self-report measure that assesses the frequency and intensity of disordered eating attitudes and behaviours. The EDE-Q focuses on the last 28 days and comprises four sub-scales: restraint, eating concern, weight concern and shape concern. The items are rated on a 7-point Likert-scale, in terms of occurrence (items 1–15, on a scale ranging from 0 = "None" and 6 = "Every day") and frequency (items 29–36, on a scale ranging from 0 = "None" and 6 = "Extremely"), with higher values indicating higher severity of eating psychopathology (e.g., "Have you been deliberately trying to limit the amount of food you eat to influence your shape or weight (whether or not you have succeeded)?; Has your shape influenced how you think about (judge) yourself as a person?").The EDE-Q global score presented an excellent internal consistency both in the original and

Portuguese version ($\alpha = .94$ and $\alpha = .95$ respectively), as well as in the current study ($\alpha = .94$).

Procedures

This study is part of a wider research project of the emotional regulation processes in sport context, conducted at the Center for Research in Neuropsychology and Cognitive Behavioural Intervention. All the ethics requirements were followed and approved by the Ethics Commission of the Faculty of Psychology and Educational Sciences of the University of Coimbra.

The sample was recruited mainly by contacting a wide range of sports clubs. The first step was to contact, by e-mail or telephone, the managers of the clubs to inform them about the aims and procedures of the study and to ascertain the possibility of data collection with their athletes. Twenty-two different clubs of aesthetic sports (e.g., ballet, gymnastic and figure skating clubs) were contacted, and eight agreed to collaborate. Each club gave the interested participants and their parents/legal tutors detailed information regarding the study (aims, procedures, and its voluntary and confidential nature). Afterwards, a written informed consent was obtained from all athletes' parents/legal tutors and from all athletes enrolled in this study. The self-report measures were completed during an authorized break (approximately 15 min) approved by their coaches, in the presence of one of the researchers. According to the aims of the present study, the inclusion criteria were: (i) female athletes; (ii) ages between 12 to 18 years old; (iii) Portuguese nationality; (iv) practice of an individual aesthetic sport.

Self-report measures were completed by 146 female athletes. However, four participants were excluded because they did not report their height or weight.

Data Analyses

All analyses were conducted through SPSS (v.22; IBM Corp. Armonk NY) and the software AMOS (v.22, SPSS Inc., Chicago, IL) (Arbuckle, 2008).

Descriptive statistics (means and standard deviations) assessed the sample's characteristics. Pearson product-moment correlations were conducted to examine associations among age, zBMI, body image-related cognitive fusion (CFQ-BI), body image-related perfectionistic self-presentation (PSPS-BI) and disordered eating (EDE-Q) (Cohen, Cohen, West, & Aiken, 2003). A Path analysis was performed to estimate presumed theoretical relationships among the study variables. The path model examined whether body image-related cognitive fusion was associated with disordered eating and whether this relationship was mediated by body image-related perfectionistic self-presentation, while controlling for age and BMI (Fig. 1).

The Maximum Likelihood estimation method was used to test path model coefficients' significances and fit statistics, with a 95% confidence interval. The adequacy of the model was assessed by the chi-square (χ^2; in which a p value above .05 indicates a good fit), the normed chi-square (CMIN/DF; which should stand below 3), the Tucker Lewis Index (TLI) and the Comparative Fit Index (CFI), in which values above 0.90 indicate a good fit, and the Root-Mean Square Error of Approximation (RMSEA; which should stand below 0.08), using a 95% confidence interval (Hu & Bentler, 1999). Moreover, significance of mediational paths was further analysed using the Bootstrap resampling method, with 5000 Bootstrap samples and 95% bias-corrected confidence intervals around the standardized estimates of direct, indirect and total. A significant mediation effect ($p < .05$) was considered when zero was not included in the interval between the lower and upper bound of the confidence interval (Nevitt & Hancock, 2001).

Results

Preliminary Analyses

The assumption of the normality of the distribution of the variables was established by the analysis of Skewness and Kurtosis (Kline, 2016). Preliminary analyses assumed that data followed the assumptions of homoscedasticity, normality, linearity, independence of errors and multicollinearity and singularity between the variables (Field, 2013).

Descriptive and Correlational Analyses

The means, standard deviations and Pearson correlation coefficients between the study variables are presented in Table 1.

Results showed that body image-related cognitive fusion was significant and positively associated with body image-related perfectionistic self-presentation and with disordered eating, with strong magnitudes. Furthermore, body image-related cognitive fusion presented a significant and positive, albeit weak, association with age and a non-significant association with zBMI. Moreover, body image-related perfectionistic self-presentation presented a significant positive and strong association with disordered eating, as well as a significant positive and weak association with zBMI scores and with age. Results also showed that disordered eating revealed significant and positive associations with zBMI and age, with weak magnitudes. Finally, zBMI presented a non-significant association with age (Table 1).

Path Analysis

A path analysis was conducted to test whether body image-related perfectionistic self-presentation (PSPS-BI) mediated the link between body image-related cognitive fusion (CFQ-BI) and disordered eating severity (EDE-Q), while controlling for age and zBMI. The proposed model was first tested through a fully saturated model (with zero degrees of freedom) with 20 parameters.

Results indicated that two paths were not significant: the direct association between age and EDE-Q ($b_{age} = .003$; $SE_b = .04$; $Z = .09$; $p = .926$); and the direct association between age and PSPS-BI ($b_{age} = -.31$; $SE_b = .93$; $Z = .34$; $p = .73$). These paths were progressively eliminated, and the model was readjusted.

The final model (Fig. 1) presented an excellent fit with a non-significant Chi-Square [$\chi^2_{(2)} = .126$; $p = .939$], and an excellent fit to the empirical data, as indicated by the analysis of well-known and recommended goodness of fit indices

Fig. 1 Path model showing the association between body image-related cognitive fusion and disordered eating, mediated by body image-related perfectionistic self-presentation, while controlling for zBMI and age, with standardized estimates and square multiple correlations (R^2; $N = 142$). Note: ***$p < .001$; *$p < .05$
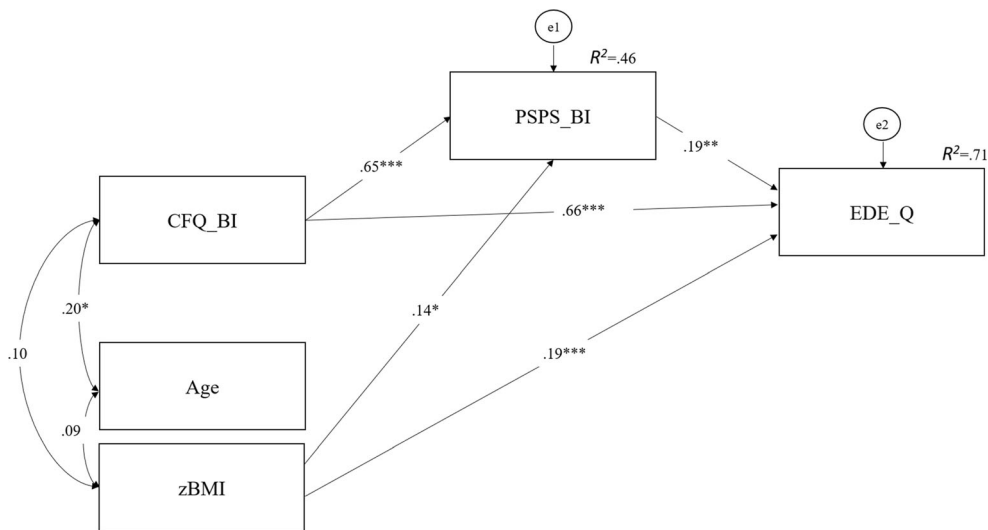
Table 1 Means (M), Standard Deviations (SD) and Intercorrelation scores between the study's measures (N = 142)

Means (M), Standard Deviations (SD) and Intercorrelation scores between the study's measures (N = 142)	M	DP	1.	2.	3.	4.
1. CFQ-BI	21.89	15.00	–	–	–	–
2. PSPS-BI	64.89	24.62	.67***	–	–	–
3. EDE-Q	1.31	1.24	.80***	.66***	–	–
4. zBMI	.14	1.16	.10	.20*	.29***	–
5. Age	13.97	1.67	.21*	.17*	.62***	.09

Note. CFQ-BI, Cognitive Fusion Questionnaire Body Image; PSPS-BI, Perfectionistic Self-Presentation Scale-Body Image; EDE-Q, Eating Disorder Examination Questionnaires; zBMI, Body Mass Index z scores. *p < .05, ***p < .001

(CMIN/DF = 0.06; CFI = 1.00; TLI = 1.04; RMSEA = .00; p = .957, IC = .00 /.04; Kline, 2016).

This model, in which all path coefficients were statistically significant (p < .05), explained 71% of the variance of disordered eating. Results indicated that CFQ-BI presented a significant direct association of .65 on PSPS-BI (b_{CFQ-BI} = 1.07; SE_b = .10; Z = 10.49; p < .001) and of .66 on EDE-Q (b_{CFQ_BI} = .05; SE_b = .01; Z = 10.70; p < .001). PSPS-BI had a direct association of .19 on EDE-Q ($b_{PSPS-BI}$ = .01; SE_b = .00; Z = 3.03; p = .002). zBMI had a direct effect of .14 on PSPS-BI (b_{zBMI} = 2.89; SE_b = 1.32; Z = 2.20; p = .028) and of .19 on EDE-Q (b_{BMI} = .202; SE_b = .05; Z = 4.03; p < .001).

Taken together, results revealed that body image-related perfectionistic self-presentation does mediate the association between body image-related cognitive fusion and disordered eating.

Discussion

Empirical studies have highlighted a higher prevalence of disordered eating in athletes than in non-athletes (Giel et al., 2016; Krentz & Warschburger, 2013), especially in athletes from aesthetic sports (Robins et al., 2002; Sundgot-Borgen et al., 2013; Tiggemann et al., 2000). However, little is known about the body image-related emotional processes that may contribute to disordered eating in aesthetic athletic girls. The present study aimed to explore a comprehensive model to explain disordered eating in aesthetic athletic girls.

Results showed that body image-related cognitive fusion was strongly associated with disordered eating severity, which is in line with previous research (Ferreira et al., 2014; Melo et al., 2019; Trindade & Ferreira, 2014). Moreover, confirming the results of previous empirical studies (Ferreira et al., 2016; Ferreira, Duarte, et al., 2018a; Ferreira, Mendes, & Trindade, 2018b; Ferreira, Ornelas, & Trindade, 2015a; Ferreira, Trindade, et al., 2015b; Marta-Simões & Ferreira, 2016), a strong relationship was found between body image-

related perfectionist self-presentation and higher levels of disordered eating. Overall, these results corroborate previous studies that suggest that the entanglement with thoughts about body image and the need to exhibit a perfect body image to others, have a strong association with disordered eating attitudes and behaviours, and extend them by concluding that these relationships are also relevant in a sample of aesthetic athletic girls. Also, this study revealed that athletes who present higher levels of fusion with body image-related thoughts tend to show greater need to present a perfect body image to others.

To further understand the relationship among these body image-related emotional processes (i.e., cognitive fusion and perfectionistic self-presentation) and disordered eating, a theoretical model was explored in a sample of aesthetic athletic girls. In this model, it was hypothesized that the relationship between body image-related cognitive fusion and disordered eating severity, was mediated by body image-related perfectionist self-presentation while controlling for zBMI and age.

Path analysis results demonstrated that the proposed model presents an excellent fit to the empirical data, accounting for 71% of the variance of disordered eating attitudes and behaviours, corroborating the initial hypothesis. Additionally, results revealed that 46% of body image-related perfectionist self- presentation was explained by body image-related cognitive fusion.

These findings reinforce the pervasive role of body image-related cognitive fusion on disordered eating (Ferreira et al., 2014; Melo et al., 2019; Trindade & Ferreira, 2014). Moreover, this model demonstrates that the relationship between body image-related cognitive fusion and disordered eating is carried by the endorsement on compensatory perfectionist strategies. Results suggested that, in aesthetic athletic girls, the entanglement with thoughts about their body image may prompt the adoption of defensive and perfectionistic strategies, such as a greater need to present a perfect body image to others, which in turn may lead to disordered eating. Furthermore, data seems to suggest that aesthetic athletic girls tend to engage in disordered eating attitudes and behaviours,

as a way to control weight and body shape and attain a perfect body image. Overall these findings suggest that, when aesthetic athletic girls get entangled with unpleasant thoughts about their body image, disordered eating attitudes and behaviours may emerge as a strategy to strive for a perfect body image, perceived as a need to enhance their performance and approval in sport context.

These results should be considered by taking into account some limitations. This is a cross-sectional study, and for that reason limits any causal inferences. Longitudinal studies are necessary to validate the nature and direction of the tested model. Moreover, this study only focused on female participants, for that reason future studies should consider males in the study of these variables. Another limitation was the use of data exclusively based on self-report measures, which may lead to some biases. Finally, and considering that disordered eating is a multi-determined phenomenon, other emotional processes should be considered to explain this phenomenon. Future prospective studies should be conducted to clarify the associations between these variables and propose causal inferences. "Future prospective studies should be conducted to clarify the associations between these variables and propose causal inferences. Also, future research is needed to compare the acceptability and impact of Cognitive-Behavioural Therapy (CBT) and Acceptance and Commitment Therapy-based (ACT) interventions to promote athlete's adaptive ways to deal with their body image.

Nevertheless, this is the first study examining the mediating role of body image-related perfectionistic self-presentation in the association between body image-related cognitive fusion and disordered eating in aesthetic athletic girls. This study clarified the pervasive role of body image-related cognitive fusion in disordered eating, as well as, in body image-related perfectionistic self-presentation as a maladaptive strategy to deal with cognitive fusion.

Previous studies have reported that the practice of sports is an environment which can increase athlete's susceptibility for the development of maladaptive eating attitudes and behaviours, especially in female athletes from aesthetic sports (Currie, 2010; Kong & Harris, 2015). Regarding the central role that body image has on adolescence and even more in aesthetic athletic girls (Giel et al., 2016), the present study offers new empirical data that may be relevant for clinical and sport psychology practitioners. This study offers important insights by suggesting that body image-related cognitive fusion may be at the root of perfectionistic self-presentation behaviours and disordered eating. Furthermore, data highlights the relevance of education programmes that promote more adaptive emotional strategies focusing on body image, to increase athlete's defusion skills and the acceptance of unpleasant thoughts and emotions related to their body image. Moreover, our data seems to indicate that intervention and prevention programs for aesthetic athletes, should focus on

the development of more adaptative strategies related to body image, through the cultivation of a balanced and acceptance relationship with one's own body characteristics (e.g., Tylka & Wood-Barcalow, 2015) rather than on the adoption of body image-related perfectionist self-presentation strategies.

Compliance with Ethical Standards

References

Arbuckle, J. (2008). *Analysis of moment structures* (AMOS) 17.0.0. Crawfordville, FL: AMOS Development Corporation.

Bartholomew, J. B., Morrison, D., & Ciccolo, J. T. (2005). Effects of acute exercise on mood and well-being in patients with major depressive disorder. *Medicine and Science in Sports and Exercise, 37*(12), 2032–2037. https://doi.org/10.1249/01.mss.0000178101.78322.dd.

Byrne, S., & McLean, N. (2002). Elite athletes: Effects of the pressure to be thin. *Journal of Science and Medicine in Sport, 5*(2), 80–94. https://doi.org/10.1016/S1440-2440(02)80029-9.

Cockell, S. J., Hewitt, P. L., Seal, B., Sherry, S., Goldner, E. M., Flett, G. L., & Remick, R. A. (2002). Trait and self-presentational dimensions of perfectionism among women with anorexia nervosa. *Cognitive Therapy and Research, 26*(6), 745–758. https://doi.org/10.1023/A:1021237416366.

Cohen, J., Cohen, P., West, S., & Aiken, L. (2003). *Applied multiple regression/correlation analysis for the behavioural sciences* (3th ed.). New Jersey: Lawrence Erlbaum Associates.

Currie, A. (2010). Sport and eating disorders-understanding and managing the risks. *Asian Journal of Sports Medicine, 1*(2), 63–68. https://doi.org/10.5812/asjsm.34864.

De Bruin, A. K., Oudejans, R. R., & Bakker, F. C. (2007). Dieting and body image in aesthetic sports: A comparison of Dutch female gymnasts and non-aesthetic sport participants. *Psychology of Sport and Exercise, 8*(4), 507–520. https://doi.org/10.1016/j.psychsport.2006.10.002.

Duffy, A. (2008). *Perfectionism, perfectionistic self-presentation, body comparisons, and disordered eating in Women's Artistic Gymnastics* (doctoral dissertation).

Fairburn, C. G., & Beglin, S. J. (1994). Assessment of eating disorders: Interview or self-report questionnaire? *International Journal of Eating Disorders, 16*(4), 363-370. https://doi.org/10.1002/1098-108X(199412)16:4<363::AID-EAT2260160405>3.0.CO;2-%23

Ferreira, C., Duarte, C., Pinto-Gouveia, J., & Lopes, C. (2018a). The need to present a perfect body image: Development of a new measure of

perfectionistic self-presentation. *Current Psychology, 37*(3), 559–567. https://doi.org/10.1007/s12144-016-9537-9.

Ferreira, C., Marta-Simões, J., & Trindade, I. A. (2016). Defensive responses to early memories with peers: A possible pathway to disordered eating. *Spanish Journal of Psychology, 19*, E45. https://doi.org/10.1017/sjp.2016.45.

Ferreira, C., Mendes, A. L., & Trindade, I. A. (2018b). Do shame and perfectionistic self-presentation explain the link between early affiliative memories and eating psychopathology? *Psychology Health & Medicine, 23*(5), 628–634. https://doi.org/10.1080/13548506.2017.1392024.

Ferreira, C., Ornelas, L., & Trindade, I. A. (2015a). Exploring drive for thinness as a perfectionistic strategy to escape from shame experiences. *The Spanish Journal of Psychology, 18*, E29. https://doi.org/10.1017/sjp.2015.27.

Ferreira, C., Palmeira, L., & Trindade, I. A. (2014). Turning eating psychopathology risk factors into action. The pervasive effect of body image-related cognitive fusion. *Appetite, 80*, 137–142. https://doi.org/10.1016/j.appet.2014.05.019.

Ferreira, C., Trindade, I. A., Duarte, C., & Pinto-Gouveia, J. (2015b). Getting entangled with body image: Development and validation of a new measure. *Psychology and Psychotherapy: Theory, Research and Practice, 88*(3), 304–316. https://doi.org/10.1111/papt.12047.

Field, A. (2013). *Discovering statistics using IBM SPSS statistics*. Sage.

Giel, K. E., Hermann-Werner, A., Mayer, J., Diehl, K., Schneider, S., Thiel, A., ... & GOAL Study Group. (2016). Eating disorder pathology in elite adolescent athletes. *International Journal of Eating Disorders, 49*(6), 553–562. https://doi.org/10.1002/eat.22511.

Gillanders, D. T., Bolderston, H., Bond, F. W., Dempster, M., Flaxman, P. E., Campbell, L., ... & Masley, S. (2014). The development and initial validation of the cognitive fusion questionnaire. *Behavior Therapy, 45*(1), 83–101. https://doi.org/10.1016/j.beth.2013.09.001.

Hayes, S. C., & Gifford, E. V. (1997). The trouble with language: Experiential avoidance, rules, and the nature of verbal events. *Psychological Science, 8*(3), 170–173. https://doi.org/10.1111/j.1467-9280.1997.tb00405.x.

Heller, E. A. (2013). *Differences between appearance anxiety, perfectionistic self-presentation, and patterns of disordered eating among female aesthetic athletes* (Doctoral dissertation, Northern Illinois University).

Hewitt, P. L., Flett, G. L., & Ediger, E. (1995). Perfectionism traits and perfectionistic self-presentation in eating disorder attitudes, characteristics, and symptoms. *International Journal of Eating Disorders, 18*(4), 317–326. https://doi.org/10.1002/1098-108X(199512)18:4<317::AID-EAT2260180404>3.0.CO;2-2.

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6*(1), 1-55. https://doi.org/10.1080/10705519909540118.

Kerr, G., Berman, E., & Souza, M. J. D. (2006). Disordered eating in women's gymnastics: Perspectives of athletes, coaches, parents, and judges. *Journal of Applied Sport Psychology, 18*(1), 28–43. https://doi.org/10.1080/10413200500471301.

Kline, R. B. (2016). Methodology in the social sciences. Principles and practice of structural equation modeling (4th ed.). Guilford press.

Kong, P., & Harris, L. M. (2015). The sporting body: Body image and eating disorder symptomatology among female athletes from leanness focused and nonleanness focused sports. *The Journal of Psychology, 149*(2), 141–160. https://doi.org/10.1080/00223980.2013.846291.

Krentz, E. M., & Warschburger, P. (2013). A longitudinal investigation of sports-related risk factors for disordered eating in aesthetic sports. *Scandinavian Journal of Medicine & Science in Sports, 23*(3), 303–310. https://doi.org/10.1111/j.1600-0838.2011.01380.x.

Lee, J. E., Pope, Z., & Gao, Z. (2018). The role of youth sports in promoting children's physical activity and preventing pediatric obesity: A systematic review. *Behavioral Medicine, 44*(1), 62–76. https://doi.org/10.1080/08964289.2016.1193462.

Machado, P. P., Martins, C., Vaz, A. R., Conceição, E., Bastos, A. P., & Gonçalves, S. (2014). Eating disorder examination questionnaire: Psychometric properties and norms for the Portuguese population. *European Eating Disorders Review, 22*(6), 448–453. https://doi.org/10.1002/erv.2318.

Marta-Simões, J., & Ferreira, C. (2016). Seeking a perfect body look: Feeding the pathogenic impact of shame? *Eating and Weight Disorders-Studies on Anorexia Bulimia and Obesity, 21*(3), 477–485. https://doi.org/10.1007/s40519-015-0240-x.

McGee, B. J., Hewitt, P. L., Sherry, S. B., Parkin, M., & Flett, G. L. (2005). Perfectionistic self-presentation, body image, and eating disorder symptoms. *Body Image, 2*(1), 29–40. https://doi.org/10.1016/j.bodyim.2005.01.002.

Melo, D., Oliveira, S., & Ferreira, C. (2019). The link between external and internal shame and binge eating: The mediating role of body image-related shame and cognitive fusion. *Eating and Weight Disorders-Studies on Anorexia, Bulimia and Obesity*, 1–8. https://doi.org/10.1007/s40519-019-00811-8.

Merwin, R. M., Timko, C. A., Moskovich, A. A., Ingle, K. K., Bulik, C. M., & Zucker, N. L. (2010). Psychological inflexibility and symptom expression in anorexia nervosa. *Eating Disorders, 19*(1), 62–82. https://doi.org/10.1080/10640266.2011.533606.

Nevitt, J., & Hancock, G. (2001). Performance of bootstrapping approaches to model test statistics and parameter standard error estimation in Structural Equation Modeling. *Structural Equation Modeling: A Multidisciplinary Journal, 8*(3), 353–377. https://doi.org/10.1207/s15328007sem0803_2.

Onis, M. D., Onyango, A. W., Borghi, E., Siyam, A., Nishida, C., & Siekmann, J. (2007). Development of a WHO growth reference for school-aged children and adolescents. *Bulletin of the World Health Organization, 85*, 660–667 https://www.who.int/growthref/growthref_who_bull.pdf?ua=1.

Petrie, T. A., & Greenleaf, C. A. (2007). Eating disorders in sport: From theory to research to intervention. In G. Tenenbaum & R. C. Eklund (Eds.), *Handbook of sport psychology* (pp. 352–378). Inc: John Wiley & Sons.

Robins, R. W., Trzesniewski, K. H., Tracy, J. L., Gosling, S. D., & Potter, J. (2002). Global self-esteem across the life span. *Psychology and Aging, 17*(3), 423–434. https://doi.org/10.1037/0882-7974.17.3.423.

Scardera, S., Sacco, S., Di Sante, J., & Booij, L. (2020). Body image-related cognitive fusion and disordered eating: The role of self-compassion and sad mood. *Eating and Weight Disorders-Studies on Anorexia, Bulimia and Obesity*, 1–8. https://doi.org/10.1007/s40519-020-00868-w

Sundgot-Borgen, J., Meyer, N. L., Lohman, T. G., Ackland, T. R., Maughan, R. J., Stewart, A. D., & Müller, W. (2013). How to minimise the health risks to athletes who compete in weight-sensitive sports review and position statement on behalf of the ad hoc research working group on body composition, health and performance, under the auspices of the IOC medical commission. *British Journal of Sports Medicine, 47*(16), 1012–1022. https://doi.org/10.1136/bjsports-2013-092966.

Thomas, J. J., Keel, P. K., & Heatherton, T. F. (2005). Disordered eating attitudes and behaviors in ballet students: Examination of environmental and individual risk factors. *International Journal of Eating Disorders, 38*(3), 263–268. https://doi.org/10.1002/eat.20185.

Tiggemann, M., Gardiner, M., & Slater, A. (2000). I would rather be size 10 than have straight A's: A focus group study of adolescent girls' wish to be thinner. *Journal of Adolescence, 23*(6), 645–660. https://doi.org/10.1006/jado.2000.0350.

Trindade, I. A., & Ferreira, C. (2014). The impact of body image-related cognitive fusion on eating psychopathology. *Eating Behaviors, 15*(1), 72–75. https://doi.org/10.1016/j.eatbeh.2013.10.014.

Trindade, I. A., & Ferreira, C. (2015). Falling in the traps of your thoughts: The impact of body image-related cognitive fusion on inflexible eating. *Eating Behaviors, 19*, 49–52. https://doi.org/10.1016/j.eatbeh.2015.06.004.

Tylka, T. L., & Wood-Barcalow, N. L. (2015). What is and what is not positive body image? Conceptual foundations and construct definition. *Body Image, 14*, 118–129. https://doi.org/10.1016/j.bodyim.2015.04.001.

Vella, S. A., Gardner, L. A., Kemp, B., Schweickle, M. J., & Cliff, D. P. (2019). Sports participation, health Behaviours, and body fat during childhood and early adolescence: A multiple mediation. *Journal of Science and Medicine in Sport, 22*(12), 1324–1329. https://doi.org/10.1016/j.jsams.2019.07.011.

Voelker, D. K., & Reel, J. J. (2018). Researching eating disorders and body image in sport: Challenges and recommendations. *Journal of Clinical Sport Psychology, 12*(4), 473–479. https://doi.org/10.1123/jcsp.2018-0017.

World Health Organization (2011). Promoting sport and enhancing health in European Union countries: A policy content analysis to support action. WHO Regional Office for Europe. https://apps.who.int/iris/handle/10665/108595