

## Examining the relationship between fitness-related self-conscious emotions, disordered eating symptoms, and morbid exercise behavior: An exploratory study

MANUEL ALCARAZ-IBÁÑEZ<sup>1,2\*</sup>, ÁLVARO SICILIA<sup>1,2</sup>, DELIA C. DUMITRU<sup>1</sup>, ADRIAN PATERNA<sup>1,2</sup> and MARK D. GRIFFITHS<sup>3</sup>

<sup>1</sup>Department of Education, University of Almería, Almería, Spain

<sup>2</sup>Health Research Centre, University of Almería, Almería, Spain

<sup>3</sup>Psychology Department, Nottingham Trent University, Nottingham, UK

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**Background and aims:** Theoretical models of morbid exercise behavior (MEB) suggest that it may emerge as a result of complex interactions between a range of psychosocial factors. However, in spite of fitness-related self-conscious emotions involving such factors, their relationship with the risk of MEB has never been investigated. Consequently, this study had two objectives. First, to explore the relationship that fitness-related self-conscious emotions have with (a) symptoms reflecting MEB as assessed by the Exercise Addiction Inventory (EAI) and the Exercise Dependence Scale-Revised (EDS-R) and (b) exercise frequency. Second, to examine whether these relationships might vary according to disordered eating symptoms. **Methods:** A sample of 646 undergraduate students (59% males;  $M_{\text{age}} = 21.25$ ;  $SD_{\text{age}} = 2.94$ ) completed a self-reported questionnaire. **Results:** After controlling for age, sex, and disordered eating symptoms, it was found that shame, hubristic pride, and authentic pride positively explained MEB; for their part, guilt (negatively) and authentic pride (positively) explained exercise frequency. The positive relationships between pride and MEB were weaker (in the case of the hubristic facet) or stronger (in the case of the authentic facet) under higher levels of disordered eating symptoms. The independent variables explained 29% (EAI), 28% (EDS-R), and 27% (exercise frequency) of the variance in dependent variables. **Discussion:** Tempering fitness-related emotions of shame, guilt, hubristic pride, and authentic pride may contribute to healthier exercise behavior.

**Keywords:** exercise addiction, exercise dependence, morbid exercise, guilt, shame, pride

### INTRODUCTION

In spite of the many health-related benefits of regular exercise (Windle, Hughes, Linck, Russell, & Woods, 2010; Wu et al., 2017), research has shown that exercising can acquire a morbid character, specifically when it turns into an increasingly uncontrollable behavior involving physical or psychological harm (Szabo, Demetrovics, & Griffiths, 2018). Furthermore, findings from a recent systematic review reported that between 3% and 7% of regular exercisers and the university student population may be at risk of developing a morbid pattern of exercise (Marques et al., 2018). Consequently, there is a need for further research into the psychosocial factors underlying this potentially unhealthy form of exercise.

According to the tenets of the interactional model posited by Egorov and Szabo (2013), potentially morbid exercise behavior (MEB) may emerge as a result of a complex process involving individual differences in emotional experiences and socially prescribed and personally endorsed values, goals, and expectations. Among these factors, those related to body appearance have been proposed as relevant

antecedents of MEB (Szabo et al., 2018). On the contrary, the possibility that these same factors may be related to MEB in reference to body functionality has, to date, scarcely been investigated. Recently, a model with the flexibility of being applied to body functionality domain – the Process Model of Self-Conscious Emotions (PMSCE; Tracy & Robins, 2004, 2007) – has emerged in research aimed at understanding exercise behavior. This study aimed to expand this line of research by exploring the relationship between self-conscious emotions (SCEs) of shame, guilt, and pride emerging from a body functionality-related feature such as physical fitness and MEB.

#### *Morbid exercise behavior (MEB)*

To date, research addressing MEB has been characterized by the lack of a specific theoretical framework that allows a

\* Corresponding author: Manuel Alcaraz-Ibáñez; Facultad de Ciencias de la Educación, Universidad de Almería, Carretera de Sacramento s/n, 04120, La Cañada de San Urbano (Almería), Spain; Phone: +34 950 015376; Fax: +34 950 015751; E-mail: [m.alcaraz@ual.es](mailto:m.alcaraz@ual.es)

clear delineation of its symptoms (Szabo, Griffiths, de La Vega Marcos, Mervó, & Demetrovics, 2015). Therefore, MEB has mainly been substantiated by considering criteria adapted from both substance dependence (i.e., tolerance, withdrawal, intention effects, lack of control, time, reduction in other activities, and continuance; American Psychiatric Association, 1994) and behavioral addictions (i.e., salience, conflicts, mood modification, tolerance, withdrawal, and relapse; Griffiths, 2005). According to these two groups of criteria, the Exercise Dependence Scale-Revised (EDS-R; Downs, Hausenblas, & Nigg, 2004) and the Exercise Addiction Inventory (EAI; Terry, Szabo, & Griffiths, 2004), respectively, have been extensively employed for self-reported assessment of symptoms reflecting an increased risk of MEB (Marques et al., 2018; Szabo et al., 2015). Consistent with the close but differentiated theoretical nature of criteria included in both instruments, previous research has shown medium-sized correlations between EDS-R and EAI scores (e.g., Cunningham, Pearman, & Brewerton, 2016; Mónok et al., 2012). Therefore, the possibility that the psychosocial factors leading to MEB may differ according to different criteria characterizing this potential unhealthy form of exercise has led some researchers to argue in favor of the concurrent employment of both instruments in research studies (e.g., Sicilia, Alcaraz-Ibáñez, Lirola, Burgueño, & Maher, 2018).

Another important issue surrounding MEB concerns the need of distinguishing between its secondary and primary nature according to whether this form of exercise is accompanied or not by increased disordered eating symptoms (e.g., bulimia/anorexia nervosa or binge-eating; Cunningham et al., 2016). However, some researchers have argued against this approach claiming that, although exercise may serve the purpose of weight control, it does not justify employing this classification (Szabo et al., 2018). Indeed, individuals showing increased disordered eating symptoms may develop MEB via the same positive and negative reinforcement processes proposed to explain this potentially unhealthy form of exercise (Egorov & Szabo, 2013; Szabo et al., 2018). Therefore, MEB could emerge as a result of a positive reinforcement process as long as the individual perceives that exercising is contributing toward the achievement of a given goal. Examples of the latter might not only include weight management but also improving exercise abilities or gaining social recognition (Sicilia, Alcaraz-Ibáñez, Lirola, & Burgueño, 2017). Conversely, MEB could emerge as the result of negative reinforcement processes if exercising represents a way of obtaining a temporary psychological relief from the emotional distress derived not only from a possible eating disorder but, additionally, from unpleasant feelings and negative mood states or emotions not necessarily related to this kind of disorder (Alcaraz-Ibáñez, Aguilar-Parra, & Álvarez-Hernández, 2018; Costa, Hausenblas, Oliva, Cuzzocrea, & Larcán, 2013).

#### *The PMSCE and exercise behavior*

According to the postulates of PMSCE (Tracy & Robins, 2004, 2007), the emotions of shame, guilt, and pride emerge

as a result of socially induced self-evaluative processes. Consequently, when individuals perceive that they are failing to meet a given social standard concerning their own self or behavior, the emotions of shame and guilt may arise. However, these two emotions differ in their potentially maladaptive nature. More specifically, shame plays a predominant role in the emergence of psychological impairment (Muris & Meesters, 2014). In contrast, when individuals perceive that they are succeeding in attaining that same self- or behavior-related social standard, hubristic, and authentic pride may be emotions that arise. However, hubristic/authentic pride is not equivalently valued emotions. More specifically, hubristic pride implies not only that the self conforms to the assumed social standard but also a sense of superiority grounded in the belief that this is due to the individual's own innate talent, which is not possessed by others (Castonguay, Gilchrist, Mack, & Sabiston, 2013; Tracy & Robins, 2007). Consequently, hubristic pride reflects a particularly maladaptive and narcissistic self-aggrandizement that may lead an individual to act impulsively and not persevere toward the behavior that contributes to achieving the socially prescribed standard in question. Conversely, authentic pride reflects a sense of self-competence that may lead to long-term perseverance in that same behavior (Carver, Sinclair, & Johnson, 2010; Tracy, Cheng, Robins, & Trzesniewski, 2009).

The PMSCE (Tracy & Robins, 2004, 2007) has been used to investigate emotions arising from global attributes and behaviors as well as those referring to specific domains such as body appearance and functionality (Castonguay, Sabiston, Crocker, & Mack, 2014; Castonguay, Sabiston, Kowalski, & Wilson, 2016). In particular, SCEs emerging from a dimension of body functionality such as physical fitness have been associated both negatively (in the case of guilt) and positively (in the case of authentic pride) with exercise behavior, concretely, in terms of frequency of practice (Castonguay et al., 2016; Gilchrist, Pila, Castonguay, Sabiston, & Mack, 2018; Mack, Kouali, Gilchrist, & Sabiston, 2015). Meanwhile, shame (positively) and both authentic/hubristic pride (negatively) have also been associated with outcomes reflecting psychological maladjustment (e.g., negative affective states and depressive symptoms; Castonguay et al., 2016).

To date, the relationship between fitness-related SCEs and MEB has not been explored. This gap in the literature is surprising, considering the number of arguments that may be advanced to support the positive relationship between three of these emotions (i.e., shame, hubristic pride, and authentic pride) and MEB. A first argument may be grounded in both theoretical (Egorov & Szabo, 2013) and empirical (Bratland-Sanda et al., 2011; Sicilia et al., 2017) evidence associating the pursuit of improving physical abilities with the risk of developing MEB. A second argument is grounded in the specific nature of these emotions. Therefore, in the case of shame, exercising might contribute to relieving the distress that individuals may feel as a result of not perceiving themselves as being as physically fit as they want to be. On the other hand, in the case of hubristic pride, exercising might contribute to maintaining a status of physical fitness superiority that, acting as an overcompensation mechanism for what is probably low overall self-esteem, is inherent in

such SCE (Tracy et al., 2009). In support of this possibility, it should also be noted that such a sense of superiority has been reported as a component of narcissism, which is particularly related to MEB (Bircher, Griffiths, Kasos, Demetrovics, & Szabo, 2017). In the case of authentic pride, exercising might contribute to reinforcing the positive feelings derived from the sense of mastery and self-confidence inherent to this emotion (Carver et al., 2010; Tracy et al., 2009). In support of this possibility, it should be noted that the self-perception of competence in exercise contexts has been proposed as a potential antecedent to both exercise frequency and MEB (Alcaraz-Ibáñez, Sicilia, & Lirola, *in press*; González-Cutre & Sicilia, 2012).

### *The present study*

Theoretical models of MEB suggest that morbid exercise may emerge as a result of complex interactions between a range of psychosocial factors including individual differences in emotional states, social/personal values, and expectations placed on exercise (Egorov & Szabo, 2013). However, in spite of fitness-related SCEs involving these kinds of factor, their relationship with the risk of MEB has never been investigated. Examining the relationship between these emotions and MEB is likely to provide useful information for the professional practice of health practitioners and exercise instructors. More concretely, it would show specific fitness-related emotions that should be addressed in preventing this potential unhealthy form of exercise.

Guided by both the PMSCE (Tracy et al., 2009; Tracy & Robins, 2004, 2007) and the interactional model of MEB (Egorov & Szabo, 2013), this study had two objectives. First, to explore the relationship between fitness-related SCEs of shame, guilt, and authentic/hubristic pride and exercise behavior in terms of (a) the symptoms characterizing its potential morbid nature, as assessed by the EAI and the EDS-R, and (b) the frequency of exercise. This distinction between symptoms of MEB and exercise frequency is important because it is not the devoting of a great deal of time to exercising more frequently that determines the morbid nature of this behavior but rather the existence of physically associated or psychologically associated negative consequences (Szabo et al., 2018). The second objective was to examine whether this relationship might vary according to the presence of increased disordered eating symptoms. According to existing empirical evidence, it is expected that, after controlling for the effects of age (Alcaraz-Ibáñez et al., 2018; Allegrè, Therme, & Griffiths, 2007; Costa et al., 2013), sex (Allegrè et al., 2007; Costa et al., 2013), and disordered eating symptoms (Brastrand-Sanda et al., 2011; Cook, Hausenblas, Crosby, Cao, & Wonderlich, 2015; Cunningham et al., 2016), the results will support the following hypotheses: (H1) fitness-related shame will positively explain unique MEB variance; (H2) fitness-related guilt will negatively explain unique exercise frequency variance; (H3) fitness-related hubristic pride will positively explain unique MEB variance; and (H4) fitness-related authentic pride will positively explain unique variance in both MEB and exercise frequency. Given the exploratory nature of the interaction analyses, no hypotheses

are given with respect to the possible moderating effects of disordered eating symptoms on the relationship between fitness-related SCEs, MEB, and exercise frequency.

## METHODS

### *Participants*

The final convenience sample comprised 646 undergraduate recreational exercisers (59% males and 97% white). To be eligible for inclusion, participants had to be engaged in leisure-time recreational exercise (i.e., exercise that was not carried out as part of their job and/or professionally) at least once in every 2 weeks. The participants' ages ranged from 18 to 38 years ( $M = 21.25$ ,  $SD = 2.94$ ), and body mass indices (BMIs) ranged from 16.53 to 36.33 kg/m<sup>2</sup> ( $M = 22.88$ ,  $SD = 0.73$ ). Participants reported being mainly involved in either (a) various forms of exercise (46.4%), (b) some form of strength and conditioning (18.1%), (c) endurance modalities (10.6%), (d) team sports (14.4%), (e) individual sports (8.2%), and (f) outdoor sports (2.3%).

### *Measures*

*Fitness-related SCEs.* Participants completed the Spanish version (Alcaraz-Ibáñez, Sicilia, & Dumitru, 2019) of the Body and Appearance Self-conscious Emotions Scale (Castonguay et al., 2016). This is a 15-item self-report scale that assesses the fitness-related SCEs of shame (e.g., "Ashamed that I am a person who is unfit"), guilt (e.g., "Guilty that I do not do enough for my fitness"), hubristic pride (e.g., "Proud of my superior fitness"), and authentic pride (e.g., "Proud of my fitness efforts"). Responses are provided on a Likert-type scale that ranges from 1 (*never*) to 5 (*always*). Adequate levels of internal consistency ( $\alpha > .85$ ) and measurement invariance across sex have been previously reported for the Spanish version of this instrument (Alcaraz-Ibáñez et al., 2019).

*Exercise addiction symptoms.* Participants completed the Spanish version (Sicilia, Alías-García, Ferriz, & Moreno-Murcia, 2013) of the EAI (Terry et al., 2004). This scale includes six items (e.g., "Conflicts have arisen between me and my family and/or my partner about the amount of exercise I do") corresponding to the six behavioral addiction criteria proposed by Griffiths (2005). Responses are provided on a Likert-type scale that ranges from 1 (*totally disagree*) to 5 (*totally agree*). Adequate levels of internal consistency ( $\alpha \geq .70$ ) and measurement invariance across sex have been previously reported for the Spanish version of this instrument (Sicilia et al., 2013).

*Exercise dependence symptoms.* Participants completed the Spanish version (Sicilia & González-Cutre, 2011) of the revised EDS-R (Downs et al., 2004). This scale includes seven factors comprising three items each (e.g., continuance: "I exercise despite recurring physical problems"). Responses are provided on a Likert-type scale that ranges from 1 (*never*) to 6 (*always*). Excellent levels of internal consistency ( $\alpha \geq .92$ ) and measurement invariance across sex have been previously reported for the Spanish version of this instrument (Sicilia & González-Cutre, 2011).

*Disordered eating symptoms.* Participants completed the Spanish version (García-Campayo et al., 2005) of the SCOFF Questionnaire (Morgan, Reid, & Lacey, 1999). This scale includes five dichotomous questions reflecting some of main components characterizing anorexia and bulimia nervosa. Used as a continuous measure (i.e., by summing scores according to the rule *no* = 0 and *yes* = 1), higher values reflect greater disordered eating symptoms. This instrument has been previously employed in samples comprising Spanish young adults (Garrido-Miguel et al., 2017).

*Exercise frequency.* A composite score from two items was employed (i.e., “Over the past 7 days, on how many days you exercised for a total of at least 30 min per day?” and “Over a typical or usual week, on how many days you exercise for a total of at least 30 min per day?”). These items have been previously employed for self-reported assessment of exercise frequency by research examining the relationship between this variable and body-related SCEs (Castonguay et al., 2016; Gilchrist et al., 2018).

*Demographics.* Participants were asked to report their age, sex, ethnicity, main exercise modality practiced, height, and weight. The quotient between self-reported weight (kg) and squared height (m) was employed to compute participants’ BMI.

#### Procedure

Students from three public Spanish universities were invited to participate in the study at the beginning of a timetabled lecture outside of the traditional examination period. The study was briefly introduced as research examining the relationship between emotions and exercise behavior. From the 692 students initially approached, 33 were excluded according to one of the two exclusion criteria adopted: (a) not practicing physical exercise at least once every 2 weeks ( $n = 24$ ) and (b) they had been remunerated for their exercise/sport participation ( $n = 9$ ). From the remaining 659 potential participants, 647 provided their informed consent to participate and completed a “paper-and-pencil” questionnaire. One of the researchers was available to assist with any questions related to the completion of the survey. Participants needed around 15 min to complete the task.

#### Statistical analyses

*Preliminary analyses.* The data were first examined for missing values and multivariate outliers. More specifically, individual residuals were examined using the procedure described by Muthén, Muthén, and Asparouhov (2016). According to Cook’s *D* values obtained using this procedure, one case was identified as a potential multivariate outlier, and its deletion led to the sample employed in subsequent analyses ( $N = 646$ ). Following this, descriptive statistics, bivariate correlations, sex differences across study variables, internal consistency (Cronbach’s  $\alpha$ ), and composite reliability ( $\rho$ ; Raykov, 2004) were computed. Composite reliability was derived from the confirmatory factor analyses (CFAs) carried out in Mplus v. 7.1 (Muthén & Muthén, 1998–2015). According to the ordered polytomous nature of the considered variables (i.e., items), these CFAs were performed employing the weighted least squares mean and variance-adjusted

(WLSMV) robust estimation method (Finney & DiStefano, 2006). Given the nested character of the data (i.e., they were collected in several classroom environments), the COMPLEX function of Mplus was applied when conducting the CFAs.

*Main analyses.* The relationships of interest were examined via a three-step regression analysis in Mplus v. 7.1. Given the high computational demands of the regression model comprising multiple interactions between latent variables (Muthén & Muthén, 1998–2015), this analysis was conducted using aggregated mean scores derived from the instruments employed. According to the continuous nature of the dependent variables, the robust maximum likelihood estimation method was employed. In Step 1, age, sex, and disordered eating symptoms were introduced as predictor variables. In Step 2, the four fitness-related SCEs were introduced. In Step 3, interaction terms between the four fitness-related SCEs and disordered eating symptoms were introduced. Given the weak and non-significant correlations found between BMI and scores derived from EDS-R ( $r = .073$ ,  $p = .063$ ), EAI ( $r = .039$ ,  $p = .226$ ), and exercise frequency ( $r = .039$ ,  $p = .326$ ), BMI was not included as a potential confounding variable in the regression models. All independent variables were mean-centered before conducting the regression analysis (Cohen, Cohen, West, & Aiken, 2003). Given the nested character of the data, the COMPLEX function of Mplus was applied when conducting the described regression analyses.

#### Ethics

The study procedures were carried out in accordance with the Declaration of Helsinki. The ethics committee of the University of Almería approved the study.

## RESULTS

The descriptive statistics are shown in Table 1. Small to medium-sized differences were found favoring: (a) males in the case of fitness-related hubristic/authentic pride, MEB (as assessed by both EAI and EDS-R), and exercise frequency; and (b) females in the case of disordered eating symptoms, fitness-related shame, and guilt. Internal consistency scores ranged from .61 (disordered eating symptoms) to .93 (authentic pride). Composite reliability scores derived from the CFAs ranged from .80 (exercise addiction) to .95 (hubristic pride).

#### Main analysis

Variance inflation factors for the most complex model (Model 3) ranged from 1.03 (age) and 3.25 (interaction term between guilt and disordered eating symptoms), therefore suggesting that multicollinearity was not an issue (O’Brien, 2007). The regression analyses results (Table 2) showed that fitness-related shame, hubristic pride, and authentic pride positively explained the significant variance in MEB, as assessed by both EAI and EDS. In addition, both fitness-related guilt (negatively) and authentic pride (positively) explained significant variance in exercise frequency.

Table 1. Descriptive statistics, composite reliability, and correlational analysis

	1	2	3	4	5	6	7	8	9	Range <sup>a</sup>	α	ρ	Males (n = 380)		Females (n = 266)		t	d
													M	SD	M	SD		
1. Age	–									18–38		–	21.68	2.93	20.64	2.84	4.48***	–0.36
2. DES	–.02	–								1–5	.61	.83	0.51	0.91	0.86	1.16	–4.37***	0.34
3. Shame	–.04	.41***	–							1–5	.86	.91	1.72	0.74	1.88	0.86	–2.59*	0.20
4. Guilt	–.05	.39***	.70***	–						1–5	.91	.94	2.22	0.97	2.49	1.10	–3.23***	0.26
5. HuPride	–.02	–.08	–.06	–.13**	–					1–5	.92	.95	2.89	1.14	2.31	1.11	6.39***	–0.51
6. AuPride	–.03	–.12**	–.33***	–.42***	.48***	–				1–5	.93	.94	3.57	0.89	3.14	1.09	5.52***	–0.44
7. EAI	–.08*	.16***	.12**	.05	.36***	.36***	–			1–5	.75	.80	2.72	0.70	2.43	0.83	4.91***	–0.38
8. EDS-R	–.06	.14***	.15***	.01	.32***	.36***	.77***	–		1–6	.92	.91	2.94	0.82	2.55	0.89	5.84***	–0.46
9. EF	–.01	–.11**	–.23***	–.31***	.25***	.47***	.38***	.40***	–	0–7	.92	.92	4.42	1.58	3.46	1.71	7.32***	–0.59

Note. SD: standard deviation; ρ: composite reliability; DES: disordered eating symptoms; HuPride: hubristic pride; AuPride: authentic pride; EAI: Exercise Addiction Inventory; EDS-R: Exercise Dependence Scale – Revised; EF: exercise frequency.

<sup>a</sup>Observed range in the case of age and possible range for remaining variables.

\*p < .05. \*\*p < .01. \*\*\*p < .001.

The interaction terms between fitness-related SCEs and disordered eating symptoms showed themselves to be statistically significant in the case of hubristic pride (negatively) and authentic pride (positively). The independent variables considered explained 29% (MEB assessed by the EAI), 28% (MEB assessed by the EDS-R), and 27% (exercise frequency) of the variance in the three dependent variables.

## DISCUSSION

Despite empirical evidence associating (a) globally experienced SCEs with a range of well-being-related and ill-being-related outcomes (Muris & Meesters, 2014) and (b) fitness-related SCEs with exercise behavior (Castonguay et al., 2016; Gilchrist et al., 2018; Mack et al., 2015), the relationship between these domain specific emotions and MEB has never been previously investigated. This study first provided preliminary evidence of the unique contribution of shame, guilt, and authentic/hubristic pride in explaining MEB, and second examined whether this relationship might depend on an extensively proposed MEB risk factor such as the increased presence of disordered eating symptoms (Cunningham et al., 2016). Supporting the proposed hypotheses, the results suggested that fitness-related shame, hubristic pride, and authentic pride may independently contribute to the development and maintenance MEB symptoms. Conversely, only fitness-related guilt (negatively) and authentic pride (positively) might independently contribute to explaining exercise frequency. The results also suggest that the positive relationships between both hubristic/authentic pride and MEB may be respectively weaker or stronger depending on the presence of increased disordered eating symptoms.

The first novel finding was that potentially maladaptive fitness-related SCEs were differentially associated with exercise behavior, with this relationship being positive in the case of shame/MEB and negative in the case of guilt/exercise frequency. This suggests that – following a negative reinforcement process (Egorov & Szabo, 2013; Szabo et al., 2018) – individuals may adopt MEB patterns as a consequence of avoiding the negative emotional experience derived from perceiving themselves as unable to meet socially prescribed fitness standards. These findings appear consistent with the particularly maladaptive nature of shame experiences (Jones & Griffiths, 2014; Muris & Meesters, 2014). These findings are also consistent with those suggesting that, compared to guilt, fitness-related shame may be more strongly associated with potential outcomes involving impaired psychological functioning, with precisely the opposite being true in the case of exercise behavior that is not necessarily morbid (e.g., exercise frequency; Alcaraz-Ibáñez et al., 2019; Castonguay et al., 2016).

The second novel finding was that both hubristic and authentic prides were independently and positively associated with MEB. This was also the case for authentic pride with respect to exercise frequency. In line with evidence pointing to the pursuit of fitness-related goals as being a potential antecedent to MEB (Bratland-Sanda et al., 2011; Sicilia et al., 2017), the findings in this study suggest that following a positive reinforcement process (Egorov &

Table 2 . Regression analysis predicting the risk of morbid exercise behavior and exercise frequency from fitness-related self-conscious emotions and disordered eating symptoms

	EAI			EDS-R			Exercise frequency						
	R <sup>2</sup>	ΔR <sup>2</sup>	p	B (SE)	β	R <sup>2</sup>	ΔR <sup>2</sup>	p	B (SE)	β	R <sup>2</sup>	ΔR <sup>2</sup>	p
Step 1	.09	–				.08	–				.08	–	
Age			.005	–.03 (.01)	–.10			.030	–.03 (.01)	–.06			.182
Sex			<.001	–.38 (.08)	–.27			<.001	–.48 (.07)	–.28			<.001
DES			<.001	.14 (.03)	.18			<.001	.16 (.03)	–.06			<.001
Step 2	.27	.18				.27	.19				.27	.19	
Age			.049	–.02 (.01)	–.06			.161	–.02 (.04)	–.04			.292
Sex			<.001	–.21 (.07)	–.17			<.001	–.31 (.07)	–.19			<.001
DES			<.001	.11 (.03)	.13			<.001	.11 (.03)	.03			.391
Shame			<.001	.14 (.04)	.27			<.001	.29 (.05)	–.00			.934
Guilt			.046	.05 (.04)	–.05			.162	–.04 (.03)	–.14			.002
HuPride			<.001	.13 (.03)	.13			.001	.10 (.03)	.01			.780
AuPride			<.001	.26 (.04)	.35			<.001	.30 (.05)	.37			<.001
Step 3	.29	.02				.28	.01				.27	.00	
Age			.029	–.02 (.01)	–.06			.129	–.02 (.01)	–.04			.281
Sex			<.001	–.24 (.07)	–.18			<.001	–.33 (.06)	–.20			<.001
DES			<.001	.14 (.03)	.16			<.001	.13 (.03)	.03			.377
Shame			<.001	.18 (.04)	.29			<.001	.32 (.05)	–.01			.864
Guilt			.128	.03 (.02)	–.06			.109	–.05 (.03)	–.14			<.001
HuPride			<.001	.12 (.03)	.12			.001	.09 (.03)	.01			.843
AuPride			<.001	.26 (.04)	.35			<.001	.30 (.04)	.37			<.001
Shame × DES			.488	–.02 (.03)	–.02			.693	–.02 (.04)	.02			.714
Guilt × DES			.613	–.02 (.03)	–.00			.985	–.00 (.05)	–.02			.603
HuPride × DES			<.001	–.08 (.02)	–.09			.035	–.07 (.03)	–.06			.153
AuPride × DES			<.001	.11 (.02)	.15			<.001	.12 (.02)	.04			.282

Note. β: standardized regression coefficients; B: non-standardized regression coefficients; SE: standard error; DES: disordered eating symptoms; HuPride: hubristic pride; AuPride: authentic pride; EAI: Exercise Addiction Inventory; EDS-R: Exercise Dependence Scale – Revised.

Szabo, 2013; Szabo et al., 2018), individuals may adopt a morbid pattern of exercise behavior with the aim of extending the positive emotional experience derived from their success in achieving socially prescribed fitness standards. These findings are also consistent with the complex and ambivalent theoretical nature of pride (Tangney & Tracy, 2012; Tracy & Robins, 2007). Therefore, despite both hubristic and authentic prides possibly leading to MEB because exercise are considered an effective mean of keeping a given socially approved status, this could translate into increased exercise behavior just in terms of its authentic facet – in other words, when the effort placed on keeping the behavior in question is positively evaluated (Castonguay et al., 2013).

These findings extend the body of knowledge in two ways regarding SCEs experienced in the body-image domain. First, the results demonstrate that potentially unhealthy outcomes (in this case, MEB) may emerge not only from experiencing appearance-related shame (Jones & Griffiths, 2014; Muris & Meesters, 2014) but also from experiencing this SCE with respect to a body functionality dimension such as physical fitness. Second, the results show that, as speculated in previous research questioning the intrinsically positive nature not only of hubristic but also of authentic pride (Webb, Wood-Barcalow, & Tylka, 2015), both constructs may lead to unhealthy outcomes (in this case, MEB). These last findings are consistent with those scholars claiming that for body image-related constructs to have an unequivocally adaptive nature, they must reflect both what the body (or, in this specific case, physical fitness) can do for individuals and what it represents in terms of being connected with others (Webb et al., 2015). This is a feature that may not be implicitly present in fitness-related pride (Castonguay et al., 2016). Considering these findings, a fruitful area for future research would be to examine the differential relationship between both facets of pride and other constructs reflecting positive body functionality with MEB.

A final novel finding is that the positive relationship between pride and MEB may be weaker (in the case of the hubristic facet) or stronger (in the case of the authentic facet) under higher levels of disordered eating symptoms. This finding reinforces the complex and potentially interactive nature of the factors leading to MEB (Egorov & Szabo, 2013) and points to the convenience of examining these kinds of relationships when investigating the psychosocial mechanisms underlying MEB. It also suggests that exercise driven by expectations of maintaining a superior level of current physical fitness may lead to MEB (to a lesser extent) inasmuch as adopting such behavior would respond to the weight-control motives and appearance concerns frequently featured by those experiencing increased disordered eating symptoms (Schaefer & Thompson, 2018). Conversely, the sense of individuals' keeping their position in the social rank promoted by authentic pride (Tangney & Tracy, 2012), in this case elicited by exercise behavior aimed at improving physical fitness, may be particularly detrimental in terms of the onset of MEB in those featuring increased disordered eating symptoms. This means that the positive feelings derived from attaining a given social standard of exercise behavior that improves physical fitness (i.e., fitness-related

pride) might be particularly rewarding to those less successful in attaining the weight and appearance standards underlying disordered eating symptoms.

### Limitations

Specific limitations of this study should be acknowledged and addressed in future research. The first limitation concerns the assessment method employed. In the case of MEB, there was a reliance on self-reported instruments whose interpretation, in terms of demonstrating a truly morbid behavior, may vary across different populations (Szabo et al., 2015). Furthermore, self-report methods are susceptible to well-known biases (such as response bias and memory recall biases). In the case of disordered eating symptoms, there was a reliance on an instrument assessing generic bulimic and anorexic symptoms (Morgan et al., 1999). The use of the latter instrument prevented the examination of the potentially differential relationship existing between these two groups of symptoms and MEB and, additionally, between MEB and symptoms not explicitly included in this instrument (e.g., those specifically reflecting binge eating; Cunningham et al., 2016). In the case of exercise frequency, there was a reliance on self-reported instruments (Castonguay et al., 2016; Gilchrist et al., 2018). However, research has shown that scores derived from these kinds of instruments may be both higher and lower than directly measured levels of exercise (e.g., employing accelerometry; Prince et al., 2008). Consequently, future research should replicate the present findings employing this kind of direct assessment technique.

The second limitation is that the sample is composed exclusively of undergraduate students. Consequently, future research should examine whether these findings generalize to other populations that may also feature a high risk of MEB (e.g., athletes; Marques et al., 2018). It has also been suggested that self-report instruments designed for the assessment of MEB may be differentially interpreted by professional/competitive athletes compared to strictly recreational exercisers (Szabo et al., 2015). Even though the sample employed in this study did not comprise professional athletes, the possibility that some competitive athletes were included cannot be discounted. This limitation could have affected the obtained results since physical fitness may be a dimension of body functionality particularly relevant for this population. Consequently, future research should examine whether the obtained findings vary according to the strictly recreational versus competitive nature of exercise involvement.

Third, while it is true that SCEs related to physical fitness may explain exercise behavior to a greater extent than appearance-related ones (Gilchrist et al., 2018), only the former were addressed in this study. Therefore, future research should explore the specific role that emotions derived from these two different body qualities might play in the development and maintenance of MEB. Finally, the cross-sectional nature of the design prevented establishing any causal association between the observed variables. For this reason, further longitudinal research is needed to examine potential causal relationships between these variables.

## CONCLUSIONS

In summary, this study provides a twofold contribution to the extant literature. First of all, the findings suggest that, even though experiencing fitness-related shame and both facets of pride are independently related to MEB, this may translate into (a) increased exercise frequency in the case of authentic pride and into (b) decreased exercise frequency in the case of guilt. Second, the study provides evidence that the positive relationships between fitness-related hubristic/authentic pride and MEB may be weaker and stronger, respectively, depending on the presence of increased disordered eating symptoms. From a theoretical perspective, these findings are relevant insofar as they reveal specific novel predisposing factors of MEB, the most relevant one being authentic pride, in particular, during the presence of increased disordered eating symptoms.

From a practical perspective, there are two main implications. On one hand, prevention efforts aimed at reducing MEB may benefit from tempering the healthism discourse, wherein fitness becomes a socially desired (and its absence sanctioned) goal (Carter, Entwistle, McCaffery, & Rychetnik, 2011). On the other hand, exercise professionals should not contribute to promoting fitness-related shame, guilt, hubristic pride, and authentic pride among exercisers under their guidance. This is particularly true in the latter case among those showing increased disordered eating symptoms.

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