

Development and Aging

Exploring the differentiated relationship between appearance and fitness-related social anxiety and the risk of eating disorders and depression in young adults

MANUEL ALCARAZ-IBÁÑEZ,  ÁLVARO SICILIA  and ADRIAN PATERNA 

Universidad de Almería, Spain

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Appearance-related social anxiety has been identified as a relevant risk factor in the development of eating disorders (ED) and depression in young adults. However, less is known about the role that fitness-related social anxiety may play on the emergence of these two psychopathological conditions. The present study aimed to examine whether appearance/fitness social anxiety may independently contribute to explaining the increased risk of ED and depressive symptoms in young adults. A total of 545 undergraduate students (46% women, $M_{age} = 21.36$, $SD_{age} = 2.93$) recruited in two Spanish public universities completed a self-reported questionnaire. After controlling for self-reported BMI and appearance-related social anxiety, the results from the regression analyses revealed that fitness-related social anxiety positively and significantly ($p < 0.05$) contributed to explaining both the risk of ED (in women and men) and depressive symptoms (in women). The inclusion of the interaction term within the appearance/fitness-related term positively contributed to explaining additional variance for both the risk of ED and depressive symptoms in men, but not in women. The regression models explained 48% (women) and 35% (men) of the ED risk and 25% (women) and 19% (men) of depressive symptoms. These findings suggest that not only appearance, but also fitness-related social anxiety experiences may contribute to explaining the emergence of ED and depression in young adults.

Key words: Body image, physical appearance, fitness, social anxiety, eating disorders, depression, young adults.

Adrian Paterna, Universidad de Almería, Facultad de Ciencias de la Educación, Carretera de Sacramento s/n, 04120, La Cañada de San Urbano (Almería), Spain. Tel: +34 950 015376; fax: +34 950 015751; e-mail: apr779@inlumine.ual.es

INTRODUCTION

Body image is defined as a multidimensional construct that reflects the subjective experience of one's own embodiment (Cash, 2012). According to this multidimensional character, body image comprises both appearance (i.e., how the body looks) and functionality (i.e., what the body is capable of doing) domains (Gilchrist, Pila, Castonguay, Sabiston & Mack, 2018). Current evidence suggests that body image-related concerns play a relevant role in the onset and maintenance of severe psychopathological conditions such as eating disorders (ED) and depression, especially during late adolescence and early adulthood (Jones & Griffiths, 2014; Schaefer & Thompson, 2018). Given the significant health and economic burden of ED (Samnaliev, Noh, Sonnevill & Austin, 2015) and depression (Vos, Abajobir, Abate *et al.*, 2017), exploring the precise nature of the body image-related concerns involved in the emergence of these two psychopathological conditions is a matter of research interest (Lantz, Gaspar, DiTore, Piers & Schaumberg, 2018; Walker, White & Srinivasan, 2018).

Defined as the anxious affective response elicited by anticipated interpersonal evaluations of the body (Hart, Leary & Rejeski, 1989), social physique anxiety (SPA) is one of the most widely investigated constructs amongst those examining body appearance issues (Sabiston, Pila, Pinsonnault-Bilodeau & Cox, 2014). This specific form of social anxiety is experienced by individuals who question their ability to make favorable impressions based on their body appearance (Leary & Jongman-Sereno, 2014). This has proven to be particularly true in two

cases. Firstly, in those people who are more exposed and sensitive to social messages oriented towards attaining certain culturally defined body ideals; for instance, young women (Sabiston *et al.*, 2014). Secondly, in those people whose bodies may objectively differ from such ideals; an example in Western cultures would be those who are overweight or obese (Voelker, Reel & Greenleaf, 2015). Nonetheless, consistent with the theoretical maladaptive nature of the self-presentational concerns (Kashdan, 2007), SPA has been linked to symptoms reflecting an increased risk of ED and depression both in women and men (Alcaraz-Ibáñez & Sicilia, 2019; Lanfranchi, Maïano, Morin & Therme, 2015).

On balance, the current evidence points to SPA as being a factor that plays a relevant role in the pathogenesis of ED and depression (Sabiston *et al.*, 2014). However, much less is known about how the emergence of these two psychopathological conditions may depend on social anxiety experiences regarding other domains of body image beyond appearance. This gap in the literature seems particularly apparent for the set of attributes reflecting the ability to perform physical activity (i.e., physical fitness) for two main reasons. Firstly, because it has been suggested that outcomes emerging from body image may be better explained considering both appearance and fitness-derived affective experiences (Gilchrist *et al.*, 2018). Secondly, because it has been suggested that not being fit enough is a condition susceptible to social sanction (Carter, Entwistle, McCaffery & Rychetnik, 2011). Thus, it seems feasible that individuals could experience social anxiety not only as a result of their inability to project positive impressions on other people based on what their body looks

like but, additionally, according to what their body can do; for instance, in terms of their physical fitness.

Despite the rationale expounded above, to the best of our knowledge, the potential dual nature of social anxiety body experiences (i.e., appearance and fitness-related) has not yet been examined. Exploring this possibility may provide a greater understanding of the emergence of the range of health-related outcomes emerging from these specific forms of social anxiety (Alcaraz-Ibáñez & Sicilia, 2019; Sabiston *et al.*, 2014). As a first and essential step in this direction, our study sought to examine whether appearance and fitness-related social anxiety may constitute substantive and distinguishable psychological constructs. To meet this preliminary objective, the tenability of a one-factor vs. a two-factor measurement model should be examined. Previous research suggests that, even though highly correlated, emotional experiences relating to body appearance and physical fitness may be considered as two substantive constructs (Gilchrist *et al.*, 2018). Consequently, it is expected that evidence in support of the distinguishable nature of these two constructs will emerge. Since scores derived from psychometric instruments assessing body image may be prone to gender bias (Schaefer, Harriger, Heinberg, Soderberg & Thompson, 2017), a second relevant preliminary objective should be to examine whether the hypothesized two-factor model is invariant across gender.

Providing that psychometric evidence in support of the two-factor model emerges, further examination of two main issues would be of interest. Firstly, whether social anxiety emerging from physical fitness may contribute to incrementally explaining two of the most clearly identified health outcomes of appearance-related social anxiety, namely, the risk of ED and depression (Sabiston *et al.*, 2014). Secondly, whether the risk of ED and depression may be incrementally explained by the interaction between both appearance and fitness-related social anxiety.

METHOD

Design and participants

The non-probabilistic sample group comprised 545 undergraduate students (46% men) recruited in two Spanish public universities. Their ages ranged from 18 to 30 years ($M = 21.36$, $SD = 2.93$) and their BMI from 16.59 to 36.33 kg/m² ($M = 23.03$, $SD = 3.36$).

Measures

Appearance and fitness-related social anxiety. We used an adapted version of the Spanish translation (Sáenz-Alvarez, Sicilia, González-Cutre & Ferriz, 2013) of the Social Physique Anxiety (SPAS) Scale (Motl & Conroy, 2000). For this, a second set of items was created by replacing words such as “physique or figure” with “physical fitness.” Given the poor performance shown by the only reverse-coded item included in the SPAS used in previous studies conducted in the Spanish context (Alcaraz-Ibáñez, Sicilia & Burgueño, 2017), and following advice against the inclusion of a reverse-coded item in an otherwise positively stated questionnaire (Roszkowski & Soven, 2010), this item was not included in any of the two factors. The six items were rated on a five-point scale from 1 (*Never*) to 5 (*Always*). Higher scores represent greater levels of appearance and fitness-related social anxiety.

Depressive symptoms. We used the Spanish version of the depression sub-scale from the Brief Symptom Inventory-18 (Derogatis, 2000). This

instrument includes six items that assess the distress experienced over the previous 2 weeks (American Psychiatric Association, 2013) as a result of the following depressive symptoms: apathy, sadness, self-deprecation, anhedonia, loss of hope and suicidal ideation. The items were rated on a five-point scale from 0 (*Not at all*) to 4 (*Extremely*). Higher scores represent greater symptoms of depression. Adequate psychometric properties for the Spanish version of this instrument have been previously reported (Andreu, Galdón, Durá *et al.*, 2008; Galdón, Galdón, Durá *et al.*, 2008).

Risk of eating disorders. We used the Spanish version (García-Campayo, Sanz-Carrillo, Ibáñez, Lou, Solano & Alda, 2005) of the SCOFF questionnaire (Morgan, Reid & Lacey, 1999). This instrument includes 5 dichotomous questions covering key characteristics of anorexia and bulimia nervosa such as loss of control over eating or food intrusive thoughts. Two or more positive responses indicate a high risk of ED (Morgan *et al.*, 1999). This instrument has been widely employed as a screening tool in the Spanish context in samples consisting of young adults (Alcaraz-Ibáñez & Sicilia, 2019; Garrido-Miguel, Torres-Costoso, Martínez-Andrés *et al.*, 2017). Findings from meta-analytic research reveal values of sensitivity and specificity for this instrument of 80% and 93%, respectively (Botella, Sepúlveda, Huang & Gambara, 2013).

Demographics and validity check. Participants provided their age and gender as well as their estimated height and weight, which were used to compute their BMI (measured in kg/m²). To minimize the risk of bias due to random responding or inattentiveness, a validity check item asking participants to mark two specific response options was included within the survey (i.e., “For this question, please, mark options 1, *Never* and 5, *Always*). To minimize the risk of bias due to order effects, the above described instruments were counterbalanced.

Procedure

After obtaining approval from the Ethics Committee of the authors' institution, the six items proposed to assess fitness-related social anxiety were pilot tested on a sample of undergraduate students ($N = 11$) aged between 18 and 23 years old ($M = 20.10$, $SD = 2.67$). None of the participants reported items that, in their opinion, might be ambiguous or unintelligible. Next, the researchers requested permission from the university lecturers to administer the survey to their students in the last 10 min of a regularly scheduled class. Participants were informed of the voluntary and anonymous nature of their participation as well as the right to withdraw at any time. Those who provided their informed consent (99.11%) completed a self-reported survey. No monetary or course credit compensation was offered in exchange for participation.

Data analyses

Preliminary analyses. The data were first screened for incorrect responses to the validity check questions. Next, the data were examined for missing values and multivariate outliers; in this latter case, attending to Cook's D values following a procedure described by Muthén, Muthén and Asparouhov (2016). The one-factor vs. two-factor structure and the invariance across gender of the instrument employed for the assessment of appearance and fitness-related social anxiety were investigated through confirmatory factor analyses (CFA) conducted in Mplus 7 (Muthén & Muthén, 1998–2015). Given the ordered polytomous nature of the variables (i.e., items), the weighted least squares mean and variance-adjusted (WLSMV) robust estimation method was employed (Finney & Di Stefano, 2006). The adequacy of the two vs. one-factor model was judged on the basis of two criteria: (1) goodness-of-fit indexes, with values for the comparative fit index (CFI) and Tucker-Lewis index (TLI) ≥ 0.95 , and for the root-mean-square error of approximation (RMSEA), with ≤ 0.08 considered indicative of acceptable fit (Brown, 2015); and (2) the presence of evidence supporting the discriminant validity of the two-factor solution; this being provided as long as the 95% confidence interval (CI) for the correlation estimate between the two latent factors is not greater than one

in absolute value (Anderson & Gerbing, 1988). The absence of significant differences in the DIFFTEST procedure implemented in Mplus 7 between a multigroup model in which parameters were freely estimated across gender groups (i.e., a configural model) and another in which item loadings and thresholds were constrained to be equal across gender groups (i.e., a metric/scalar model) were considered as indicative of measurement invariance across gender. Given the hierarchical structure of the data (i.e., they were collected in 15 classrooms), the CFA were conducted using the COMPLEX function in Mplus. Next, descriptive statistics and correlations between study variables were obtained, segmented by gender. Finally, the effect size of the differences in the variables under investigation between (a) women/men and (b) those classified/or not as in risk of ED was computed using Cohen's *d* (Cohen, 1988).

Main analyses. The multivariate relationships between study variables were examined through one 3-step logistic (in the case of ED risk) and linear (in the case of depressive symptoms) regression analysis using the COMPLEX function and the WLSMV estimation method in Mplus7. WLSMV has been suggested as a robust estimation method for the absence of normality in regression models including both categorical and continuous variables (Muthén & Muthén, 1998–2015). In this regression analysis, both (a) BMI and (b) physical appearance/fitness-related social anxiety and depressive symptoms were treated as continuous variables according to their aggregated mean scores. Likewise, the risk of eating disorder was explicitly declared as a dichotomous variable using the function implemented for the purpose in Mplus7 (i.e., 0 = no risk, 1 = at risk); specifically, according to the cut-off point proposed for the SCOFF questionnaire (i.e., ≥ 2 positive responses; Garcia-Campayo *et al.*, 2005; Morgan *et al.*, 1999). Independent variables were mean-centred before creating the interaction terms and being entered into the regression equations (Cohen, Cohen, West & Aiken, 2003). BMI and appearance-related social anxiety were introduced as predictor variables in Step 1. Fitness-related social anxiety was additionally introduced as a predictor variable in Step 2. The interaction term between appearance and fitness-related social anxiety was additionally introduced as a predictor variable in Step 3. According to prior evidence suggesting that potential body image-related predictors of ED and depression may differ depending on gender (Jones & Griffiths, 2014; Schaefer & Thompson, 2018), the above-described regression analyses were conducted separately for women and men. The equality of the observed relationships between study variables in Step 3 across women and men was examined through a multigroup analyses (i.e., a Wald test) conducted in Mplus 7.

RESULTS

Preliminary analyses

Seventeen cases (2.53%) with incorrect responses to the validity check question were identified and excluded. Missing values (<0.05%) were handled employing imputation methods implemented in Mplus 7. After inspecting the Cook's *D* values, three cases were identified as potential multivariate outliers; their deletion resulted in the sample size employed in subsequent analyses (*N* = 545). Regarding the factorial structure of the instrument proposed for assessing appearance and fitness-related social anxiety,

a value above what could be considered acceptable was found in the one-factor solution. In contrast, an adequate value was found in the case of the two-factor model (see Table 1). Providing evidence in support of discriminant validity for the two-factor model, the 95% CI of the correlation between appearance and fitness-related social anxiety was not greater than one in absolute value in female (0.88, 0.93) and male (0.80, 0.90) subsamples. Providing evidence supporting the invariant character of the two-factor structure across gender, the results derived from the DIFFTEST procedure did not reveal significant differences between the configural and metric/scalar models ($\Delta\chi^2 = 59.66$, $\Delta df = 44$, $p = 0.06$).

The descriptive statistics, composite reliability values (i.e., ρ ; Raykov, 2004), correlations, and differences across study variables according to gender and being at risk or not of ED are shown in Table 2. Medium-sized differences favoring women were found both in the case of appearance ($d = 0.55$) and fitness-related ($d = 0.49$) social anxiety. Large and medium-sized differences favoring those classified as at risk of ED were found, respectively, in the case of (a) appearance ($d = 1.13$) and fitness-related ($d = 1.17$) social anxiety and (b) BMI ($d = 0.77$) and depressive symptoms ($d = 0.67$). Positive correlations were found between BMI and both appearance and fitness-related social anxiety; these being medium sized in women but close to zero in men. Positive and medium to high correlations were also found both in women and men between appearance and fitness-related social anxiety and depressive symptoms. According to the SCOFF scores, 22.97% and 22.49% of the female and male participants, respectively, were classified as “at risk of ED.”

Main analyses

All tolerance values were >0.25 (women) and 0.30 (men) and all variance inflation factors (VIF) were <3.94 (women) and 2.69 (men) indicating that multicollinearity was not an issue (Kline, 2011). The results of the regression analyses (see Table 3) revealed that, after controlling for the effects of BMI and appearance-related social anxiety (Step 1), fitness-related social anxiety positively and significantly contributed to explaining both the risk of ED (in men and women) and depressive symptoms (in women). The inclusion of the interaction term within the appearance/fitness-related term positively contributed to explaining additional variance for both the risk of ED and depressive symptoms in men, but not in women. The results of the Wald test of equalities between female and male subgroups revealed that only the relationship between appearance-related social anxiety and the risk of ED was significantly different from zero ($\Delta\chi^2 = 4.09$, $\Delta df = 1$, $p = 0.04$). In Step 3, the regression

Table 1. Goodness-of-fit indexes of the instrument employed for the assessment of appearance and fitness-related social anxiety

Model	χ^2	<i>df</i>	CFI	TLI	RMSEA (90% CI)
One-factor	510.43	54	0.987	0.984	0.125 (0.115, 0.135)
Two-factor	188.26	53	0.996	0.995	0.068 (0.058, 0.079)
Two-factor (configural invariance)	241.40	106	0.997	0.996	0.068 (0.057, 0.080)
Two-factor (metric/scalar invariance)	285.99	150	0.997	0.997	0.058 (0.047, 0.068)

Note: CFI = comparative fit index, TLI = Tucker–Lewis index, RMSEA = root mean square error of approximation.

Table 2. Descriptive statistics, composite reliability, correlational analysis and groups differences

	Women <i>n</i> = 296										Men (<i>n</i> = 249)				No risk of ED (<i>n</i> = 421)				At risk of ED (<i>n</i> = 124)			
						Range	<i>M</i>	<i>SD</i>	ρ	<i>M</i>	<i>SD</i>	ρ	<i>t</i>	<i>d</i>	<i>M</i>	<i>SD</i>	ρ	<i>t</i>	<i>d</i>			
	1	2	3	4	5																	
1. Age	–	0.18**	–0.12	–0.14*	–0.00	18–30	21.46	2.73	–	21.25	3.16	–	0.82	0.09	21.37	2.96	21.32	2.84	0.17	0.02		
2. BMI	0.12**	–	0.08	0.05	0.35***	16.59–36.33	22.55	3.69	–	23.59	2.83	–	3.64***	0.32	22.47	3.01	24.93	3.77	7.53***	0.77		
3. Appearance-related Social Anxiety	–0.08	0.35***	–	0.77***	0.37***	1–5	2.54	1.12	0.96	1.97	0.94	0.96	6.39***	0.55	2.03	0.91	3.13	1.18	10.98***	1.13		
4. Fitness-related Social Anxiety	–0.10	0.31***	0.85***	–	0.40***	1–5	2.37	1.21	0.98	1.84	0.94	0.97	5.66***	0.49	1.86	0.93	3.04	1.25	11.46***	1.17		
5. Symptoms of Depression	–0.01	0.29***	0.59***	0.58***	–	0–4	1.11	0.99	0.94	0.80	0.84	0.92	3.90***	0.34	0.83	0.82	1.44	1.15	6.62***	0.67		

Notes: ρ = Composite reliability (Raykov, 2004). Correlation values below (above) the diagonal correspond to the female (male) subsample.

*Observed range in the case of age and BMI.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

models explained 48% (women) and 35% (men) of the ED risk and 25% (women) and 19% (men) of depressive symptoms.

DISCUSSION

Recently, some scholars have argued that considering both appearance and functionality-related body image domains may contribute to a better understanding of health outcomes derived from these kinds of experiences (Gilchrist *et al.*, 2018). Accordingly, the main goal of the present study was to examine whether appearance and fitness-related social anxiety may independently contribute to explaining the risk of ED and depressive symptoms in a sample of undergraduate young adults. The findings from the present study extend our current knowledge of the relationship between body image and its potential health outcomes by suggesting that both appearance and fitness-related social anxiety experiences may contribute to explaining the emergence of ED and depression in young adults.

The findings supporting the two-factor solution of body-related social anxiety experiences suggest that this affective reaction may emerge from self-presentational concerns derived not only from body appearance but, additionally, from physical fitness. Obtaining evidence in support of the invariant character across gender of the adapted version of the SPAS (Motl & Conroy, 2000; Sáenz-Alvarez *et al.*, 2013) employed in the present study provides avenues for future research aimed at exploring the gendered nature of appearance and fitness-related social anxiety. In this regard, the greater levels of appearance-related social anxiety reported by women included in the analyzed sample are consistent with what has been extensively documented by previous research (Sabiston *et al.*, 2014). Conversely, these findings are much more novel in the case of the fitness-related domain. In fact, theoretical frameworks such as Objectification Theory have explained gender differences in appearance-related concerns on the basis of the social learning process (Fredrickson & Roberts, 1997). In this vein, women are socialised to view themselves as objects whose value is determined by external appraisals of how their bodies look (Noll & Fredrickson, 1998). However, the findings from the present study suggest that young adult women may also experience more social anxiety than men as a result of not being able to make favorable fitness-related impressions (Sabiston *et al.*, 2014). These findings may prove important from a theoretical perspective insofar as they suggest that western female body ideals may incorporate elements closely related to physical fitness (e.g., attaining supposed functionality-enabling body composition characteristics or certain levels of muscular tone). In favor of this interpretation, it could be argued, is the growing popularity of content allusive to “fitspiration” (a term derived from joining fitness and inspiration) in social media, particularly among women (Uhlmann, Donovan, Zimmer-Gembeck, Bell & Ramme, 2018).

The obtained findings are consistent with those from previous research insofar as they point to body-related social anxiety as a relevant factor in the emergence of certain deleterious health outcomes both in women and men (Alcaraz-Ibáñez & Sicilia, 2019; Alcaraz-Ibáñez *et al.*, 2017). These results also allow for some preliminary conclusions to be made regarding the complementary role that appearance and fitness-related concerns

Table 3. Multivariate relationships between (a) appearance and fitness-related social anxiety and (b) the risk of eating disorders and depression

		Risk of eating disorders						Symptoms of depression					
		Women (n = 296)			Men (n = 249)			Women (n = 296)			Men (n = 249)		
		R ²	β (SE)	95% CI	p	R ²	β (SE)	95% CI	p	R ²	β (SE)	95% CI	p
Independent variables													
Step 1		0.45				0.28				0.24			
BMI			0.20 (0.07)	0.06, 0.33	0.004		0.34 (0.06)	0.22, 0.47	0.000				
Appearance-related			0.58 (0.08)	0.43, 0.73	0.000		0.38 (0.06)	0.26, 0.49	0.000				
Social Anxiety													
Step 2		0.47				0.33				0.24			
BMI			0.20 (0.07)	0.06, 0.34	0.006		0.35 (0.07)	0.22, 0.48	0.000				
Appearance-related			0.38 (0.10)	0.19, 0.57	0.000		0.12 (0.08)	-0.04, 0.27	0.150				
Social Anxiety													
Fitness-related			0.23 (0.09)	0.06, 0.40	0.007		0.34 (0.09)	0.16, 0.51	0.000				
Social Anxiety													
Step 3		0.48				0.35				0.25			
BMI			0.19 (0.07)	0.06, 0.33	0.006		0.33 (0.06)	0.22, 0.45	0.000				
Appearance-related			0.39 (0.11)	0.17, 0.60	0.000		0.05 (0.09)	-0.12, 0.22	0.550				
Social Anxiety													
Fitness-related			0.18 (0.09)	0.00, 0.36	0.048		0.27 (0.10)	0.07, 0.46	0.007				
Social Anxiety													
Appearance*			0.11 (0.08)	-0.05, 0.26	0.169		0.21 (0.07)	0.07, 0.35	0.004				
Fitness-related													
Social Anxiety													

Note: β = Standardized regression coefficients, SE = standard error; CI = confidence interval.

may eventually play on the emergence of ED and depression in young adults. In this sense, it should be noted that, among the multivariate relationships examined involving body-related social anxiety, only the one relating appearance-related social anxiety and the risk of ED significantly differs in its magnitude across gender groups. Conversely, the regression coefficient between the interaction term for appearance/fitness-related social anxiety and the risk of ED was significant. This suggests that, far from being irrelevant in men, appearance-related social anxiety may be particularly detrimental in terms of the emergence of such a disorder in the presence of greater levels of fitness-related social anxiety. Overall, these findings invite further research on the relationship between fitness-related social anxiety and other health-related outcomes previously associated to appearance-related social anxiety (e.g., physical activity) (Sabiston *et al.*, 2014).

The findings point to the fitness-related dimension of body image as a potential source of self-presentational concerns. These results reinforce the notion that not only a poor body appearance (Voelker *et al.*, 2015) but also a poor fitness level could be perceived as a feature that is subject to social sanction (Carter *et al.*, 2011). One of the reasons behind such perceptions may be found in public health messages aimed at promoting exercise and physical fitness (Garber, Blissmer, Deschenes *et al.*, 2011; Steele, Fisher, Skivington *et al.*, 2017). Indeed, some scholars have warned about the potential dangers of public health messages that, adopting a neoliberal and achievement-oriented perspective, place all the responsibility with respect to fitness and health promotion on the individual (Cairney, McGannon & Atkinson, 2018; Carter *et al.*, 2011). The findings from the present study substantiate some of these dangers by suggesting that such messages may increase self-presentational concerns with respect to physical fitness which, in turn, may lead to unwanted health-related outcomes such as the increased risk of ED and depression. From a practical point of view, these findings are consistent with the requirement that public health messages should not be oriented towards the “more is better” idea of physical fitness held by some scholars (Cairney *et al.*, 2018). The findings may also suggest that professionals involved in health promotion (e.g., medical professionals or physical educators) should be extremely careful about imposing excessive moral obligations which, in terms of achieving rather unrealistic physical fitness, may lead to the emergence of self-presentational concerns regarding this body-related feature.

Some of the main limitations of the present study are acknowledged and discussed below. A first main limitation concerns the approach adopted for the assessment of the risk of ED. In particular, despite the wide-ranging and complex features involved in the diagnosis of this pathology (American Psychiatric Association, 2013), this variable was assessed employing a brief screening instrument focused just on bulimic and anorexic symptoms (Morgan *et al.*, 1999). Consequently, further research is warranted that replicates the findings obtained here by employing a multi-item inventory that allows for a more comprehensive representation of these features. A clear example of the latter would be considering not only symptoms reflecting some of the thinness-related features involved in ED but, additionally, those more related to the pursuit of muscularity (Murray *et al.*, 2017). A second main limitation has to do with

the sample group recruited; specifically, that it consisted of non-clinical young adult undergraduates. Consequently, these findings cannot be generalized to clinical populations or those that, being particularly sensitive to body-image concerns may be at greater risk of ED or depression; for instance, adolescents (Erskine, Baxter, Patton *et al.*, 2017; Jones & Griffiths, 2014; Schaefer & Thompson, 2018). Finally, the cross-sectional nature of the data prevents us from drawing any causal inferences between the variables of interest. In view of this limitation, future research should examine whether, as suggested by previous works employing longitudinal designs for appearance-related social anxiety (Alcaraz-Ibáñez & Sicilia, 2019; Levinson & Rodebaugh, 2016), fitness-related social anxiety may prospectively contribute to explaining the emergence of ED or depression.

On balance, the findings from the present study underscore the role that not only appearance but also fitness-related social anxiety experiences may play on the emergence of severe pathological conditions such as ED and depression in young adults. In light of these findings, a focus on lessening social pressures towards attaining unrealistic or highly demanding standards of fitness may represent a fruitful strategy to implement in future prevention and intervention work aimed at decreasing the prevalence of ED and depression in young adults. As a possible step in this direction, health care and fitness professionals should promote the adoption of critical perspectives against fitness ideals spread by mass and social media among their patients and clients.

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CONFLICTS OF INTEREST

The authors declare no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

DATA ACCESSIBILITY

The datasets generated during and analyzed during the current study are available in the University of Almeria repository (<http://repositorio.ual.es/handle/10835/6471>).

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