



# Analysis of the dynamic relationship between social physique anxiety and depressive symptoms in young adults

Manuel Alcaraz-Ibáñez\*, Alvaro Sicilia

Facultad de Educación, Centro de Investigación en Salud, Universidad de Almería, Carretera de Sacramento s/n, 04120, La Cañada de San Urbano, Almería, Spain

## ARTICLE INFO

### Keywords:

Social physique anxiety  
Body image  
Psychopathology  
Young adults  
Emerging adults  
Depression

## ABSTRACT

This study explored the dynamic relationship between social physique anxiety and depressive symptoms in a sample of young adults over a six-month period. Using a two-wave longitudinal design, data were collected from a sample of 398 undergraduate students (47.70% females, 97.50% white) aged between 18 and 30 years old ( $M = 20.47$ ,  $SD = 2.42$ ). Results from the latent change score model showed that initial levels of social physique anxiety significantly predicted changes in depressive symptoms ( $\beta = 0.35$ ,  $p = .002$ ). Conversely, initial levels of depressive symptoms did not significantly predict changes in social physique anxiety ( $\beta = 0.01$ ,  $p = .90$ ). None of these relationships were moderated by sex. The findings suggest that a focus on addressing distressed affective reactions derived from anticipating negative social appraisals may help to ameliorate depressive symptoms among young adults.

## Introduction

The term depression refers to a broad clinical spectrum involving symptoms such as sadness, self-deprecation and hopelessness (Derogatis, 2000). Currently, depression is one of the leading causes of disability and economic disease burden worldwide (Greenberg, Fournier, Sisitsky, Pike, & Kessler, 2015; Vos et al., 2017). With rates up to 10% (Mojtabai, Olfson, & Han, 2016), young adults (i.e., 18–30 years old; Van Kim, Larson, & Laska, 2012) have been identified as one of the age groups with the highest prevalence of depression (Sutin et al., 2013). These figures are of even more concern in light of the increased trend in the prevalence of depression in young adults observed over the last century (Mojtabai et al., 2016). Consequently, gaining a deeper insight into the causes leading to the emergence of depression during young adulthood is a matter of interest from a public-health standpoint (Muñoz, Beardslee, & Leykin, 2012).

A range of risk factors are associated with the emergence of depression in young adults. For instance, epidemiological studies have shown that young women display greater depressive symptoms than men (Mojtabai et al., 2016; Sutin et al., 2013). Likewise, evidence from meta-analytic research supports both excessive body weight and eating pathologies as risk factors for depression (Mannan, Mamun, Doi, & Clavarino, 2016; Puccio, Fuller-Tyszkiewicz, Ong, & Krug, 2016). Body image is one factor receiving increased research attention for explaining the onset of depression during young adulthood (Jones & Griffiths,

2014; Sharpe et al., 2017). Body image is a complex construct comprising subjective perceptions and attitudes about one's body attributes such as weight, shape and appearance (Cash, 2012). Body image attitudes may refer to investments (i.e., to what extent body attributes are important for self-evaluation) or evaluations (i.e., to what extent an individual is satisfied or dissatisfied with his/her body attributes as a result of cognitive or affective appraisals) (Cash, 2012). A clear example of a construct involving affective body appraisals is social physique anxiety (SPA; Hart, Leary, & Rejeski, 1989). SPA refers to the anxious and uncomfortable affective reaction experienced as a result of anticipating negative social evaluations of one's own body (Hart et al., 1989). Thus, SPA does not merely reflect a negative cognitive self-evaluation of the body but the inability to generate favourable public impressions on the basis of one's own physical attributes (Leary & Jongman-Sereno, 2014). This distinction between the cognitive and affective nature of body-related evaluations is relevant insofar as both kinds of construct may be differentially related to their potential outcomes (Davison & McCabe, 2005; Mustapic, Marcinko, & Vargek, 2015). Consequently, examining the differential impact of negative body evaluations of a different nature on depression may lead to the development of more precise and effective prevention and intervention actions aimed at reducing the social and economic cost caused by this pathology in a particularly sensitive population such as young adults (Greenberg et al., 2015; Mojtabai et al., 2016; Sutin et al., 2013; Vos et al., 2017).

To explain the causal relationship between negative body

\* Corresponding author.

E-mail address: [m.alcaraz@ual.es](mailto:m.alcaraz@ual.es) (M. Alcaraz-Ibáñez).

evaluations and depression, three main theoretical possibilities have been raised (Patalay, Sharpe, & Wolpert, 2015). Firstly, the *body dissatisfaction-driven hypothesis* stipulates that depression may emerge as a result of failed attempts to bring the body back in line with pursued ideals. Secondly, the *internalising-driven hypothesis* implies that depression may lead to negative body-related evaluations. More specifically, since the inherent negative cognitive bias posited by some theoretical models of depression as the core element of this mental condition would be the cause behind negative body evaluations (Beck, 2002; Haefffel et al., 2017). Thirdly, the *bidirectional hypothesis* implies that the relationship between body-related concerns and depression would be reciprocal.

Some of these theoretical possibilities concerning the relationship between body evaluations and depression have been prospectively tested. Findings from these research studies have supported body dissatisfaction as an antecedent to depression in male and female adolescents across a four-year period (Ferreiro, Seoane, & Senra, 2012). Evidence has also been provided that depression may lead to negative body evaluations among males (but not among females), across a 10-year period that extended from adolescence to young adulthood (Quick, Eisenberg, Bucchianeri, & Neumark-Sztainer, 2013). However, to date, only two empirical studies have simultaneously tested these three theoretical possibilities (Patalay et al., 2015; Sharpe et al., 2017). Findings from these two studies have supported the body dissatisfaction-driven hypothesis versus the other two possibilities in females transitioning from early to mid-adolescence, as well as in females and males transitioning from adolescence to early adulthood. Conversely, these same findings have supported the internalising-driven hypothesis versus the other two possibilities in males transitioning both from early to mid-adolescence and from early to late-young adulthood (Patalay et al., 2015; Sharpe et al., 2017). In summary, evidence to date tends to favour the body dissatisfaction-driven hypotheses over the other two possibilities in young adults. It is less clear whether this pattern of relationships is consistent across sexes.

The validity of the body dissatisfaction-driven hypothesis across sexes in young adults may be questioned somewhat based on the limitations of previous research. A first limitation concerns the employment of subgroup analyses instead of a formal test of moderation when examining whether the relationships under consideration were consistent across sexes (Patalay et al., 2015; Sharpe et al., 2017). More specifically, insofar as the former procedure does not allow potential sex differences in the dependent variables under consideration (i.e., depression; Mojtabai et al., 2016; Sutin et al., 2013) to be taken into account. A second relevant limitation concerns the fact that the presence of an eating pathology was not considered (Sharpe et al., 2017). In this respect, evidence from meta-analytic research reveals the bidirectional causality between eating pathologies and depression (Puccio et al., 2016). Moreover, the close relationship between body dissatisfaction and eating pathologies has been extensively documented (Lantz, Gaspar, DiTore, Piers, & Schaumberg, 2018). Thus, the possibility that the predictive effect of body dissatisfaction on depressive symptoms reported by Sharpe et al. (2017) is due to the shared variance between the former construct and an eating pathology cannot be discarded. Finally, it should be noted that Sharpe et al. (2017) considered a construct encompassing negative cognitive appraisals of the body (i.e., satisfaction/dissatisfaction with body weight and shape). Consequently, the influence that negative body evaluations of an affective nature (and more specifically, SPA) may exert on the emergence of depression in young adults remains largely unknown.

The link between SPA and depression seems plausible based on two main arguments. The first is that SPA involves a negative evaluation of one's own body (Hart et al., 1989). In support of this possibility, it is worth noting that the cross-sectional positive relationship between SPA and depressive symptomatology is well documented (Sabiston, Pila, Pinsonnault-Bilodeau, & Cox, 2014). The second is the detrimental effect that the subsequent depletion of self-regulatory resources (aimed at

controlling the aversive thoughts and feelings derived from social anxiety) may have on overall psychological functioning (Kashdan, 2007). For this second possibility, scholars have identified social anxiety (though not specifically body-related) as a prospective predictor of depressive symptomatology in young adults (Grant et al., 2014).

In spite of the evidence supporting SPA as a potential risk factor of depression, to our knowledge, no study has yet examined this possibility employing a longitudinal design. In this regard, it should be noted that SPA profiles are predominantly stable over six-month periods (Levinson & Rodebaugh, 2016; Sabiston et al., 2014) while depressive symptoms are comparatively variable (Keller, Neale, & Kendler, 2007; Kouros & Garber, 2014). This difference may be of relevance when deciding on the methodological approach to apply, particularly in light of warnings about the potentially spurious conclusions that may emerge from adopting a between-person methodological approach that relies on covariance structures when examining dynamic relationships involving a rather stable variable (e.g., autoregressive cross-lagged panel designs; Hamaker, Kuiper, & Grasman, 2015; Usami, Hayes, & McArdle, 2016). Consequently, it seems sensible to address the dynamic relationship between SPA and depressive symptoms by adopting a within-person approach that allows one to examine changes across two time points (McArdle, 2001, 2009).

The present study's preliminary objectives were threefold. The first was to describe within-person changes in SPA and depressive symptoms over a six-month period. The second was to describe between-person differences within those changes. The third was to examine the extent to which the initial level of both SPA and depressive symptoms was related to its subsequent change. Based on previous research adopting a between-person approach (Davison & McCabe, 2005; Levinson & Rodebaugh, 2016; Sabiston & Chandler, 2010), slight overall within-person changes and slight between-person differences in SPA changes were expected to emerge. In the absence of a previous empirical basis to support either the direction of change or the prevalent tendency, no hypothesis was advanced for these last two questions. As research employing a within-person approach reveals that depressive symptoms are susceptible to change (Keller et al., 2007; Kouros & Garber, 2014) and the results of studies addressing depressive symptom trajectories in young adults (Schubert, Clark, Van, Collinson, & Baune, 2017; Sutin et al., 2013), it was expected that mild overall decreases and between-person differences in those depressive symptom changes would emerge.

As a main objective, this study aimed to explore the dynamic relationships between SPA and depressive symptomatology in a sample of young adults over a six-month period. According to evidence suggesting the validity of the body dissatisfaction-driven hypothesis (Ferreiro et al., 2012; Sharpe et al., 2017), it was expected that: (a) initial SPA levels would be positively related to within-person changes in depressive symptoms, (b) initial levels of depressive symptoms would be weakly related to within-person changes in SPA; (c) changes in SPA and depressive symptoms would be positively correlated. Given the inconclusive findings concerning the moderating role of sex on the relationship between body image concerns and depression (Sharpe et al., 2017), no hypothesis was advanced in this regard (Rawana, McPhie, & Hassibi, 2016; Richard, Rohrmann, Lohse, & Eichholzer, 2016). It was expected that all these relationships would emerge after controlling for the effects of potential confounding variables such as body weight/shape dissatisfaction, body mass index (BMI; Mannan et al., 2016; Sharpe et al., 2017; Richard et al., 2016), sex (Mojtabai et al., 2016; Sutin et al., 2013) and being at risk of an eating pathology (Levinson & Rodebaugh, 2016; Puccio et al., 2016).

## Method

### Participants

Using a non-probabilistic sampling technique, undergraduate students from three Spanish public universities were invited to participate

in the classrooms and gave their consent ( $N = 438$ ). Participants were excluded if they were younger than 18 or older than 30 years of age ( $n = 21$ ), if they were diagnosed with another primary psychiatric diagnosis apart from depression or eating pathologies ( $n = 8$ , including  $n = 4$  with generalized anxiety disorder,  $n = 2$  with bipolar disorder,  $n = 1$  with schizophrenia, and  $n = 1$  with substance abuse), or if they reported current use of pharmacological or psychological treatment for depression or an eating pathology. None of the participants were excluded according to the last exclusion criteria. Six months after the initial survey, those participants that were present in the classrooms ( $n = 408$ ) were invited to complete a reduced version of the initial survey. Nine participants declined to fill in the second survey and were therefore excluded from the study. The retention rate between time 1 (T1) and time 2 (T2) was 91.32%. Given the low percentage of person-level missingness (i.e., not completing the assessment at T2), these missing data were treated by adopting a pairwise deletion approach (Newman, 2014). Attrition analyses revealed no significant differences between the participants who dropped out at T2 and those that completed the survey at both assessment points in terms of sex, age, eating disorder risk, or the remaining variables of interest. Thus, 398 participants (47.70% females, 97.50% white) aged between 18 and 30 years old ( $M = 20.47$ ,  $SD = 2.42$ ) were included in the analyses.

### Procedure

Following approval by the ethics committee of the author's institution, participants were invited to take part in the study at the beginning of a lecture within the first month of the academic year. The project was described as research on body and emotional experiences. After being informed of the voluntary, non-remunerated and anonymous nature of their participation, those who provided their informed consent completed a paper-and-pencil survey. In both assessment waves, a sentence placed at the end of the survey encouraged participants to check that they did not unintentionally leave any question unanswered. Participants needed approximately 5–10 min to complete the survey. The participants' responses at T1 and T2 were matched using a self-generated personal code.

### Measures

#### Social physique anxiety

This was assessed using the Spanish version (Sáenz-Alvarez, Sicilia, González-Cutre, & Ferriz, 2013) of the Social Physique Anxiety Scale (SPAS; Motl & Conroy, 2000). Grouped in a single dimension, the seven items comprising the instrument (e.g., "It would make me uncomfortable to know others were evaluating my physique or figure") assess anxiety and discomfort experienced as a result of perceiving that others could be negatively evaluating his/her physique (Hart et al., 1989). The items are rated on a scale from 1 (*never*) to 5 (*always*). Higher scores represent greater levels of SPA. In spite of the weak factor loading of the only reverse-worded item included in the instrument (i.e., item 5, "I am comfortable with how fit my body appears to others"), evidence supporting the psychometric properties of the SPAS in Spanish samples has been provided (Alcaraz-Ibáñez, Sicilia, & Burgueño, 2017; Sáenz-Alvarez et al., 2013). In the present study, the construct reliability values were  $\rho = 0.88$  (T1) and  $\rho = 0.91$  (T2).

#### Depressive symptoms

These were assessed using the Spanish translation of the depression sub-scale of the Brief Symptom Inventory-18 (Derogatis, 2000). The six items comprising this subscale (e.g., "Feeling hopeless about the future") assess distress caused by depressive symptoms (i.e., apathy, sadness, self-deprecation, anhedonia, loss of hope and suicidal ideation) over the past seven days. However, reflecting more recent depression diagnostic criteria, this time frame was adapted in the present study to "the last two weeks" (American Psychiatric Association, 2013). The

items are rated on a scale from 0 (*not at all*) to 4 (*extremely*). Higher scores represent more severe symptoms of depression. Evidence supporting the psychometric properties of this instrument in Spanish samples has been provided (Andreu et al., 2008; Galdón et al., 2008). In the present study, the construct reliability values were  $\rho = 0.80$  (T1) and  $\rho = 0.83$  (T2).

#### Risk of eating pathology

This was assessed only at T1 using the Spanish version (García-Campayo et al., 2005) of the SCOFF questionnaire (Morgan, Reid, & Lacey, 1999). This instrument consists of five questions (e.g., "Do you worry you have lost control over how much you eat?") that reflect some key characteristics of anorexia and bulimia nervosa (e.g., loss of control, overeating or food-related intrusive thoughts). Each of these five questions is rated dichotomously (*no/yes*). Used as a screening instrument, a threshold of two positive responses (from a possible maximum of five) has been proposed as indicative of a possible eating pathology (Morgan et al., 1999). According to this cut-off point, 19.10% of the participants were considered "at risk" of an eating pathology.

#### Body weight or shape dissatisfaction

This was assessed only at T1 using an adaptation of the item proposed by Gideon et al. (2016; i.e., "how dissatisfied are you with your body weight or shape?"). This item is rated on a scale from 0 (*not at all*) to 4 (*markedly*).

#### Demographics

Participants reported their age, ethnicity (in this case, for descriptive purposes only), height and weight only at T1. Body mass index (BMI) was derived from self-reported height and weight; it was expressed in  $\text{kg}/\text{m}^2$ .

#### Data analyses

##### Preliminary analyses

Data were first screened to identify missing values and potential univariate (i.e.,  $z$  score  $> \pm 4$ ) and multivariate outliers, in the latter case using Cook's distance following the procedure described by Muthén, Muthén, and Asparouhov (2016). Next, the factorial structure and construct reliability of the psychometric instruments employed to assess SPA and depression were investigated, namely through confirmatory factor analyses conducted in Mplus (version 7.0; Muthén & Muthén, 1998-2015). To deal with an eventual departure of the data from the normal distribution, these analyses were conducted using full information maximum likelihood estimation with robust standard errors (MLR). Then, descriptive statistics and correlations between continuous study variables were obtained for the full sample. Finally, differences in SPA and depression by sex and eating pathology risk were computed. The effect size of the correlations ( $r$ ) and the group differences ( $d$ ) was interpreted according to the guidelines outlined by Cohen (1988).

##### Main analyses

The dynamic relationships of interest were examined using structural equation modelling (SEM) and a latent change score (LCS) approach (McArdle, 2001, 2009) with Mplus. To keep a reasonable ratio between the number of cases and parameters estimated, SPA and depression were conceptualized in the LCS models as latent variables represented by three indicators (i.e., item parcels) using the item-to-construct balance technique (Little, Rhemtulla, Gibson, & Schoemann, 2013). Thus, items were ranked on the basis of the factor loading found in the preliminary analyses for the Time 1 assessment and were matched in an inverted order. This approach has a number of advantages over considering single items as indicators of the specified latent constructs (e.g., to keep both a reasonable ratio between the number of cases and parameters estimated and having a higher ratio of common-

to-unique factor variance, as well as reducing the source of sampling error; Little et al., 2013). Details of the steps followed are described below.

First, the invariant character of the indicators comprising the latent constructs across both assessment waves was checked. Verifying compliance with this requisite before constructing a LCS model allows one to state that the changes observed across time reflect true changes in the constructs of interest rather than modifications in the scale scores' metric (McArdle, 2009). To check this condition, the following four progressively constrained models were specified (Brown, 2015): (a) a baseline model including no constraints; (b) a second model in which the indicators' factor loadings at T1 and T2 were constrained to equality; (c) a third model in which the indicators' intercepts at T1 and T2 were additionally constrained to equality; and (d) a fourth model in which the indicators' residual variances at T1 and T2 were also constrained to equality. In these four models, the indicators' error terms were allowed to correlate across both assessment waves (Brown, 2015). Significant  $p$ -values (i.e.,  $p < .05$ ) in the scaled  $\chi^2$  difference tests between progressively nested models were considered as indicative of non-invariance (Muthén & Muthén, 1998-2015).

Secondly, two univariate LCS models were specified (i.e., the first for SPA and the second for depressive symptoms). These allowed us to examine the overall changes in within-person levels of SPA and depressive symptoms, the presence of between-person differences in those changes, and whether changes in one of these two variables depended on its starting values. The percentage of participants showing increases, decreases or lack of changes was estimated calculating plausible values for the latent change variables and its 95% confidence intervals following the procedure described by Asparouhov and Muthén (2010).

Finally, the dynamic relationship between SPA and depression was investigated using a bivariate LCS model. This model allows one to test whether initial levels of SPA and depression predicted changes in those variables, and whether changes in SPA and depressive symptoms occur simultaneously. In this model, the effects of potentially confounding variables such as sex (dummy coded, with males as the reference group), BMI, body shape and weight dissatisfaction, and being at risk of an eating pathology (dummy coded, with "not at risk" as the reference group) were controlled. Individual interaction terms employing Mplus's *XWITH* function were employed to model sex as a moderator of the associations between initial levels of SPA and depression with changes across time in those variables.

To allow for the identification of the LCS models, means and variances for factors (excluding those representing changes) were fixed at 0 and 1, respectively, whilst autoregressive paths from Time 1 to Time 2 and the latent factor representing change were fixed at 1 (McArdle, 2001, 2009). To deal with an eventual departure of the data from the normal distribution, LCS models were estimated using the MLR estimation method implemented in Mplus. As model fit indices, values  $\geq 0.95$  or  $\geq 0.90$  for the comparative fit index (CFI), and  $\leq 0.06$  or  $\leq 0.08$  for both the root-mean-square error of approximation (RMSEA) and the standardized root-mean-square residual (SRMR), respectively, were considered as excellent or acceptable (Brown, 2015).

## Results

### Preliminary analyses

One potential multivariate outlier was identified and eliminated, leading to the final sample employed in the remaining statistical analyses ( $N = 398$ ). The results for the confirmatory factorial analyses conducted to verify the factorial structure and construct reliability of the psychometric instruments are shown in Table 1. As found in previous research (Alcaraz-Ibáñez et al., 2017; Sáenz-Alvarez et al., 2013) and as mentioned previously, the negatively-worded item included in SPAS showed weak factor loadings after being reverse-scored at T1 ( $\lambda = 0.37$ ) and T2 ( $\lambda = 0.27$ ). In light of these findings and

**Table 1**  
Goodness-of-fit indexes of psychometric instruments.

	$\chi^2$	$df$	CFI	SRMR	RMSEA [95% CI]
SPAS Time 1	79.54	14	0.93	0.04	0.11 [0.09, 0.13]
SPAS Time 1 (item 5 excluded)	52.67	9	0.94	0.04	0.11 [0.08, 0.14]
SPAS Time 2	63.36	14	0.95	0.03	0.09 [0.07, 0.12]
SPAS Time 2 (item 5 excluded)	50.68	9	0.95	0.03	0.11 [0.08, 0.14]
BSI (depressive symptoms) time 1	11.36	9	0.99	0.02	0.03 [0.00, 0.07]
BSI (depression symptoms) time 2	6.24	9	1.00	0.02	0.03 [0.00, 0.04]

Note. SPAS = Social Physique Anxiety Scale, BSI = Brief Symptom Inventory.

methodological recommendations (Roszkowski & Soven, 2010), this item was dropped from further analyses.

The descriptive statistics and correlational analyses are shown in Table 2. High levels of SPA at T1 were strongly associated with high levels of SPA at T2. This was also the case for depressive symptoms at T1/T2. High levels of SPA were moderately associated with high levels of depression. High levels of body weight and shape dissatisfaction were moderately to strongly associated to high levels of SPA and depressive symptoms. BMI was weakly associated with SPA. Mid- and small-sized differences in SPA ( $d_{T1} = 0.46$ ,  $d_{T2} = 0.42$ ) and depression ( $d_{T1} = 0.20$ ,  $d_{T2} = 0.19$ ) favouring women were found, respectively. Likewise, large- and mid-sized differences in SPA ( $d_{T1} = 1.02$ ,  $d_{T2} = 1.07$ ) and depression ( $d_{T1} = 0.45$ ,  $d_{T2} = 0.35$ ) favouring those at risk of an eating pathology were found, respectively.

### Main analyses

The results of the invariance analyses (see Table 3) supported the equivalence of the indicators across both assessment waves. The results of the first univariate LCS model revealed a non-significant mean increase from T1 to T2 in SPA ( $M = 0.12$ ,  $p = .19$ ). Furthermore, both SPA at T1 ( $\sigma^2 = 0.69$ ,  $p < .001$ ) and change in SPA ( $\sigma^2 = 0.34$ ,  $p < .001$ ) showed significant values of variance, thus indicating between-person differences in within-person changes for this variable. Results also revealed that SPA increases were less pronounced for those with greater starting levels in this variable ( $\beta = -0.16$ ,  $SE = 0.08$ ,  $p = .049$ ). According to the estimated plausible values, 17.60% of the participants showed significant increases, 30.70% showed significant decreases and the remaining 51.80% showed no significant changes in SPA. The model-of-fit indexes obtained for this model were  $\chi^2(5) = 12.90$ ,  $p = .02$ , CFI = 0.99, SRMR = 0.02, RMSEA = 0.06, RMSEA 95% CI [0.02, 0.11]. The results of the second univariate LCS model revealed a significant mean decrease from T1 to T2 in depressive symptoms ( $M = -0.21$ ,  $p = .004$ ). The model-of-fit indexes obtained for this model were  $\chi^2(5) = 3.95$ ,  $p = .56$ , CFI = 1.00, SRMR = 0.01, RMSEA = 0.00, RMSEA 95% CI [0.00, 0.06]. Moreover, depression at T1 ( $\sigma^2 = 0.22$ ,  $p < .001$ ) and change in depression ( $\sigma^2 = 0.15$ ,  $p < .001$ ) showed significant variance values, thus, indicating between-person differences in within-person changes for this variable. Results also revealed that decreases in depressive symptoms were more pronounced for those with greater starting levels in this variable ( $\beta = -0.34$ ,  $p = .001$ ). According to the estimated plausible values, 13.10% of the participants showed significant increases, 24.10% showed significant decreases, and the remaining 62.80% showed no significant changes in depressive symptoms.

The results of the bivariate LCS model are shown in Table 4 and Fig. 1. The model-of-fit indexes obtained for this model were  $\chi^2(74) = 84.38$ ,  $p = .19$ , CFI = 1.00, SRMR = 0.03, RMSEA = 0.02, RMSEA 95% CI [0.00, 0.04]. Positive relationships between SPA and depressive symptoms both in their initial levels and in their latent changes were found. Furthermore, SPA at T1 significantly predicted changes in depressive symptoms whilst depressive symptoms at T1 did not significantly predict changes in SPA. In regard to the covariates, being at risk of an eating pathology at T1 significantly predicted



**Table 2**  
Descriptive statistics and correlations between latent variables.

		<i>M</i>	<i>SD</i>	Range	$\gamma_1$	$\gamma_2$	1	2	3	4	5
1	Body mass index	22.58	2.76	16.36–36.95	0.69	1.13	–				
2	Body weight and shape dissatisfaction	0.70	0.91	0–3	1.15	0.38	0.12*	–			
3	Social physique anxiety Time 1	2.09	0.89	1–5	1.01	0.82	0.10*	0.63***	–		
4	Social physique anxiety Time 2	2.11	0.98	1–5	0.87	0.11	0.14**	0.54***	0.82***	–	
5	Depressive symptoms Time 1	0.69	0.71	0–4	1.26	1.25	–0.04	0.39***	0.58***	0.45***	–
6	Depressive symptoms Time 2	0.62	0.69	0–4	1.39	1.53	–0.01	0.35***	0.50***	0.56***	0.71***

Note.  $\gamma_1$  = skewness;  $\gamma_2$  = kurtosis.

\*  $p < .05$ .

\*\*  $p < .01$ .

\*\*\*  $p < .001$ .

**Table 3**  
Longitudinal invariance.

	$\chi^2$	<i>df</i>	CFI	SRMR	RMSEA [95%CI]	$\Delta\chi^2$	$\Delta df$	<i>p</i>
Non-constrained	97.43	48	0.98	0.03	0.05 [0.04 to 0.06]	–	–	–
Factor loadings constrained	103.66	52	0.98	0.03	0.05 [0.04 to 0.06]	5.66	4	0.23
Factor loadings + intercepts constrained	110.75	56	0.97	0.03	0.05 [0.04 to 0.06]	6.56	4	0.16
Factor loadings + intercepts + residual variances constrained	119.94	62	0.97	0.04	0.05 [0.04 to 0.06]	9.84	6	0.13

**Table 4**  
Results of the bivariate latent change score model.

Independent variables (T1)	Dependent variables (T2)			
	$\Delta$ Social physique anxiety		$\Delta$ Depressive symptoms	
	$\beta$	B(SE)	$\beta$	B (SE)
Social physique anxiety	– 0.30*	– 0.21 (0.09)	0.35**	0.44 (0.09)
Depressive symptoms	0.01	0.01 (0.11)	– 0.51***	0.17 (0.06)
Body mass index	0.08	0.02 (0.01)	0.01	0.00 (0.01)
Body weight and shape dissatisfaction	0.08	0.05 (0.05)	– 0.02	– 0.01 (0.04)
Female	0.07	0.05 (0.05)	– 0.01	– 0.01 (0.05)
At risk of eating disorder	0.19*	0.28 (0.11)	– 0.09	– 0.09 (0.07)

\*  $p < .05$ .

\*\*  $p < .01$ .

\*\*\*  $p < .001$ .

changes in SPA. No other covariate was found with significant explanatory capacity, either for changes in SPA or depressive symptoms. Overall, the bivariate LCS model explained 6.10% and 19.50% of changes in SPA and depression, respectively. Neither of the two additional tested models revealed significant interactions between SPA at T1 and sex on changes in depression ( $\beta = 0.01, p = .86$ ) or between depression at T1 and sex on changes in SPA ( $\beta = 0.07, p = .28$ ).

**Discussion**

This study aimed to examine the dynamic relationship between SPA and depressive symptoms in a sample of young adults. The evidence obtained suggests that SPA may be a risk factor for depression (but not the other way around) in young adults of both sexes. These findings contribute to the body of research investigating the aetiology of depression by identifying a potential risk factor in an age group with a particularly high and growing prevalence of this pathology (i.e., young adults; Mojtabai et al., 2016; Sutin et al., 2013).

The weak non-significant within-person increases found in SPA over a six-month period seem consistent with the predominantly stable

nature attributed to SPA in its trait form (Levinson & Rodebaugh, 2016; Sabiston & Chandler, 2010). However, the fact that significant between-person differences in these within-person changes emerged, suggests that some young adults (i.e., around 50% of the sample in the present study) may experience these changes. These results are novel insofar as they reveal that a period of six-months may be long enough to experience changes in SPA in its trait form in young men and women. In view of these findings, an important next step for research would be to explore which of the potential predictors may differentiate young adults experiencing increases from those experiencing decreases in SPA (e.g., personality traits or exposure to social pressures; Sabiston et al., 2014). For their part, the observed overall within-person decreases in depressive symptoms are in line with the previously reported progressive decline of such a symptomatology throughout young adulthood (Schubert et al., 2017). Additionally, the fact that overall within-person decreases tended to be of greater magnitude for those featuring greater initial levels of depressive symptoms is consistent with the results of past trajectory studies showing that a decreasing trajectory was more frequent than an increasing one (Schubert et al., 2017). Nonetheless, this last circumstance may also be plausibly explained here by the

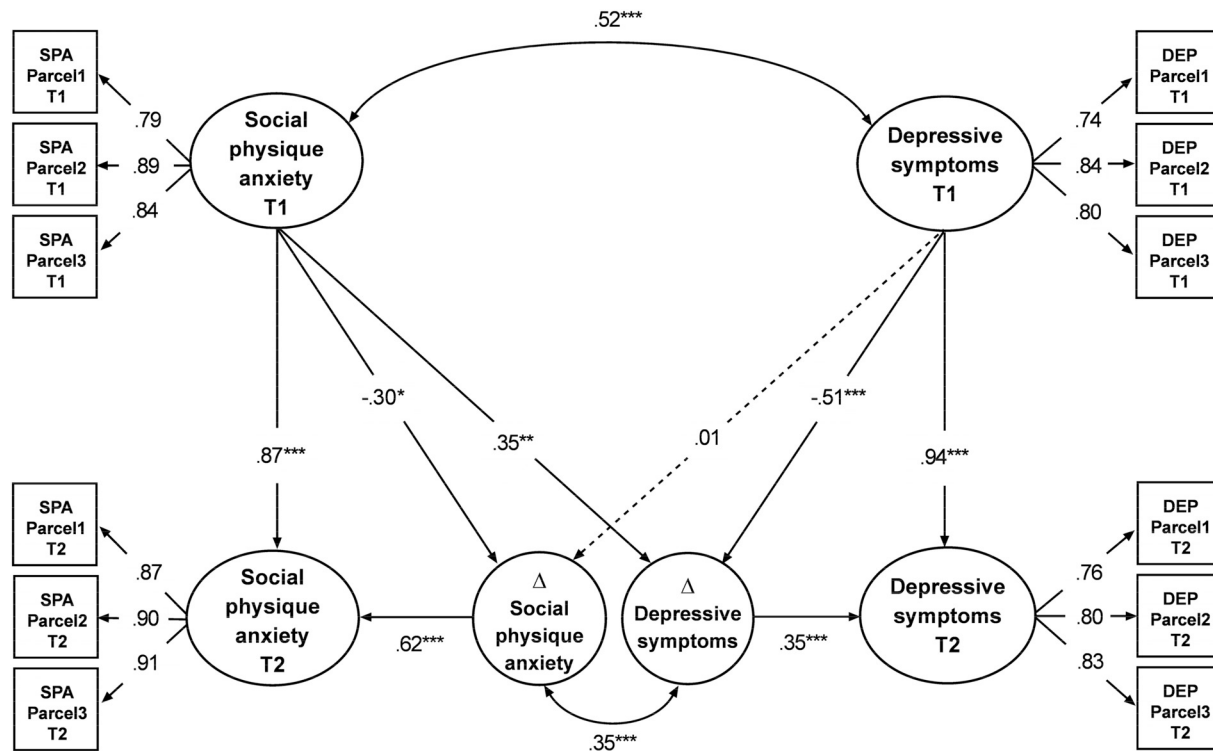


Fig. 1. Bivariate latent change score model of social physique anxiety and depression. All coefficients are standardized. Dotted lines represent non-significant pathways. Indicators for latent variables were correlated over time but were omitted for parsimony. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

existence of transitory adverse life events (Keller et al., 2007) that, related with the beginning of the academic year (e.g., a relocation or social changes), could have passed by the time the second assessment was conducted.

The results of the bivariate LCS support the validity of the body dissatisfaction-driven hypothesis (Patalay et al., 2015; Sharpe et al., 2017) in young adults. More specifically, our findings suggest that SPA may play a more relevant role than body dissatisfaction in the emergence of depressive symptoms in young adults. In line with evidence suggesting that potential outcomes derived from evaluative body image constructs may depend on the specific nature of the latter (Davison & McCabe, 2005; Mustapic et al., 2015), these findings imply that changes in depressive symptoms experienced by young adults may be explained by negative body appraisals that are not so much cognitive in nature (Sharpe et al., 2017) but rather affective and self-presentational.

Another relevant finding of the present study was the absence of a moderating effect of sex on the relationship between SPA and depressive symptoms. This fact suggests that, as revealed by previous research (Rawana et al., 2016; Sharpe et al., 2017), body image concerns may constitute risk factors for depression of similar importance for both men and women in young adulthood. These findings somewhat question the trend of focusing on the female population when examining the potential health-related outcomes derived from body image concerns in young adults still present in the literature (de Carvalho, Alvarenga, & Ferreira, 2017; Uhlmann, Donovan, Zimmer-Gembeck, Bell, & Ramme, 2018). Thus, the evidence obtained underscores the convenience of considering both sexes when examining the potentially detrimental consequences of body image concerns during young adulthood.

From a theoretical perspective, this study contributes to the expanding body of prospective research investigating the impact of body concerns on mental health by providing evidence in support of the body dissatisfaction-driven hypothesis against competing alternatives in young adults (i.e., the internalising-driven or the bidirectional hypotheses; Patalay et al., 2015; Sharpe et al., 2017). Additionally, these

findings suggest that depressive symptoms may emerge not merely from dissatisfaction with body attributes but from the unpleasant affective reaction derived from the inability to create favourable external impressions on the basis of such attributes. From a practical point of view, these results suggest that public health efforts aimed at palliating the incidence of depressive symptoms in young adults may benefit from addressing aversive reactions derived from supposed external body appraisals. In light of these findings, and according to previous evidence suggesting adolescence is a critical period for body image formation (Markey, 2010), further longitudinal studies are warranted examining trajectories in SPA change from adolescence to young adulthood. Information from such research may be of great importance in elucidating the precise moment at which prevention initiatives should be implemented aimed at decreasing the future incidence of depression by mitigating SPA experiences (e.g., those related to the school-based health curriculum or to the launch of media campaigns).

**Limitations**

The present study included certain limitations. The first was the use of a non-probabilistic sampling strategy. Thus, the relationships of interest were examined in a group of individuals sharing homogeneous sociocultural and ethnic characteristics. Secondly, there were several assessment-related limitations, specifically, the self-reported character and the somewhat limited scope of construct complexity of some of the employed instruments. For instance, the instrument employed to assess depressive symptomatology covered some of the main symptoms (i.e., depressed mood, loss of interest or pleasure and feelings of worthlessness) proposed in the last version of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-V; American Psychiatric Association, 2013), but lacked others (e.g., insomnia/hypersomnia, diminished ability to think/concentrate or fatigue). Additionally, cognitive body dissatisfaction was assessed employing a single item addressing body weight and shape (Gideon et al., 2016). Despite similar approaches having been

adopted by previous research examining the relationship between body dissatisfaction and depressive symptoms (Patalay et al., 2015), this strategy may have led to an under-representation of body attributes susceptible to evaluation (e.g., specific parts of the body). As a final limitation, the influence of some potentially relevant variables to the aetiology of depressive symptoms was not controlled. This would be the case for the presence of subclinical levels of general or social anxiety, as well as the occurrence of severe adverse life events, such as the death of a loved one or a romantic loss (Grant et al., 2014; Kashdan, 2007; Keller et al., 2007; Kessler et al., 2015). Apart from trying to replicate the findings of the present study addressing some of these limitations, another relevant avenue for further research would be to investigate whether these results may be generalized to clinical populations or other age groups with a high prevalence of depression, such as adolescents (Mojtabai et al., 2016) or older adults (Sutin et al., 2013).

## Conclusions

In summary, this study provides evidence supporting SPA as a potential risk factor for experiencing increased depressive symptomatology during young adulthood for both men and women. These findings suggest that a focus on addressing the distressed affective reactions derived from anticipating negative social appraisals inherent to SPA experiences may be useful in reducing depressive symptoms in young adults. These findings may contribute to guiding policy and clinical practice aimed at reducing depressive symptoms during young adulthood.

## Acknowledgements

The first author is supported by the Spanish Ministry of Education through a FPU grant with reference FPU17/01158.

## References

- Alcaraz-Ibáñez, M., Sicilia, A., & Burgueño, R. (2017). Social physique anxiety, mental health, and exercise: Analyzing the role of basic psychological needs and psychological inflexibility. *The Spanish Journal of Psychology*, 20, E16. <https://doi.org/10.1017/sjp.2017.13>.
- American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders. DSM-V* (5th ed.). Arlington, VA: American Psychiatric Association.
- Andreu, Y., Galdón, M. J., Durá, E., Ferrando, M., Murgui, S., García, A., & Ibáñez, E. (2008). Psychometric properties of the brief symptom inventory-18 (BSI-18) in a Spanish sample of outpatients with psychiatric disorders. *Psicothema*, 20, 844–850.
- Asparouhov, T., & Muthén, B. O. (2010). Plausible values for latent variables using Mplus. Retrieved from <http://www.statmodel.com/download/Plausible.pdf>.
- Beck, A. T. (2002). Cognitive models of depression. In R. L. Leahy, & T. E. Dowd (Vol. Eds.), *Clinical advances in cognitive psychotherapy: Theory and application*. Vol. 14. *Clinical advances in cognitive psychotherapy: Theory and application* (pp. 29–61). New York, NY: Springer.
- Brown, T. A. (2015). *Confirmatory factor analysis for applied research* (2nd ed.). New York, NY: The Guilford Press.
- de Carvalho, P. H. B., Alvarenga, M. d. S., & Ferreira, M. E. C. (2017). An etiological model of disordered eating behaviors among Brazilian women. *Appetite*, 116, 164–172. <https://doi.org/10.1016/j.appet.2017.04.037>.
- Cash, T. F. (2012). Cognitive-behavioral perspectives on body image. In T. F. Cash (Vol. Ed.), *Encyclopedia of body image and human appearance*. Vol. 1. *Encyclopedia of body image and human appearance* (pp. 334–342). London: Elsevier Inc. <https://doi.org/10.1016/B978-0-12-384925-0.00054-7>.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum.
- Davison, T. E., & McCabe, M. P. (2005). Relationships between men's and women's body image and their psychological, social, and sexual functioning. *Sex Roles*, 52, 463–475. <https://doi.org/10.1007/s11199-005-3712-z>.
- Derogatis, L. R. (2000). *Brief symptom inventory 18*. Minneapolis, MN: NCS Pearson, Inc.
- Ferreiro, F., Seoane, G., & Senra, C. (2012). Gender-related risk and protective factors for depressive symptoms and disordered eating in adolescence: A 4-year longitudinal study. *Journal of Youth and Adolescence*, 41, 607–622. <https://doi.org/10.1007/s10964-011-9718-7>.
- Galdón, M. J., Durá, E., Andreu, Y., Ferrando, M., Murgui, S., Pérez, S., & Ibáñez, E. (2008). Psychometric properties of the brief symptom inventory-18 in a Spanish breast cancer sample. *Journal of Psychosomatic Research*, 65, 533–539. <https://doi.org/10.1016/j.jpsychores.2008.05.009>.
- García-Campayo, J., Sanz-Carrillo, C., Ibáñez, J. A., Lou, S., Solano, V., & Alda, M. (2005). Validation of the Spanish version of the SCOFF questionnaire for the screening of eating disorders in primary care. *Journal of Psychosomatic Research*, 59, 51–55. <https://doi.org/10.1016/j.jpsychores.2004.06.005>.
- Gideon, N., Hawkes, N., Mond, J., Saunders, R., Tchanturia, K., & Serpell, L. (2016). Development and psychometric validation of the EDE-QS, a 12 item short form of the eating disorder examination questionnaire (EDE-Q). *PLoS One*, 11(5), 1–19. <https://doi.org/10.1371/journal.pone.0152744>.
- Grant, D. M., Judah, M. R., Mills, A. C., Lechner, W. V., Davidson, C. L., & Wingate, L. R. (2014). Rumination and excessive reassurance seeking: Mediators of the relationship between social anxiety and depression? *Journal of Psychopathology and Behavioral Assessment*, 36, 465–474. <https://doi.org/10.1007/s10862-013-9399-5>.
- Greenberg, P. E., Fournier, A.-A., Sisitsky, T., Pike, C. T., & Kessler, R. C. (2015). The economic burden of adults with major depressive disorder in the United States (2005 and 2010). *The Journal of Clinical Psychiatry*, 76, 155–162. <https://doi.org/10.4088/JCP.14m09298>.
- Haefel, G. J., Hershenberg, R., Goodson, J. T., Hein, S., Square, A., Grigorenko, E. L., & Chapman, J. (2017). The hopelessness theory of depression: Clinical utility and generalizability. *Cognitive Therapy and Research*, 41, 543–555. <https://doi.org/10.1007/s10608-017-9833-1>.
- Hamaker, E. L., Kuiper, R. M., & Grasman, R. P. P. P. (2015). A critique of the cross-lagged panel model. *Psychological Methods*, 20, 102–116. <https://doi.org/10.1037/a0038889>.
- Hart, E. A., Leary, M. R., & Rejeski, W. J. (1989). The measurement of social physique anxiety. *Journal of Sport and Exercise Psychology*, 11, 94–104.
- Jones, B. A., & Griffiths, K. M. (2014). Self-objectification and depression: An integrative systematic review. *Journal of Affective Disorders*, 171, 22–32. <https://doi.org/10.1016/j.jad.2014.09.011>.
- Kashdan, T. B. (2007). Social anxiety spectrum and diminished positive experiences: Theoretical synthesis and meta-analysis. *Clinical Psychology Review*, 27, 348–365. <https://doi.org/10.1016/j.cpr.2006.12.003>.
- Keller, M. C., Neale, M. C., & Kendler, K. S. (2007). Association of different adverse life events with distinct patterns of depressive symptoms. *American Journal of Psychiatry*, 164, 1521–1529. <https://doi.org/10.1176/appi.ajp.2007.06091564>.
- Kessler, R. C., Sampson, N. A., Berglund, P., Gruber, M. J., Al-Hamzawi, A., Andrade, L., ... Wilcox, M. A. (2015). Anxious and non-anxious major depressive disorder in the world health organization world mental health surveys. *Epidemiology and Psychiatric Sciences*, 24, 210–226. <https://doi.org/10.1017/S2045796015000189>.
- Kouros, C. D., & Garber, J. (2014). Trajectories of individual depressive symptoms in adolescents: Gender and family relationships as predictors. *Developmental Psychology*, 50, 2633–2643. <https://doi.org/10.1037/a0038190>.
- Lantz, E. L., Gaspar, M. E., DiToro, R., Piers, A. D., & Schaumberg, K. (2018). Conceptualizing body dissatisfaction in eating disorders within a self-discrepancy framework: A review of evidence. *Eating and Weight Disorders-Studies on Anorexia, Bulimia and Obesity*, 23, 275–291. <https://doi.org/10.1007/s40519-018-0483-4>.
- Leary, M. R., & Jongman-Sereno, K. P. (2014). Social anxiety as an early warning system: A refinement and extension of the theory of social anxiety. In S. G. Hofmann, & P. M. DiBartolo (Eds.), *Social anxiety* (pp. 579–597). (3rd ed.). Amsterdam: Elsevier Inc. <https://doi.org/10.1016/B978-0-12-394427-6/00020-0>.
- Levinson, C. A., & Rodebaugh, T. L. (2016). Clarifying the prospective relationships between social anxiety and eating disorder symptoms and underlying vulnerabilities. *Appetite*, 107, 38–46. <https://doi.org/10.1016/j.appet.2016.07.024>.
- Little, T. D., Rhemtulla, M., Gibson, K., & Schoemann, A. M. (2013). Why the items versus parcels controversy needn't be one. *Psychological Methods*, 18, 285–300. <https://doi.org/10.1037/a0033266>.
- Mannan, M., Mamun, A., Doi, S., & Clavarino, A. (2016). Is there a bi-directional relationship between depression and obesity among adult men and women? Systematic review and bias-adjusted meta analysis. *Asian Journal of Psychiatry*, 21, 51–66. <https://doi.org/10.1016/j.ajp.2015.12.008>.
- Markey, C. N. (2010). Why body image is important to adolescent development. *Journal of Youth and Adolescence*, 39, 1387–1391. <https://doi.org/10.1007/s10964-010-9510-0>.
- McArdle, J. J. (2001). A latent difference score approach to longitudinal dynamic structural analyses. In R. Cudek, S. du Toit, & D. Sorbom (Eds.), *Structural equation modeling: Present and future* (pp. 342–380). Lincolnwood, IL: Scientific Software International.
- McArdle, J. J. (2009). Latent variable modeling of differences and changes with longitudinal data. *Annual Review of Psychology*, 60, 577–605. <https://doi.org/10.1146/annurev.psych.60.110707.163612>.
- Mojtabai, R., Olsson, M., & Han, B. (2016). National trends in the prevalence and treatment of depression in adolescents and young adults. *Pediatrics*, 138(6), e20161878. <https://doi.org/10.1542/peds.2016-1878>.
- Morgan, J. F., Reid, F., & Lacey, J. H. (1999). The SCOFF questionnaire: Assessment of a new screening tool for eating disorders. *BMJ*, 319, 1467–1468. <https://doi.org/10.1136/bmj.319.7223.1467>.
- Motl, R. W., & Conroy, D. E. (2000). Validity and factorial invariance of the social physique anxiety scale. *Medicine and Science in Sports and Exercise*, 32, 1007–1017. <https://doi.org/10.1097/00005768-200005000-00020>.
- Muñoz, R. F., Beardslee, W. R., & Leykin, Y. (2012). Major depression can be prevented. *American Psychologist*, 67, 285–295. <https://doi.org/10.1037/a0027666>.
- Mustapic, J., Marcinko, D., & Vargek, P. (2015). Eating behaviours in adolescent girls: The role of body shame and body dissatisfaction. *Eating and Weight Disorders*, 20, 329–335. <https://doi.org/10.1007/s40519-015-0183-2>.
- Muthén, B. O., Muthén, L. K., & Asparouhov, T. (2016). *Regression and mediation analysis using Mplus*. Los Angeles, CA: Muthén & Muthén.
- Muthén, L. K., & Muthén, B. O. (1998-2015). *Mplus version 7: User's guide* (7th ed.). Los Angeles, CA: Muthén & Muthén.
- Newman, D. A. (2014). Missing data: Five practical guidelines. *Organizational Research*

- Methods*, 17, 372–411. <https://doi.org/10.1177/1094428114548590>.
- Patalay, P., Sharpe, H., & Wolpert, M. (2015). Internalising symptoms and body dissatisfaction: Untangling temporal precedence using cross-lagged models in two cohorts. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, 56, 1223–1230. <https://doi.org/10.1111/jcpp.12415>.
- Puccio, F., Fuller-Tyszkiewicz, M., Ong, D., & Krug, I. (2016). A systematic review and meta-analysis on the longitudinal relationship between eating pathology and depression. *International Journal of Eating Disorders*, 49, 439–454. <https://doi.org/10.1002/eat.22506>.
- Quick, V., Eisenberg, M. E., Bucchianeri, M. M., & Neumark-Sztainer, D. (2013). Prospective predictors of body dissatisfaction in young adults: 10-year longitudinal findings. *Emerging Adulthood*, 1, 271–282. <https://doi.org/10.1177/2167696813485738>.
- Rawana, J. S., McPhie, M. L., & Hassibi, B. (2016). Eating- and weight-related factors associated with depressive symptoms in emerging adulthood. *Eating Behaviors*, 22, 101–108. <https://doi.org/10.1016/j.eatbeh.2016.04.002>.
- Richard, A., Rohrmann, S., Lohse, T., & Eichholzer, M. (2016). Is body weight dissatisfaction a predictor of depression independent of body mass index, sex and age? Results of a cross-sectional study. *BMC Public Health*, 16, 863–871. <https://doi.org/10.1186/s12889-016-3497-8>.
- Roszkowski, M. J., & Soven, M. (2010). Shifting gears: Consequences of including two negatively worded items in the middle of a positively worded questionnaire. *Assessment & Evaluation in Higher Education*, 35, 113–130. <https://doi.org/10.1080/02602930802618344>.
- Sabiston, C. M., & Chandler, K. (2010). Effects of fitness advertising on weight and body shape dissatisfaction, social physique anxiety, and exercise motives in a sample of healthy-weight females. *Journal of Applied Biobehavioral Research*, 14, 165–180. <https://doi.org/10.1111/j.1751-9861.2010.00047.x>.
- Sabiston, C. M., Pila, E., Pinsonnault-Bilodeau, G., & Cox, A. E. (2014). Social physique anxiety experiences in physical activity: A comprehensive synthesis of research studies focused on measurement, theory, and predictors and outcomes. *International Review of Sport and Exercise Psychology*, 7, 158–183. <https://doi.org/10.1080/1750984X.2014.904392>.
- Sáenz-Alvarez, P., Sicilia, A., González-Cutre, D., & Ferriz, R. (2013). Psychometric properties of the social physique anxiety scale (SPAS-7) in spanish adolescents. *The Spanish Journal of Psychology*, 16(E86), 1–9. <https://doi.org/10.1017/sjp.2013.86>.
- Schubert, K. O., Clark, S. R., Van, L. K., Collinson, J. L., & Baune, B. T. (2017). Depressive symptom trajectories in late adolescence and early adulthood: A systematic review. *Australian and New Zealand Journal of Psychiatry*, 51, 477–499. <https://doi.org/10.1177/0004867417700274>.
- Sharpe, H., Patalay, P., Choo, T.-H., Wall, M., Mason, S. M., Goldschmidt, A. B., & Neumark-Sztainer, D. (2017). Bidirectional associations between body dissatisfaction and depressive symptoms from adolescence through early adulthood. *Development and Psychopathology*, 30, 1447–1458. <https://doi.org/10.1017/S0954579417001663>.
- Sutin, A. R., Terracciano, A., Milanese, Y., An, Y., Ferrucci, L., & Zonderman, A. B. (2013). The trajectory of depressive symptoms across the adult life span. *JAMA Psychiatry*, 70, 803–811. <https://doi.org/10.1001/jamapsychiatry.2013.193>.
- Uhlmann, L. R., Donovan, C. L., Zimmer-Gembeck, M. J., Bell, H. S., & Ramme, R. A. (2018). The fit beauty ideal: A healthy alternative to thinness or a wolf in sheep's clothing? *Body Image*, 25, 23–30. <https://doi.org/10.1016/j.bodyim.2018.01.005>.
- Usami, S., Hayes, T., & McArdle, J. J. (2016). Inferring longitudinal relationships between variables: Model selection between the latent change score and autoregressive cross-lagged factor models. *Structural Equation Modeling*, 23, 331–342. <https://doi.org/10.1080/10705511.2015.1066680>.
- Van Kim, N. A., Larson, N., & Laska, M. N. (2012). Emerging adulthood: A critical age for preventing excess weight gain? *Adolescent Medicine: State of the Art Reviews*, 23, 571–588.
- Vos, T., Abajobir, A. A., Abate, K. H., Abbafati, C., Abbas, K. M., Abd-Allah, F., ... Murray, C. J. L. (2017). Global, regional, and national incidence, prevalence, and years lived with disability for 328 diseases and injuries for 195 countries, 1990–2016: A systematic analysis for the global burden of disease study 2016. *The Lancet*, 390, 1211–1259. [https://doi.org/10.1016/S0140-6736\(17\)32154-2](https://doi.org/10.1016/S0140-6736(17)32154-2).