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**THE RELATIONSHIP BETWEEN SOCIAL PHYSIQUE  
ANXIETY AND PSYCHOSOCIAL HEALTH IN  
ADOLESCENTS**

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**Abstract:** Social physique anxiety (SPA) is a subtype of social anxiety that relates to body concerns in social contexts and has been proposed as an indicator of psychosocial adjustment in adolescents. The purpose of this study is to explore the relationship of SPA with a number psychosocial and behaviour variables in adolescents. A nationally representative sample of 3331 8th- and 10th-grade students completed a survey as a part of the Health Behaviour in School-aged Children (HBSC) study. SPA was positively associated with poor health symptoms, larger body shape and being on a diet, while it was negatively associated with physical activity and social support. Girls, those who thought were much too fat and those who were or should be on a diet had higher SPA scores than their counterparts.

Hierarchical regression analysis indicate that gender ( $\beta = .20$ ), being on a diet ( $\beta = -.27$ ), physical activity behaviour ( $\beta = -.06$ ), body shape ( $\beta = -.14$ ), psychological symptoms ( $\beta = .15$ ) and parental ( $\beta = -.07$ ) and peer communication ( $\beta = -.07$ ) were significant predictors of SPA. No significant interactions with gender were significant. Interventions should help adolescents deal with the pressures of achieving a socially desirable body shape and weight, including self-acceptance and seeking appropriate social support.

**Keywords:** Adolescent health, Body image, Physical activity, Psychological functioning, Social support.

## Social Physique Anxiety and Psychosocial Health in Adolescents

Social physique anxiety (SPA) is a subtype of social anxiety that “people experience in response to others’ evaluations of their physiques” (Hart, Leary & Rejeski, 1989, p. 94). It manifests itself in social contexts and represents an individual’s perception of threat concerning what others may think of his or her body. SPA has been associated with a variety of health-compromising behaviours, such as smoking (Crocker, Kowalski, Kowalski & Chad, 2001), disordered eating (Lanfranchi, Maïano, Morin & Therme, 2015; Thompson & Chad 2002), and seeking sexual attention (Sabiston, Sedgwick, Crocker, Kowalski & Mack, 2007). It has also been associated with psychological variables that influence well-being, such as body dissatisfaction and self-esteem (Brunet, Sabiston, Dorsch & McCreary, 2010; Sabiston, Pila, Pinsonnault-Bilodeau & Cox, 2014).

Typically, females have been reported to experience more social physique anxiety than males (e.g., Kowalski, Mack, Crocker, Niefer, & Fleming, 2006; Smith, 2004) as body appearance is more important for girls than for boys (McCabe & Ricciardelli, 2001). Hence, girls are at a higher risk of developing body image disturbances than boys. Nevertheless, body-related concerns are prevalent in adolescents regardless of gender (Caglar, Bilgili, Karaca, Avaz & Asçi, 2010), although, the nature of these concerns may differ. While girls are driven by a desire to obtain a lean body, males aim to achieve muscularity (Brunet et al. 2010; Helfert & Warschburger, 2011). Thus, it is important to be aware of the differentiated impact body concerns may have in adolescents’ lifestyles.

Body dissatisfaction develops from a negative comparison between the ideal body and socio-cultural standards (Smith, 2004). Several biopsychosocial factors may influence this comparison. For example, the biological changes observed during puberty (Niven, Fawcner, Knowles, Henretty & Stephenson, 2009), the unrealistic standards of media depictions of the ideal body (Blowers, Lozton, Grady-Flessner, Occhipinti & Dawe, 2003) and the increased value of peer acceptance during this developmental period impact the way adolescents engage in this evaluative process (Smith, 2004). As critical influences on perceptions of one’s body tend to occur in early adolescence (Crocker, Sabiston, Kowalski, McDonough & Kowalski, 2006), early identification of adolescents who are at risk of developing body image disturbances is relevant for public health. Therefore, the inclusion of SPA as a mental health and psychosocial adjustment indicator in this age group can be of interest to practitioners (Smith, 2004).

Excessive body-related concerns influence lifestyle choices, including dieting and physical activity. Engagement in harmful eating behaviours in an attempt to improve physique has been reported in 14-15 year-old female adolescents (Crocker et al., 2001) and 7-16-year-old boys and girls (Thompson & Chad, 2002). However, while girls were more likely to engage in extreme

weight loss behaviours (e.g., use of laxatives), boys tended to use weight gain supplements to improve muscularity (McCabe & Ricciardelli, 2001). Therefore, dieting can be an indicator of maladjustment particularly in those adolescents who have high social physique anxiety.

The relationship between SPA and physical activity as a part of a healthy lifestyle is less clear. Although SPA can be a barrier to exercise participation, it can also motivate people to exercise to change their weight and body shape (Hausenblas, Brewer & van Raalte, 2004) or influence when and how people choose to exercise (Sabiston et al., 2014). To illustrate, Caglar et al. (2010) reported no differences in physical activity levels of adolescents categorised as high and low in SPA, and Niven et al. (2009) reported that SPA was unrelated to current or future physical activity in adolescent girls in general. However, Niven et al. observed a negative relationship between physical activity and SPA in those girls who were active due to appearance and fitness concerns. Such disparities are likely to be due to the characteristics of study samples or the participants' motivations to be active.

SPA develops in the context of social interactions, real or perceived. Thus, the relationship between perception of social support and SPA is worth exploring, in particular the influence of peers and parents. The social groups in which adolescents evolve have their own norms concerning appearance (Sabiston et al., 2007), so that conversations about physical appearance influence the development of body-related attitudes (Sabiston et al., 2007). Perceptions of nonconformity with the prevailing group norms and subsequent fears of negative evaluation from peers contribute to SPA; therefore, it is expected that adolescents who feel supported by their peers experience less SPA. Parental encouragement regarding weight control also influences body dissatisfaction in boys and girls (Helfert & Warschburger, 2011). Throughout adolescence, parents' praise of their children's physical appearance tend to decrease while criticisms tend to increase (Striegel-Moore & Kearney-Cooke, 1994), contributing further to the societal pressures to conform to an ideally prescribed body. For example, SPA in girls was associated with mothers' dissatisfaction with their daughters' appearance (Sabiston et al., 2007). Therefore, appropriate parental support may be a protective factor against SPA.

The influence of peers and parents in SPA may differ in adolescence. Girls, more than boys, perceived that their mothers were encouraging weight loss in order to comply with societal ideals (McCabe & Ricciardelli, 2001). Brunet and Sabiston (2011) suggested that older adolescents and young adults experience more SPA around their peers than around their parents due to the increased role peers play during this life stage. Indeed, peer acceptance appears to become more important during mid-adolescence, further supporting the protective role of perceived social support from peers.

As SPA may be a potential indicator of health, it is feasible to expect SPA to be associated with health complaints. Health complaints represent a subjective evaluation of the symptoms experienced by the individual with or without a defined diagnosis (Haugland & Wold, 2001, p. 611). These symptoms typically represent two dimensions (Haugland, Wold, Stevenson, Aaroe & Woynarowska, 2001): somatic (e.g., backaches, headaches) and psychological (e.g., low mood, irritability). Measurement of health complaints is particularly useful in large epidemiological studies, as these symptoms have a negative influence on adolescents' functional ability and wellbeing. While studies that link body image and SPA to negative emotional states and emotional distress have been identified (Friedman, Reichmann, Costanzo & Musante, 2002), studies that correlate somatic symptoms and SPA are lacking. However, considering that psychological symptoms are often associated with somatic symptoms (Haugland et al., 2001), it is reasonable to also expect a positive association between SPA and somatic complaints.

Because adolescence is a critical period for the development and maintenance of health-related attitudes and behaviours that will endure throughout a person's lifespan, early identification of adolescents who are at risk of developing high SPA is relevant for public health. Therefore, the purpose of this study is to examine the relationship between SPA and a number of lifestyle behaviours (physical activity, dieting), psychosocial variables (body shape, peer relationships and parental communication, health complaints in the form of psychological and somatic symptoms) in a national representative sample of adolescents. It is expected that SPA will be associated with perceptions of being overweight, being on a diet, increased health complaints, and decreased social and family support. Based on the contradictory results described in the literature, the associations between SPA and physical activity are exploratory.

## **Methods**

### Sample and sampling procedures

Participants were 3331 students (52.6% girls) from the 8th (mean age = 14.16 years, SD = 0.96) and 10th grade (mean age = 16.08 years, SD = 0.92), and they constitute a nationally representative sample of Portuguese school-aged adolescents for these specific school grades. Schools were randomly selected from the official list of national public schools. Classes were randomly selected in each of the selected schools. The sample was stratified by grade and by the 5 regions of the country.

### *Measures*

The following variables from the Health Behaviour in School-aged Children (HBSC) survey were used: physical activity behaviour, dieting, body satisfaction, psychological complaints, somatic complaints, quality of peer relationships and parental communication. Gender and grade as demographic variables were also collected.

**Physical activity.** Physical activity was measured by answering the question: "Over the past 7 days, on how many days were you physically active for a total of at least 60 minutes per day?" (Prochaska, Sallis & Long, 2001). Possible responses range from 0 to 7 days.

**Body shape.** Students were asked to consider their appearance by answering the question: "What do you think about your body?" (1 = much too thin, 2 = a bit too thin, 3 = about the right size, 4 = a bit too fat, 5 = much too fat) (Iannotti et al., 2009).

**Dieting.** Participants were asked the following question: "At present are you on a diet or doing something else to lose weight?" (1 = No, my weight is fine, 2 = No, but I should lose some weight, 3 = No, because I need to put on weight, 4 = Yes) (Howe, Black, Wong, Parnell & Skidmore, 2013).

**Psychological complaints.** Participants reported how frequently they had experienced the following four symptoms in the last six months: feeling low, irritability or bad temper, feeling nervous and difficulties getting to sleep (1 = about every day, 2 = more than once a week, 3 = about every week, 4 = about every month, 5 = rarely or never). This scale was reverse-scored and the sum of all items was calculated ( $\alpha = .72$ ) so that higher scores represent more health complaints (Haugland & Wold, 2001).

**Somatic complaints.** Participants reported how frequently they had experienced the following four symptoms in the last six months: headache, stomach-ache, backache and feeling dizzy (1 = about every day, 2 = more than once a week, 3 = about every week, 4 = about every month, 5 = rarely or never). This scale was reverse-scored and the sum of all items was calculated ( $\alpha = .60$ ), so that higher scores represent more health complaints (Haugland & Wold, 2001).

**Parental communication.** Parental communication was the sum of scores of two items: how easy is it to talk to your (a) mother and (b) father? Responses were given in a 5-point Likert scale (1 = don't speak/don't have, 2 = very difficult, 3 = difficult, 4 = easy, 5 = very easy). Total scores for this variable ranged from 2 to 10 ( $\alpha = .61$ ) (Alcón, Pedersen & González, 2004)

**Quality of peer relationships.** Peer support was operationalised as the weighted mean of the responses to the following items (Iannotti et al., 2009): how easy it is to talk to a best friend, friends of the same sex and friends of the opposite sex (1 = don't speak/don't have, 2 = very difficult, 3 = difficult, 4 = easy,

5 = very easy); the number of close male and female friends (zero to five or more); how many days per week participants spend time with their friends after school and how many evenings per week participants spend with their friends (zero to seven or more) ( $\alpha = .71$ ).

Social physique anxiety. The Portuguese short-version of Social Physique Anxiety Scale (Calmeiro, Matos, Simões, & Gamito, 2012) is a 6-item self-report measure that assesses the degree to which individuals feel anxious when they believe others are evaluating their physiques. A total SPA score, ranging from 6 to 30, is obtained by the sum of 6 items ( $\alpha = .86$ ). Respondents indicate whether an item is “characteristic or true of you” on a 5-point Likert scale (1 = not at all; 5 = extremely). This scale was not part of the cross-European study, but was included in the 2006 Portuguese national survey.

### *Procedure*

This study received approval from the ethics commission of S. Joao de Deus Hospital, and the National Commission for Data Protection. Data were collected by means of a self-administered survey as part of the Portuguese Health Behaviour in School-Aged Children (HBSC) study (Matos & al., 2003; 2007; 2012; 2014), a cross-national collaborative study that includes 44 countries across Europe and North America. Details concerning the survey procedures are fully described elsewhere (Currie et al. 2001).

Schools were randomly selected from a national list provided by the Office of the Ministry of Education, stratified by region. Once each school’s principal had agreed to participate, students were randomly selected, stratified by grade, gender and region of the country. Informed consent and parental consent were obtained. Surveys were sent by mail to schools with specific instructions concerning administration procedures; the surveys were then administered by the teachers during regular class time. Completed surveys were collected and returned to the researchers by mail. Students’ completion of the questionnaires was voluntary and anonymity was assured. The response rate at school level was 92% and at student level it was 87%.

### *Data analysis*

Descriptive statistics were calculated for all variables. Independent t-tests and univariate ANOVAs with Scheffe as post-hoc tests were used to compare SPA between levels of categorical variables. As suggested by Keith (2014), to predict SPA, all variables were mean centered. A hierarchical regression analysis was conducted, with gender, grade (step 1), physical activity, dieting (step 2), body shape, psychological and somatic complaints, quality of peer relationships



and parental communication (step 3) and interactions between these variables with gender (step 4) were used as predictors.

## Results

Univariate normality was assessed for all items and skewness and kurtosis were deemed acceptable ( $<2$ ). Thirty-four multivariate outliers were deleted (Mahalanobis distance  $\geq 24.32$ ,  $p < .001$ ). Table 1 shows the correlation matrix between all variables as well the descriptive statistics.

Table 1. Correlation coefficients and descriptive statistics for all variables.

	1	2	3	4	5	6	7	8
1. SPA	--	-.120**	-.181**	.180**	.263**	-.138**	.211**	.258**
2. Physical activity		--	.122**	-.080**	-.115**	.171**	-.029	-.066**
3. Parental Communication			--	-.150**	-.258**	.187**	-.056**	-.126**
4. Somatic symptoms				--	.461**	-.037*	.107**	.171**
5. Psychological symptoms					--	-.109**	.087**	.170**
6. Peer relationship						--	-.055**	-.048**
7. Body shape							--	.257**
8. On a diet								--
Mean	15.85	3.31	7.23	4.92	5.85	.71		
SD	5.58	1.92	1.83	2.31	2.88	.12		
Minimum	6	0	2	3	3	.19		
Maximum	30	7	10	15	15	1.04		

SPA = Social Physique Anxiety.

\*  $p < .05$ ; \*\*  $p < .01$ . All correlation coefficients correspond to the Pearson product-moment correlation, except for correlations with "Body shape" and "On a diet" which are Spearman rho coefficients.

Overall, the pattern of correlation show that SPA is positively associated with poor health symptoms, body shape and being on a diet, while it is negatively associated with physical activity, and social support variables. These correlations ranged from small to moderate, with the strongest correlations being between SPA with psychological symptoms ( $r = -.263$ ) and with being on a diet ( $r = .258$ ).

Table 2 shows the descriptive and inferential statistics for SPA means across levels of categorical variables for the overall sample.

Table 2. Descriptive and inferential statistics for social physique anxiety (SPA) across levels of categorical variables.

Variable	%	Mean	sd	SPA		
				p	ES	Post-hoc
Gender				<.001 <sup>^</sup>	-0.36†	
1. Male	46.7	14.72	5.66			
2. Female	53.3	16.72	5.35			
Grade				.066 <sup>^</sup>	-0.004†	
1. 8th grade	51.0	15.68	5.84			
2. 10th grade	49.0	15.66	5.37			
Body shape				<.001‡	0.10††	1>2>4>3; 1>5>3
1. Much too fat	2.7	21.83	5.58			
2. A bit too fat	32.2	17.60	5.32			
3. About the right size	48.4	14.40	5.23			
4. A bit too thin	15.2	15.56	5.34			
5. Much too thin	1.5	17.33	5.20			
On a diet				<.001‡	0.09††	1,2>3>4
1. Yes	11.5	18.82	5.80			
2. No, but I should lose weight	21.2	17.84	5.18			
3. No, I should put on weight	12.1	15.77	5.45			
4. No, my weight is fine	55.1	14.34	5.27			

<sup>^</sup> Tested by independent t-test; ‡Tested by analysis of variance

ES = effect size: †Cohen's d; ††Eta squared.

Girls have a significantly higher mean of SPA than males [ $t(2742.31) = -10.83$ ,  $p < .001$ ,  $d = -0.36$ ]. Concerning the variable "body shape", while almost half (48.4%) of the adolescents consider to be "about the right size", more than one-third (34.9%) perceived to be "a bit too fat" or "much too fat". SPA was significantly different between levels of "body shape" [ $F(4, 2691) = 72.40$ ,  $p < .001$ ,  $\eta^2 = 0.10$ ]. Notably, SPA was significantly higher among those who thought they were "much too fat" compared to all other participants; likewise, SPA was significantly lower in adolescents who thought they were "about the right size," compared to all other participants.

Concerning the variable "dieting", more than one in ten participants are on a diet (11.5%) or think they should be (21.2%). SPA was also significantly different across levels of this variable [ $F(3, 2840) = 88.19$ ,  $p < .001$ ,  $\eta^2 = 0.09$ ]. Participants

who answered “yes” and “no, but I should lose weight” reported significantly higher SPA than the rest of the participants. Those who answered “no, my weight is fine” reported significantly lower SPA than all other participants did.

Table 3 shows the results of the hierarchical linear regression analysis. Gender and grade explain 4.0% of SPA’s variance, with gender as the only significant predictor in this step. Being on a diet and physical activity were entered in step 2, explaining a further 7.6% of SPA. At step 3, psychosocial variables were entered in the equation, contributing to 5.2% of SPA’s variance. Body shape and psychological symptoms were positively associated with SPA, while peer relationships and parental communication were negatively associated with SPA. Finally, interaction terms of all these variables with gender were entered at step 4, but no significant contribution was observed. All the variables in the model explained 17.1% of SPA and they appear to be related similarly with SPA in boys and girls.

Table 3. Results of the hierarchical multiple regression analysis to predict SPA levels (interaction with gender).

Predictors	B (95% CI)	$\beta$	t	R2	R2 Change
Step 1				.040	0.040***
Gender	2.19 (1.78; 2.60)	.195	10.43***		
Grade	-.11 (-.84; .20)	-.010	-0.53		
Step 2				.115	0.076***
On a diet	-3.67 (-1.55; -1.18)	-.268	-14.57***		
Physical activity	-.18 (-.29; -.08)	-.063	-3.34**		
Step 3				.168	.052***
Body shape	-0.55 (-.73; -.38)	-.140	-6.13***		
Somatic symptoms	.014 (-.08; .11)	.006	.30		
Psychological symptoms	0.276 (.20; .35)	.145	6.97***		
Peer relationship	-3.20 (-4.78; -1.62)	-.071	-3.96***		
Parental communication	-.215 (-.33; -.10)	-.070	-3.80***		
Step 4				.171	.004
Grade x gender	.429 (-.35; 1.21)	-.019	-.34		
On a diet x gender	.385 (-.09; .86)	.127	.11		
Physical activity x gender	-.029 (-.24; .18)	-.015	-.27		
Body shape x gender	-.34 (-.70; .02)	-.14	-1.88		
Somatic symptoms x gender	.03 (-.18; .24)	.02	.26		
Psychological symptoms x gender	.12 (-.04; .29)	.11	1.50		
Peer relationship x gender	-3.31 (-6.53; -.10)	-.113	-2.02*		
Parental communication x gender	.107 (-.12; .33)	.055	.35		

\* p < .05; \*\*\* p < .001

## Discussion

The purpose of this study was to examine the relationships between SPA and a number of health-related behavioural and psychosocial variables in a national representative sample of adolescents. Overall, gender, being on a diet, perceiving to be overweight, having poorer peer relationships and poorer parental communication were significantly associated with social physique anxiety in adolescents. None of these variables predicted SPA of boys and girls differently as there were no interaction effects with gender.

Consistent with the literature, girls had significantly higher levels of SPA than boys (Davison & McCabe, 2006; Kowalski et al., 2006; Smith, 2004). In addition, the more participants perceived to be fat, the higher the SPA, irrespective of gender. This lack of interaction suggests the drive for thinness can also be found in boys (Brunet et al., 2010), and that they may also be pressured to internalise and conform to social standards of beauty (c.f., Dittmar & Howard, 2004).

In what pertains to health behaviours, only dieting significantly predicted SPA. Specifically, being on a diet or believed one should be significantly predicted SPA. These results were similar for boys and girls, indicating that boys also engage in attempts to change their body perhaps due to cultural ideals of beauty. In fact, on average those who indicated their weight was fine had lower SPA compared to the remaining respondents.

Although PA was negatively associated with SPA, controlling for gender and age, physical activity was not a significant predictor of SPA. Some of the literature supports these results as SPA has been found to be unrelated to physical activity (Caglar et al., 2010). However, the relationship between physical activity and SPA is complex and the literature provides mixed results. For example, Hausenblas et al (2004) reported that SPA may either hinder or motivate a physically active life. On one hand, being concerned with others' evaluations may discourage participation in physical activity to avoid exposure their bodies; on the other hand, physical activity may encourage adolescents' involvement in order to achieve an idealised body and improve their appearance (Homan & Tylka, 2014; Niven et al., 2009). Therefore, the relationship between SPA and exercise behaviour remains complex and research addressing the moderator and mediating factors of this relationship needs to be conducted. In particular, the reasons why adolescents do physical activity likely mediates this relationship.

Grade was not associated with SPA. Hagger and Stevenson (2010) reported a decline of SPA in early adolescent boys followed by stabilization after 13-14 years of age. It is possible that due to the onset of puberty, 8th-grade boys begin to be concerned with compliance with social standards of muscularity. In fact, a curvilinear relationship of self-concept with age across adolescence and

early adulthood has been demonstrated (Marsh, Smith, Marsh & Owens, 1988), whereby levels of physical self-esteem decreased during early adolescence (11-12 year-olds) into mid-adolescence (15-16 year-olds), and then increased until the beginning of adult life (21 year-olds). In addition, body image was shown to become stable or to decrease less from mid-adolescence to young adulthood than from early-to mid-adolescence (Eisenberg, Neumark-Sztainer & Paxton, 2006).

In the present study, quality of peer relationships and parental communication were higher in negatively associated with low SPA, but the effects sizes were small. Quality of peer relationships was a stronger predictor of SPA than parental communication. Overall, these results are consistent with the growing importance of peer influence in adolescence compared to the influence of parents, which tends to decrease or remain constant (Horn, 2004). Adolescents tend to spend more time with peers than with parents and, as members of a significant reference-group, the opinions of peers may have a stronger impact on adolescents' body image-related self-perceptions. The lack of interaction with gender are not aligned with the idea that girls are more interpersonally orientated than boys (Davison & McCabe, 2006). In fact, McCabe and Ricciardelli's (2001) suggested that peers put more pressure on girls to achieve the societal ideal of a lean body than on boys to achieve a muscular body. However, the results of this study do not support such a differential impact in the current sample.

As expected, parental communication predicted SPA. These results confirm parental communication as a positive health asset for adolescents (Brooks et al., 2015). Adolescents who feel comfortable speaking to parents would feel more supported in relation to their self-perceptions. In addition, research has shown that parental pressure to adhere to ideals of beauty influences adolescents' body image (Helfert & Warschburger, 2011), particularly in girls (McCabe & Ricciardelli, 2001). However, no interactions with gender were observed. The fact that this variable measured a general perception of ease of communication with parents, rather than specific patterns of communication concerning adolescents' bodies may justify these results.

Psychological symptoms, but not somatic symptoms, predicted SPA. These results are consistent with research that suggests that negative moods are associated with body image concerns (Friedman et al. 2002). It is possible that the nature of stressor (i.e., concerns over how others judge one's bodies) results in more pronounced psychological symptoms than somatic symptoms. Another reason that justifies the stronger impact of psychological symptoms is that these may be initial expressions of stress that may later be expressed in somatic symptoms as well (Haugland et al., 2001). Nevertheless, it appears that this symptomatology is not severe enough to result in associated psychological symptoms.

A number of factors limit this study. First, data were obtained by self-report

which may result in socially desirable response biases. Second, the present measures were developed to feature in a much larger health-related survey, which limits the depth of information available for each variable. Therefore, some variables were measured using a single item approach or with limited number of items. Yet, the measures used in the HBSC survey were valid and reliable (Currie et al, 2001; Matos et al, 2013). Third, this study was cross-sectional which precludes causality and calls for caution when interpreting directionality concerning associations between the independent variables and SPA. Therefore, researchers need to explore the developmental causal mechanisms of SPA in both genders through longitudinal research designs.

Notwithstanding the limitations, a major strength of this study is representative nature of its sample. This study was conducted with a large, nationally representative sample of school-aged adolescents. The results are therefore generalisable to the Portuguese school population. In addition, the present study identifies relevant behavioural and psychosocial variables linked to SPA in adolescents. This information is useful to develop interventions with at risk adolescents. Although effective clinical interventions to deal with SPA have not been tested (Sabiston et al., 2014), we suggest that interventions aimed at improving general body image may be equally effective in decreasing SPA. Therefore, cognitive-behavioural strategies that involve psycho-education, cognitive dissonance and desensitisation should be tested in intervention studies. In addition, because SPA develops in a social context, educational interventions should also teach adolescents coping strategies to deal with the pressures of achieving a socially desirable body shape and weight, including self-acceptance and seeking appropriate social support (Brunet et al., 2010; Sabiston et al., 2007). Considering that the cultural norms in relation to body size and shape, studies need to incorporate measures of muscularity.

### Compliance with Ethical Standards

**Ethical Approval.** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

### Informed Consent

Participation was voluntary and informed consent/parental consent was obtained from all participants included in the study.

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