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1 Body Image Dissatisfaction, Physical Activity and Screen-Time in Spanish Adolescents

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Abstract

This cross-sectional study contributes to the literature on whether body dissatisfaction (BD) is a barrier/ facilitator to engaging in physical activity (PA), and to investigate the impact of mass-media messages via computer-time on BD. High-school students (N=1501), reported their PA, computer-time (homework/leisure), and BD. Researchers measured students'weight and height. Analyses revealed that BD was negatively associated with PA, on both genders; whereas computer-time was associated only with girls' BD. Specifically, as computer-homework increased, BD decreased; as computer-leisure increased, BD increased. Weight-related interventions should improve body image and PA simultaneously, whilst critical consumption of mass-media interventions should include a computer component.

Keywords: sedentary behaviour; body image; physical activity; adolescents; social media

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Body Image Dissatisfaction, Physical Activity and Screen-Time in Spanish Adolescents

Eating disorders and unhealthy weight control behaviours are major issues of public health concern (Hudson et al., 2007; WHO, 2005). Worldwide prevalence rates of eating disorders are relatively low (1-5%) (Treasure et al., 2010), but they are associated with severe physical and psychosocial consequences (Herpertz-Dahlmann, 2015). One of the strongest predictors of developing an eating disorder is body image dissatisfaction (Stice, 2002). In a sample of Spanish 12- 17 years old, more than 50% of girls and nearly 50% of boys reported dissatisfaction with their body image (Valverde et al., 2010). Importantly, body image dissatisfaction represents a risk factor for the adoption of unhealthy weight control behaviours that are more common than eating disorders. For instance, it has been shown that adolescents with higher levels of body dissatisfaction engage more frequently in dieting, unhealthy weight control behaviours and binge eating (Neumark-Sztainer et al., 2006). The Homeostatic Theory of Obesity and its Circle of Discontent, a system of feedback loops between body dissatisfaction, negative affect, energy consumption and weight gain, offer an interactive framework to study this issue (Diclemente and Delahanty, 2016; Marks, 2015, 2016; Rosenbaum and White, 2016). According to this novel theory, for most people and on most occassions, the reciprocal relationship between these factors are in equilibrium. However, if any of these factors were to increase (i.e., high levels of dissatisfaction, negative affect, energy consumption or body weight), the reciprocity between them forms a vicious circle; a disturbance from equilibrium maintaining problematic eating behaviors and obesity.

During adolescence many of these problems emerge because teenagers experience important physical and psychological changes, strongly influenced by a society focused on body appearance (Smolak,

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2009). Moreover, there are two health-related behaviours that are relevant during this life period. Whilst physical activity levels declines drastically during adolescence, rates of screen-time exposure increase considerably (Currie et al., 2012; Sallis, 2000). Worldwide estimates indicate that almost 80% of youths do not achieve the public health recommendation of at least 60 minutes per day of moderate-to-vigorous physical activity (Hallal et al., 2012). Specific to Spain, the WHO-Health Behavior in School- Aged Children report (WHO-HBSC)(Currie et al., 2012), showed that the proportion of adolescents fulfilling the physical activity recommendation fell from 27% in 11- years- old boys and 15 % in girls, to 25 % in 15-years- old boys and 8% in girls, respectively. Furthermore, during adolescence it has been observed a rise on exposure time to TV, computers and other types of screens, collectively known as screen-time According to the WHO-HSBC report, the proportion of Spanish adolescents watching TV more than 2 hours daily, increased from 60% in11- years-old boys and 54% in girls, to 65% in 15 years-old boys and 63% in girls, respectively.

Aside from the well-known health- related physical benefits of regularly engaging in physical activity such as improved cardiovascular health, reduced risks of diabetes and metabolic syndrome (Hallal et al., 2006; Strong et al., 2005), there are also associated psychological benefits. A recent literature review of works investigating the relationship between exercise and body image concluded that regular exercise has a positive effect on body image (Hausenblas and Fallon, 2006). Interestingly, reversing the direction of the association, it has been argued by Heinberg and colleagues (2001), that a certain degree of body image dissatisfaction may be beneficial to motivate physical activity adherence. This last premise should be taken with caution because there are several studies showing that low body satisfaction may be a barrier to

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engaging in physical activity (Kopcakova et al., 2014; Neumark-Sztainer et al., 2004; Schuler et al., 2004). For example, it has been reported that people with high social physique anxiety may find wearing sporting clothes or "exposing" their body in front of other people in a gym, to be quite intimidating (Crawford and Eklund, 1994; Spink, 1992). Furthermore, it has been reported that among body dissatisfied, at- risk-for-overweight and obesity children and adolescents, peer victimization represented a barrier to engaging in physical activity (Storch et al., 2007); and among overweight adults, feeling too fat (and having body image concerns), also represented a common barrier to exercise (Ball et al., 2000). From an eating disorders and obesity prevention point of view it is certainly important to provide further evidence on whether a certain degree of body dissatisfaction might be a barrier or facilitator to engaging in physical activity. To date, there are no studies looking at this issue in non-Anglo-Saxon, large samples. This fact limits the generalizability of previous findings in other cultures. Thus the first aim of this study, is to investigate if body dissatisfaction represents a barrier to engaging in physical activity in a large sample of adolescents from Catalonia, Spain

As previously noted, during adolescence, screen-time exposure increases and this is of concern as it has been identified as an important risk factor for physical and psychological poor health. For example, it has been linked to weight gain/obesity risk in adulthood, reduced self worth, reduced academic achievement, depression and as a potential risk factor for eating disorders (Jordan et al., 2008; Thorp et al., 2011; Tremblay et al., 2011; Vaughan and Fouts, 2003). According to sociocultural models of eating disorders, mass media messages pressure individuals to conform to the cultural ideals of beauty (Levine and Murnen, 2009; López-Guimerà et al., 2010). Internalization of these ideals results in body dissatisfaction because attaining these ideals is generally very difficult for most people (Thompson and Stice, 2001). Then, body dissatisfaction could lead to negative affect and disordered eating, which can lead to eating disorders. Cross-

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sectional studies have found positive associations between media use (TV and magazines), body dissatisfaction and disordered eating behaviour among adolescents (López-Guimerà et al., 2010; Vaughan and Fouts, 2003). Likewise, experimental studies have shown that exposure to thin-ideal images causes an increase in body dissatisfaction (Levine and Murnen, 2009; López-Guimerà et al., 2010). However, the majority of these studies have focused on the impact of the TV and magazines, and in spite of a growing interest during the past years on investigating the impact of being exposed to the Internet (mainly social networks, such as Facebook), little is known about the broader role of computers on body dissatisfaction (Bair et al., 2012; Fardouly and Vartanian, 2015; Fardouly et al., 2015; Mabe et al., 2014; Meier and Grey, 2014; Tiggemann and Miller, 2010; Tiggemann and Slater, 2013a, 2013b; Williams and Ricciardelli, 2014). According to the 2011 Survey on Information and Communication Technology more than half of the individuals in the European Union use Internet everyday or almost every day (Seybert and States, 2012). In 2014, in Spain, nearly 75% of households reported having Internet access and at least one computer (Instituto Nacional de Estadisticas, 2014). Interestingly, in a recent study of adolescents from several countries of the European Union, Spanish adolescents between 14 and 17 years-old are the group with the highest percentage of daily use of social networks in Europe (91.6%) and 39.2% recognised spending more than two hours in these websites, daily (Tsitsika et al., 2013). The growth in recent years in accessibility to this technology highlights the importance of researching the relationship between computer-use and body dissatisfaction. Thus, the second aim of this study is to add to the existing literature on the impact of TV and magazines on body dissatisfaction, by investigating the association of computer time exposure and body dissatisfaction.

Method

Participants

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Data for the present study was drawn from baseline assessments of the MABIC project, a study on the prevention of eating and weight-related problems conducted in the Barcelona area, Spain (Sánchez-Carracedo et al., 2016). The study sample was compromised by 1,501 adolescents attending 11 secondary schools. Mean participant age was 14.2 years (SD= 1.1; range 13-17 yrs); and participants were roughly equally distributed across genders (47.6% girls) and grades. The self-reported racial/ethnic background of participants was as follows: 71.7% Spanish, 12.8% Latin-American, 2.2% from other European countries, 5.6% African and 8.0% of mixed or unknown origin. Socioeconomic status (SES), according to parents' educational level and occupational status (Hollingshead, 1975), was predominantly middle-class (medium low=38.5%; medium=26.5%; medium-high= 16.3%). The study was approved by the Animal & Human Experimentation Ethics Committee of the Universitat Autonòma de Barcelona. Parents were informed about the study via the school administration and could opt out if they disagreed with participation of their child. Participation rate was high (85.5%), whilst main reasons for lack of participation were: absenteeism at the assessment day (10.1%), no parental consent (3.6%) and unwillingness to participate/medical conditions (0.8%).

Measures and Procedures

Participants completed a paper and pencil booklet with a battery of validated questionnaires that included measures on body image, physical activity, screen-time exposure, and demographic and sociocultural identified in the literature to affect physical activity, body dissatisfaction and screen-time. Factors that have been shown to predict declines in physical activity are being female, increasing age during adolescence, being of low SES and from non-Caucasian ethnicity (Bauman et al., 2012). Factors associated

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with higher body dissatisfaction are being female, having a higher BMI, having a high internalization of the beauty ideal and being susceptible to sociocultural pressures (Smolak, 2009; Thompson and Stice, 2001; Williams and Ricciardelli, 2014). Factors that have been found to correlate with increased levels of screen-time exposure in adolescence are less conclusive, but gender, SES and BMI are generally controlled for in the literature (Dumith et al., 2012; Van der Horst et al., 2007).

The booklet was completed individually during regular class time, whilst height and weight were taken in a private room near the area of booklet administration. Completion of the questionnaires coupled with anthropometric assessments lasted approximately 60 minutes. Assessments took place between January and March 2011.

Body image dissatisfaction (BD). It was assessed with the body dissatisfaction subscale of the Eating Disorders inventory-3 (EDI-3) (Garner, 2004), in its Spanish validated version (Elosua et al., 2010). This is a ten-item scale that measures satisfaction with different parts of the body with response options on a six-point Likert scale from "0= Never" to "5= Always". Higher scores on the scale indicate greater dissatisfaction with one's body. The EDI-3 is well validated in female populations and its validity in male populations has also been reported in a sample of adolescent boys (Spillane et al., 2004). In the present study, the internal consistency of the EDI- BD subscale was found to be acceptable for both genders (Cronbach's alpha=.85 for girls and.81 for boys).

Moderate-to- vigorous physical activity (MVPA). It was assessed with two items that asked participants to report the number of hours on a typical week (7 days) that they spent on vigorous physical activities ('heart beats rapidly') and moderate physical activities ('not exhausting'), separately. Each type of activity was exemplified with a list of activities to aid comprehension. Examples of vigorous physical

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activities were intense cycling, running, swimming, aerobic dancing, skating, footbal, basketball; examples of moderate physical activites were fast walking, light cycling, weight lifitng, dancing, volleyball).These items were taken from the EAT Project Inventory (Neumark-Sztainer et al., 2012). Responses were on a 9-point scale ranging from "0 hours to 7 or more hours". For the analyses first, we re-coded responses to correspond to number of hours; the response "7 hours or more" was coded simply as 7 hours; and then created a score by adding up responses to the moderate and vigorous scores to form a total time score spent in MVPA (score range=0-14). This score was created in line with the public health recommendation for adolescents that suggests attaining at least 60 minutes per day of moderate-to-vigorous physical activity (Hallal et al., 2012).

Screen-time exposure. It was assessed with six questions from the EAT Project Inventory (Neumark-Sztainer et al., 2012) that asked participants to report the number of hours on a typical school-day (Monday- Friday) that they watch TV; use a computer for doing homework (computer-homework), and use a computer for leisure (computer-leisure). Participants were also asked to report the number of hours spent on these three activities (i.e., TV, computer-homework, computer-leisure) on a typical day of the weekend (Saturday –Sunday). Response options were on a 7-point scale ranging from "0, 0.5, 1, 2, 3, 4 to "5 hours or more". To facilitate interpretation of results, for the analyses, we re-coded responses to correspond to hours. The response "5 hours or more" was coded simply as 5 hours (Neumark-Sztainer et al., 2004).

Sociocultural pressures and internalization of the beauty ideal. They were assessed with the Sociocultural Attitudes Towards Appearance Questionnaire-3 (SATAQ-3) (Thompson et al., 2004), in its Spanish validated version (Sánchez-Carracedo et al., 2012). It consists of4 subscales:"Internalization-General" to evaluate the internalization of the general beauty ideal transmitted by TV and magazines;

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"Internalization-Athlete" that assesses the internalization of athletic models; "Information" which assesses the belief that the mass media is an important source of information about appearance, and "Pressures" which assesses feelings of pressure from media messages to modify one's appearance. Participants respond on a 5-point Likert scale from "completely disagree" to "completely agree". In the current study the reliability estimates for the four subscales were .93, .83, .91 and .93, respectively.

Body Mass Index (BMI). Researchers measured participant's body weight in light clothing and no shoes to the nearest 0.1 kg using digital scales (SECA- model 872), and height to the nearest 0.1 cm with a wall-mounted stadiometer(Seca-model214). Weight values were later corrected by subtracting 0.9 kg from the boys and 0.7 kg from the girls, which are average values estimated after weighing several sets of clothes similar to those worn at the time of assessment. BMIz scores were calculated using WHO 2007 growth reference criteria (Onis et al., 2007).

Statistical Analyses

Statistical analyses were performed with STATA13 (StataCorp.2013, 2013) and the level of significance was set at 0.05.There are well established gender differences in body satisfaction and physical activity (both higher in boys than in girls, especially in adolescents) (Grunbaum et al., 2002; Neumark-Sztainer et al., 2002) hence to facilitate interpretation of results all analyses were conducted separately for boys and girls. Independent t-tests were performed to compare main variables included in the analyses across gender groups. To assess the association between body dissatisfaction and physical activity on one hand, and screen-time variables and body dissatisfaction on the other hand, linear mixed effects (LME) regression models with random intercepts were used. The LME model was used since adolescents within the same schools are likely to display similar correlated values in several variables, so that school was used as a cluster

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variable in the model. In the first model, body dissatisfaction was treated as the independent variable and MVPA as the dependent variable; in the second model, body dissatisfaction was treated as the dependent variable and all six screen-time variables as independent variables. Both LME regression models were adjusted, with sociodemographic variables (ethnicity, age, BMI z scores and SES) and sociocultural variables (SATAQ-3 variables).

Results

Table 1 summarizes descriptive statistics and results of independent t-tests to compare main variables included in the regression models between gender groups. Noteworthy, only 1.9% of adolescents met the screen-time recommendation (a maximum of 2 hours of total screen-time, daily) and only 22.1% reached the physical activity guidelines. For informative purposes, in the Supplementary Files section (available at: http://hpq.sagepub.com/), we provide a table of correlations between BD and the six screen-time-related variables and MVPA by gender group.

[Insert Table 1 here]

Body Dissatisfaction and Physical Activity

LME regression model examining the associations between body dissatisfaction and MVPA after adjusting for control variables were significant for girls (total explained variance=9.49%, Wald χ^2 (9) =56.307, p<0.001) and boys (total explained variance= 11.10%, Wald χ^2 (9) = 60.69, p<0.001). School was not a significant factor affecting the relation between body dissatisfaction and MVPA on any gender group (girls: p= 0.802; boys: p=0.889). In particular, body dissatisfaction was significantly associated with lower

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rates of MVPA in girls: B=-.04, *SE*=0.02, *p*=0.011, 95% CI [-0.08, -0.01] and boys: B=-.07, *SE*=0.02, *p*<0.001, 95% CI [-0.10, -0.03].

Screen-time and Body Dissatisfaction

Table 2 illustrates the LME regression model results of the association between the screen-time variables and body dissatisfaction after adjusting for control variables. School was a significant factor for the model ran for boys (p=0.009), but not for girls (*p*= 0.889).The models were statistically significant in both gender groups,(girls: total variance explained= 45.08%, Wald χ^2 (14) = 563.99, p<0.001; boys; total variance explained=43.83%, Wald χ^2 (14) =99.65, p<0.001), but we observed significant associations of certain screen-time variables and body dissatisfaction only in girls. Specifically, body dissatisfaction decreased as the number of computer-homework hours increased (B=-.70, *p*=0.003), and body dissatisfaction increased as the number of computer-leisure hours increased (B=.56, *p*=0.01).There were no statistically significant associations between body dissatisfaction and TV hours in any gender group.

[Insert Table 2 here]

Discussion

In line with global trends, our findings in a large sample of Spanish adolescents showed that a large proportion of adolescents are generally inactive (77.9%), have a screen-time exposure way above the recommended levels (98.9%), and express some degree of dissatisfaction with their body image (65.9%). All these variables are of concern and put them at higher risk of developing physical and psychological distress. Particularly, the present study explored first, whether a certain degree of body dissatisfaction was negatively

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associated to regularly engaging in physical activity and second, whether screen-time exposure was associated to body dissatisfaction.

There is a wealth of evidence showing that regular engagement in physical activity is beneficial for improving body satisfaction (Hausenblas and Fallon, 2006). However, evidence on whether high levels of body dissatisfaction may be a barrier to engaging in MVPA or not, is mixed. It has been proposed that certain degree of body dissatisfaction may motivate individuals to engage in physical activity (Heinberg et al., 2001). On the other hand, past research, has found that social physique anxiety, weight-related peer victimization, feelings of being "too fat" and high levels of body dissatisfaction can represent a barrier to physical activity engagement, both in girls and boys (Ball et al., 2000; Crawford and Eklund, 1994; Focht and Hausenblas, 2004; Kopcakova et al., 2014; Neumark-Sztainer et al., 2004, 2006; Schuler et al., 2004; Spink, 1992; Storch et al., 2007). Our data seem to support this last premise, although the cross- sectional nature of our study does not allow us to establish the exact direction of the relationship between body dissatisfaction and physical activity. Nonetheless, this finding is important for future interventions in eating and weigh-related problems, which should aim to improve body image and physical activity levels together, and do not rely on that body dissatisfaction will motivate people to increase physical activity.

In the last few years, there has been a burgeoning interest in study in the relation between computer use and body image. The majority of them focus on the use of the Internet, more specifically on social network sites (e.g., Facebook), on computer-based publicity, and on the impact of pro-anorexia-web pages (Bair et al., 2012; Fardouly and Vartanian, 2015; Fardouly et al., 2015; Holland and Tiggemann, 2016; Mabe et al., 2014; Meier and Grey, 2014; Tiggemann and Miller, 2010; Tiggemann and Slater, 2013a, 2013b).Importantly, the vast majority of these studies investigated the relationship in girls only. To our

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knowledge this study is one of the few evaluating the impact of computer time on adolescent girls and boys' body dissatisfaction. First, we found a significant association for girls but not for boys. In particular we found that a greater number of hours of computer use for leisure were associated with higher scores of body dissatisfaction, but that greater number of hours of computer use for doing homework was associated with lower scores of body dissatisfaction. Without information about the content of the material viewed, it is difficult to interpret the findings, and so the differences between boys and girls. However, there is evidence that the influence of media on body dissatisfaction seems to be higher for girls than for boys (Calado et al., 2011; Swami et al., 2010). Internalization of the thin beauty ideal (extensively promoted by Western media) is thought to directly promote body dissatisfaction because it is unattainable for most women (Homan, 2010). Hence, we may hypothesize that when girls use computers for surfing the Internet or social networking in their leisure time, they are exposed to messages around the beauty ideal, which in consequence negatively affect their body image. This finding is in line with the predictions of sociocultural models and previous studies that have demonstrated the mediating role of internalization of the thin-beauty ideal, in the relation between body dissatisfaction and the use of Internet-based social network sites such as Facebook (Tiggemann and Miller, 2010; Tiggemann and Slater, 2013a, 2013b).

An original aspect of the present study is that it not only focused on computer time during adolescents' leisure time, but also explored the relationship between computer time for doing homework and body image. Specifically, we found that girls who spend more hours with computers doing homework have a more positive body image, possibly, because they are not being exposed to beauty ideal messages. In addition, they may derive a positive self-evaluation from attributes of their personality other than their physical appearance (e.g., cognitive abilities, school achievement) (Booth and Gerard, 2013; Marsh et al.,

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2005). For example in a correlational study, undergraduate girls with higher academic achievement reported lower concern with their physical appearance (Miles, 2009). Certainly this is an issue worth investigating in the future. More research is granted to investigate why this connection may exist.

Several studies have shown the negative impact that TV exposure has on body image (Levine and Murnen, 2009; López-Guimerà et al., 2010). In our study the number of raw hours exposed to TV was not statistically significantly associated to body dissatisfaction. Our measure was quite crude and did not ask about the type of programs or content. This global measure may not be sufficient to capture the well-documented impact of TV on body dissatisfaction. Another possible explanation may be related to a change in screen "types" usage. When we compare in our sample, the number of hours that adolescents spend watching TV or using computers for leisure activities, the latter is higher. This is consistent with trends in developed countries. In 2015, US adolescents between 12-17 years-old was the age group with the least weekly TV hours and noteworthy, in the space of 4 years, almost one-third of this age group's traditional TV viewing time has migrated to other activities (Marketing Charts, 2015). In Catalonia, trends are similar with people between 15 and 29 years old, being the age group with the lowest percentage of average TV time (after the 65+ age group) (Institut d'Estadistica de Catalunya, 2006). It seems that in the past TV has been a big source of information, but with the advent of Internet and new technologies, the focus has shifted to other type of media (i.e., computers, tablets, Smartphones, Facebook, Instagram, Tweeter, etc.). This is a valuable finding for future interventions oriented to the critical consumption of mass media pointing to the necessity of including these new media component in addition to TV and magazines.

We acknowledge a number of limitations. Self-reported measures were used to report physical activity and screen-time. Objective measures such as the use of accelerometers would have been preferable.

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However, the use of these tools was not feasible in a sample of this scale. Notwithstanding, all the measures used have been previously validated. In addition, there are biological factors, especially relevant during adolescence such as biological maturity, which may influence physical activity adherence (Machado Rodrigues et al., 2010). Particularly to adolescent girls, there is evidence of a negative association between levels of physical activity and biological maturity, being mediated by self-concept (Cumming et al., 2011). In future studies investigating the impact of body dissatisfaction on physical activity engagement, it may be worth including a measure of biological maturity, to shed further light on this relationship. Another limitation is that at the time of doing data collection the use of tablets and Smartphones was not as widespread as it is today in Spain. It is possible that if we had included some questions about these types of technologies, we would have found stronger effects on body image. The most important limitation is that because of the cross-sectional design of this study, we are unable to establish causal relationships between physical activity, computer-time and body dissatisfaction.

The current study has also a number of important strengths. The large and diverse sample in terms of ethnicity and socioeconomic status increase the generalizability of the findings. Importantly, we contributed to the literature in the field within a Spanish sample. This is of great value because the majority of studies examining this theme have been conducted in Anglo-Saxon cultures, mainly USA. Even though Spain shares a number of characteristics of Western culture such as the general ideal of beauty and unhealthy messages of weight control strategies, Spain, along with other European countries has its own cultural traditions and eating patterns, which may be protective from developing disordered eating behaviours. For example, Spain involves the Mediterranean diet, seen as one of the healthiest; in the Spanish society, family meals are still common; and although in recent years there has been an increase in the number of fast food

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restaurants, they still are poorly frequented compared to the more traditional establishments, where the cuisine is similar to the Mediterranean diet (Davidson and Gauthier, 2010; López-Guimerà et al., 2013; Marin-Guerrero et al., 2008). Moreover, the instruments used to measure key variables were all validated measures within Spanish samples and the objective assessment of height and weight reduced any self-report bias. Noteworthy, we investigated the role of computer-use on body dissatisfaction, an area which certainly in the near future will grow considerably. Future research may explore the quality of programs/ messages that are transmitted in TV versus computers, tablets, Smartphones, as well as the impact of new technologies on body dissatisfaction and physical activity. Future studies on body image may explore the impact of specific uses of new technologies (i.e., mainly for email; mainly social networking; mainly for work; computer gaming, downloading movies, music videos, etc.).

Conclusions

The present study showed within a large sample of Spanish adolescents that body dissatisfaction can work as a barrier and not a motivator to physical activity adherence. Importantly, it was found that the use of computers during leisure time was negatively associated with girls' body image. Findings of the present study along with previous research findings have implications for the development of programs aimed at preventing the broad spectrum of weight related disorders with a focus on improving body satisfaction and physical activity simultaneously, as well as the critical consumption of messages delivered via new technologies.

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519 Table 1 Descriptive and test statistics of variables included in analyses by gendergroup

	Females		Males		95% CI of the difference	*t*	*p*
	Mean	SD	Mean	SD			
Age	14.05	1.03	14.18	1.1	(-0.23. -0.02)	-2.28	**0.04**
BMI	21.22	3.65	20.93	4.01	(-0.10. 0.68)	1.45	**0.02**
SES	6.13	1.46	6.29	1.49	(-0.31. -0.01)	-2.05	0.46
STQIG	18.91	9.82	14.41	6.89	(3.64. 5.37)	10.24	**<.001**
STQIA	7.61	4.01	9.24	4.54	(-2.07. -1.20)	-7.31	**<.001**
STQP	12.21	6.55	9.93	4.83	(1.69. 2.86)	7.61	**<.001**
STQI	21.4	9.7	18.01	8.6	(2.46. 4.33)	7.13	**<.001**
WDTV	1.98	1.4	2.09	1.4	(-0.26. 0.03)	-1.58	0.96
WDC-H	2.04	1.29	1.59	1.22	(0.32. 0.57)	6.84	0.59
WDC-L	2.43	1.61	2.28	1.61	(-0.01. 0.31)	1.82	0.31
WETV	2.51	1.49	2.5	1.46	(-0.14.0.16)	0.13	0.43
WEC-H	1.87	1.25	1.43	1.11	(0.33. 0.57)	7.28	**0.01**
WEC-L	2.97	1.62	2.85	1.65	(-0.04. 0.29)	1.44	0.47
BD	12.34	9.19	7.89	7.27	(3.61. 5.30)	10.34	**<.001**
MVPA	4.12	3.08	5.88	3.49	(-2.06. -1.40)	-10.23	**<.001**

Note: CI: confidence interval; SD: standard deviation;BMI= Body Mass Index; SES=Socio economic Status; STQIG= Internalization-General; STQIA= Internalization Athletic Ideal; STQP= Pressures; STQI= Information; WDTV= weekday TV; WDC-H= weekday computer-homework; WDC-L= weekday computer-leisure; WETV=weekend TV; WEC-H= weekend computer-homework; WEC-L=weekend computer-leisure; BD= Body Dissatisfaction; MVPA= moderate-to-vigorous activity. Significant p-values in bold. N for females were between 696 and 713; N for males were between 765 and 784

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521 Table 2 LME regression model of the association between body dissatisfaction and screen-time variables by

522 gender group

	Females				Males			
Variables	B	SE	*p*	95%CI	B	SE	*p*	95%CI
WDTV	-0.04	0.25	0.886	(-0.53, 0.46)	-0.07	0.21	0.748	(-0.50, 0.36)
WDC-H	-0.69	0.26	**0.009**	(-1.21, -0.18)	-0.06	0.23	0.781	(-0.52, 0.39)
WDC-L	-0.04	0.22	0.872	(-0.49, 0.41)	-0.16	0.2	0.431	(-0.56, 0.24)
WETV	0.11	0.24	0.658	(-0.36, 0.57)	-0.18	0.21	0.385	(-0.60, 0.23)
WEC-H	0.34	0.26	0.196	(-0.18, 0.86)	0.09	0.24	0.705	(-0.39, 0.57)
WEC-L	0.57	0.23	**0.013**	(0.12, 1.02)	0.05	0.19	0.78	(-0.33, 0.44)
Random effect								
School	3.06e-11	2.13e-10	0.889	(3.53e-17; 2.65e-5)	0.91	0.35	**0.009**	(0.43,1.92)

Note: LME: linear mixed effects; SE: standard error; WDTV= weekday TV; WDC-H= weekday computer-homework; WDC-L= weekday computer-leisure; WETV=weekend TV; WEC-H= weekend computer-homework; WEC-L=weekend computer-leisure.
Model adjusted for Age, Ethnicity, SES, BMI z-score, Internalization-General, Internalization-athlete, Pressures and Information. Significant p-values in bold

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