

Analysis of body image and obesity by Stunkard's silhouettes in 3- to 18-year-old Spanish children and adolescents

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Título: Análisis de imagen corporal y obesidad mediante las siluetas de Stunkard en niños y adolescentes españoles de 3 a 18 años.

Resumen: Este artículo se centra en estudiar la imagen corporal y la sobrecarga ponderal (sobrepeso y obesidad) en niños y adolescentes españoles. La muestra estuvo compuesta por 1082 niños y adolescentes de 3-18 años (11.85 ± 2.82) de la Región de Murcia (541 de sexo masculino y 541 de sexo femenino). El instrumento utilizado fue el de las siluetas de Stunkard. El 34 % de hombres y el 17.9% de mujeres fueron clasificados en la categoría de sobrepeso/obesidad, $\chi^2(1)=26.936$, $p=.001$, $d=0.65$. Respecto a la imagen corporal, el 61.2% presentó insatisfacción con su cuerpo, destacando aquellos a los que les gustaría ser más delgados (hombres 44.7% y mujeres 46%). Por tanto, el problema psicológico de la insatisfacción corporal tuvo una mayor prevalencia que el problema fisiológico de la obesidad. Se recomienda implementar programas de actividad física para mejorar la imagen corporal y la composición corporal de los niños y adolescentes de la Región de Murcia.

Palabras clave: Autoconcepto físico; insatisfacción corporal; sobrepeso; composición corporal.

Abstract: This paper is focused on the study of body image and excess weight and obesity in Spanish children and adolescents. This investigation involved 1082 children and adolescents (541 males and 541 females) from the Region of Murcia, aged between 3 and 18 years (11.85 ± 2.82). The instrument used was Stunkard's silhouettes. 34% of men and 17.9% of women were classified as overweight/obese, $\chi^2(1)=26.936$, $p=.001$, $d=0.65$. Regarding body image, 61.2% were dissatisfied with their body, highlighting those who would like to be thinner (men 44.7% and women 46%). Therefore, the psychological problem of body dissatisfaction had a higher prevalence than the physiological problem of obesity. It is recommended to implement physical activity programs to improve body image and body composition of children and adolescents in the Region of Murcia.

Key words: Physical self-concept; body dissatisfaction; excess weight; body composition.

Introduction

The term self-concept refers to the combination of perceptions that the human being develops about itself. It is a psychological variable which is fundamental in order to understand the emotional wellbeing and social integration of the individual (Shavelson, Hubner, & Stanton, 1976). Along these lines, in the last few years many authors have coincided in stressing the importance of self-concept, associating it to the wellbeing of human beings (Molero, Zagalaz, & Cachón, 2013). The subjects that see themselves in a positive light interpret the world in a different way than those who view themselves negatively, establishing in this way a connection between self-concept and conduct (Bufford, 1986).

Body image is made up of the perception we have of our body and of each one of its parts. It is built historically and culturally and, in the case of westernised societies, currently the ideal physical aesthetic is slenderness for women and musculature for men, which is spread by the powerful industries of film, fashion and the media. In this context surfaces the incomformity with body image (Jiménez, Zagalaz, Molero, Pulido-Martos, & Ruiz, 2013; Mancilla, Vázquez, Mancilla, Amaya Hernández, & ÁlvarezRayón, 2012).

Nowadays, the care of the body and body image is of great social relevance (Álvaro et al., 2016; Cachón, Cuervo, Zagalaz, & González, 2015; Chacón et al, 2017; López, Ahmed & Díaz, 2017; Morrison, Kalin, & Morrison, 2004;

O'Dea, & Abraham, 2000; Zurita et al., 2015, 2016). In childhood, and especially in adolescence, lots of self-esteem problems arise stemming from the changes the body experiences during these years. This, combined with the natural desire of being accepted, makes children and adolescents compare themselves constantly with others. It is no surprise then that body image is one of the most influential predictors of self-esteem (Chacón et al., 2016; Moreno, Cervello, & Moreno, 2008).

Some studies have found connections between obesity and the perception of body image (López, Nicolás, & Díaz, 2016; Magallares, Carbonero, Ruiz, & Jauregui, 2016). Moreover, Pedro et al. (2016) reported the connection between body image and the body mass index (BMI). In the same vein, Trejo Ortiz, Castro Veloz, Facio Solís, Mollinedo Montano, & Valdez Esparza (2010) determined that higher values of BMI, especially in women, were connected to a higher bodily dissatisfaction. Due to the connections between body image and obesity, authors like Coelho, Padez, Moreira, Rosado, & Mourao-Carvalho (2013), have pointed out that the silhouettes of body image could be a valid way of measuring obesity in children.

Furthermore, according to Contreras, Fernández, García, Palou, & Ponseti (2010), who studied a sample of 400 adolescents from Albacete between the ages of 12 and 17, the adolescents who regularly practiced a sport (at least once a week) had higher perceptions of their self-concept, generally as well as physically, in comparison to those who were not regular practitioners. They also found that the frequency with which they practiced sport, the duration of the practice, the years of dedication, the satisfaction and the pleasure taken from the sport were positively connected to physical and

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general self-concept. In this way, the state of health and perceived body image are connected significantly and positively (López, 2017; Ortega et al., 2013; Urrutia, Azpillaga, Luis de Cos, & Muñoz, 2010).

Hence, due to the importance of body image and its direct connection to the state of health in people, the goal of this study is to analyse, through Stunkard's silhouettes, the body image and weight overload in Spanish children and adolescents between the ages of 3 and 18, comparing the results with those of other regions and countries, and studying the significant differences in function of gender and age. Likewise, this study seeks to contribute data which may be useful in order to improve the body image of children and adolescents.

Method

Characteristics of the participants and sample

The study sample was made up of 1082 children and adolescents from the Region of Murcia (Spain), between the ages of 3 and 18 (Average 11.85, standard deviation 2.82, 50% women), belonging to four stages of education: Kindergarten, Elementary School, Middle School, and High School. The students of the sample belonged to public state schools, and came from different levels of socio-economic backgrounds. The education centers were chosen according to convenience sampling.

Procedure

First of all, meetings were carried out with the management staff of the centers and the parents of the students. The data was gathered in the same education centers through a questionnaire. All the parents/tutors gave informed consent. This research was approved by the Ethical Commission of Research of the University of Murcia (Spain) and all the subjects filled out the questionnaires anonymously.

Instruments

The body silhouettes method, designed and validated by Stunkard, Sørensen, & Schulsinger (1983), was used; it shows nine body silhouette figures, of both men and women, from very thin to very obese:

This instrument allows the measurement of the body image in a reliable and simple way. For this, the subjects have to choose the figure which is closest to their own along with the silhouette they would like to have. The results allow three measurements: the current image, the desired image and the discrepancy (desired-current), which is interpreted as the level of dissatisfaction with the body image. If the discrepancy is equal to 0, the subject is satisfied with their body image; if the discrepancy has a positive value, the subject wishes to be bigger; if the discrepancy has a negative value, the subject wishes to be thinner.

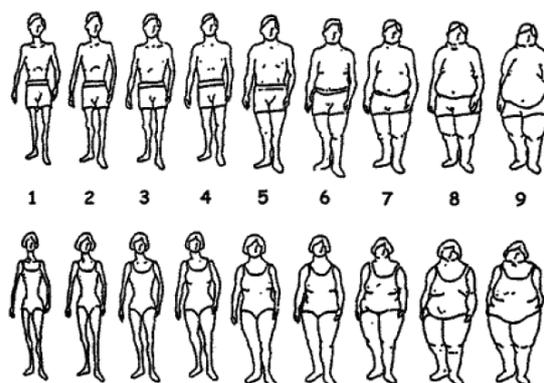


Figure 1. Stunkard silhouettes.

Additionally, the Stunkard silhouettes have been linked to the BMI and have proven to be a valid, trustworthy, and effective instrument to classify subjects as obese or as thin, in the case of adults as well as in the case of children and adolescents.

Bulik et al. (2001) carried out a study with 16,728 American women and 11,366 American men, between the ages of 18 and 100, in which they established the equivalence between each image and the BMI. For the younger participants in this study silhouette 1 corresponded with thinness ($BMI < 18.5$), silhouettes 2 and 4 with standard weight ($18.5 < BMI < 25$), silhouette 5 with overweight ($25 \leq BMI < 30$) and silhouette 6 or above with obesity ($BMI \geq 30$), equivalents which will also be used in this study.

In the child and adolescent population, Cortés-Martínez et al. (2009) evaluated 1862 Mexican children and adolescents between the ages of 6 and 18, and reported that silhouettes 5-9, in both genders, corresponded with excess weight and obesity. The Kindergarten students filled out the questionnaire with the help of the research staff and Kindergarten teachers.

Data analysis

The statistical analysis was carried out using the Statistical Package for Social Sciences 22.0 (SPSS-22.0). First of all, descriptive statistical techniques were applied: frequencies, percentages (%), averages & standard deviation (SD). Kolmogórov-Smirnov's nonparametric test was used to verify the normality of the distribution of the sample. Consequently, an analysis of the significant statistical differences was carried out, considering $p < .05$ as the level of statistical significance. The T-test was used for related samples to compare the current image with the desired one, and the T-test for independent samples for comparisons between genders (chi-square test χ^2 for percentages and frequencies). Moreover, the size of the effect was calculated using Cohen's d (Cohen, 1988). In order to analyse the difference between age groups the variance analysis with a factor (ANOVA) was used, along

with post-hoc analysis and Tukey's multiple comparisons HSD test.

Results

Table 1 shows the distribution of the subjects according to their perception in the different silhouettes, in total and according to gender, along with the distribution according to the classification of nutritional status based on the BMI (Bulik et al., 2001). We can observe in the analysed sample that overweight is perceived by 26% of the subjects, being more frequent in men (34%) than in women (17.9%). This difference is statistically significant, $\chi^2(1)=36.385, p<.001, OR=2.359, 1.778 \leq IC95\%OR \leq 3.310$. 80.6% of women perceived themselves as having a standard weight along with 64% of men, which is also a statistically significant difference, $\chi^2(1)=37.358, p<.001, OR=2.340, 1.776 \leq IC95\%OR \leq 3.084$.

Table 1. % muestral según siluetas y clasificación IMC.

Silhouette	Total <i>n</i> =1082	Men <i>n</i> =541	Women <i>n</i> =541	ClasBMI	Total	Men	Women
1.00	1.8	2.0	1.5	Slimness	1.8	2.0	1.5
2.00	14.1	12.2	16.1	Standard weight	72.3	64	80.6
3.00	22.0	18.5	25.5				
4.00	36.1	33.3	39.0				
5.00	18.1	22.0	14.2	Overweight	18.1	22.0	14.2
6.00	6.2	9.1	3.3	Obesity	7.9	12.0	3.7
7.00	1.3	2.4	0.2				
8.00	0.2	0.4	-				
9.00	0.2	0.2	0.2				

ClasBMI: Classification according to Body Mass Index.

Table 2 shows the distribution of the participants according to the silhouette with which they perceived themselves and the silhouette they wished to have; a clear tendency towards standard weight is perceived here. It can be seen that more than 20% of the subjects, perceiving themselves in standard weight, wished for a slimmer silhouette. These cases are highlighted in bold and are represented in 65% of women and 35% of men.

Table 2. Distribution of perceived and desired silhouettes.

Perceived silhouette	Desired silhouette					
	1	2	3	4	5	6
1	21.1	31.6	31.6	15.8		
2	5.2	50.3	25.5	19.0		
3	2.9	20.2	53.4	19.3	4.2	
4	1.5	7.2	37.6	45.8	7.9	
5	1.0	4.1	23.5	52.6	18.9	
6		4.5	11.9	50.7	31.3	1.5
7			7.1	28.6	57.1	7.1
8					100.0	
9			50.0	50.0		
Total	2.5	15.7	34.7	36.9	10.1	0.2

Note: Line percentages.

Figure 2 shows the distribution of the percentage of discrepancy according to gender, where it is noted that acceptance (null discrepancy) is more common in women (43.8%) than in men (34.6%). 10% of women prefer a larger silhouette, in contrast with 21% of men. On another note, the bigger discrepancies (2 or more silhouettes), can also be observed with more frequency in men.

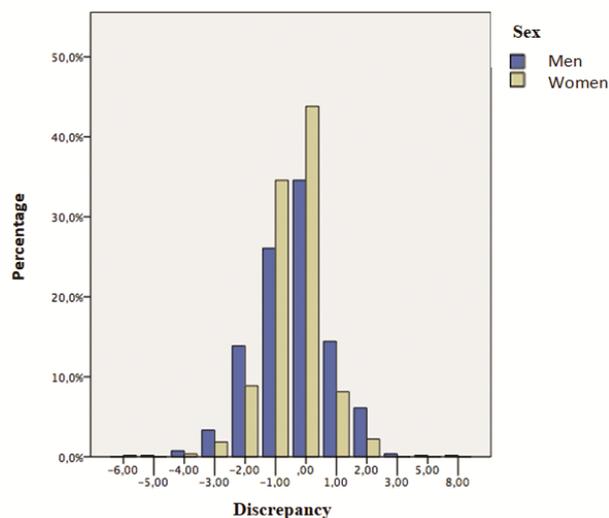


Figure 2. Distribution (%) of discrepancy according to gender.

Notwithstanding, an analysis was carried out in order to detect influential factors in the discrepancy through the factors of gender, BMI classification, and educational level, which showed statistically significant differences in function of gender, $F(1,1056)=20.912, p<.001, \hat{\eta}^2=.019$, with low effect size, and BMI classification, $F(3,1056)=76.063, p<.001, \hat{\eta}^2=.202$ with an average effect size. Based on these factors, the sense of discrepancy identified as 0 (no discrepancy), 1 (with a silhouette of discrepancy) and 2 (with 2 or more silhouettes of discrepancy) were analysed, according to BMI classification, silhouette and gender through contingency tables, which showed significant differences in standard weight and overweight yet not in slimness nor obesity; most of the participants wished to be perceived as a silhouette bigger or smaller, respectively.

Table 3 shows the distribution of discrimination according to BMI classification, gender and silhouette for the participants which identified themselves in the range of standard weight or overweight, and in bold are selected the table cells with significant corrected typified residuals (superior to 2).

Table 3. % of discrepancy by gender.

Clasif.	Silhouette	Sex	n	Discrepancy				
				-2,00	-1,00	,00	1,00	2,00
Standard weight	2	Man	66		9.1(1.9)	36.4(-3.0)	22.7(-0.7)	31.8(3.5)
		Woman	87		2.3(-1.9)	60.9(3.0)	27.6(0.7)	9.2(-3.5)
Standard weight	3	Man	100	7.0(3.2)	13.0(-2.3)	40.0(-3.5)	31.0(3.9)	9.0(3.1)
		Woman	138	0.0(-3.2)	25.4(2.3)	63.0(3.5)	10.9(-3.9)	0.7(-3.1)
Standard weight	4	Man	180	9.4(0.5)	23.3(-5.4)	50.0(1.6)	16.7(5.9)	0.6(1.1)
		Woman	211	8.1(-0.5)	49.8(5.4)	41.7(-1.6)	0.5(-5.9)	0.0(-1.1)
Overweight	5	Man	119	24.4(-1.6)	51.3(-0.4)	24.4(2.4)		
		Woman	77	35.1(1.6)	54.5(0.4)	10.4(-2.4)		

Note: percentage (corrected statutory residual).

It is seen that on the lower level of standard weight (silhouette 2) women (61%) accept themselves more than men (36%), who mainly prefer a bigger silhouette. This same tendency can be observed in silhouette 3, in which acceptance by women is of 63%, with the tendency of desiring a smaller silhouette (25%), whereas 40% of men wish for a larger silhouette. In the higher level of standard weight, silhouette 4, the percentage of women who wish for a smaller silhouette doubles men, of whom, 17% even wish for a bigger silhouette. In overweight, following the previous tendency, the acceptance percentage of women is less than half of that of men.

Discussion

The results of this study indicate that excess weight was perceived by 26% of the subjects (male 34% and female 17.9%), being 80.6% of women those who saw their weight as normal in contrast with 64% of men. However, more than 20% of the subjects who perceived themselves as having standard weight, wished for a slimmer silhouette (65% of women and 35% of men). It is also worth emphasising that acceptance of body image was more frequent in women (43.8%) than in men (34.6%), existing 10% of women who prefer a larger silhouette, in contrast to 21% of men.

These results can be compared with those of Gómez, Sánchez-Alcaraz, & Mahedero (2013), who evaluated the body image of 195 students between the ages of 12 and 17 in the Region of Murcia. When it comes to gender, it was found that men were more dissatisfied; in this study there were also more dissatisfied men, since the acceptance of body image was more frequent in women (43.8%) than in men (34.6%), even though the discrepancy (or dissatisfaction with body image) was greater in the female gender than in men. According to these authors, as age increases so does the level of satisfaction, something which cannot be easily appreciated in this study.

Ramos, Pérez de Eulate, Liberal, & Latorre (2003) studied the body image of 4657 Basque adolescents, between the ages of 12 and 18 (2406 girls and 2251 boys). Among the main results it stands out that 47% of the students who were studied wanted to be thinner; a similar result to the present study in which we found that 45.4% of the students who were studied wished to be slimmer. Ramos et al. (2003) also

highlighted that more than half (60%) wished to change their image, a result which again coincides with this study in which 61.2% of the analysed children and adolescents were dissatisfied with their bodies. Another aspect which was pointed out by the authors is that there is a larger percentage of women who do not accept their body image (37% of women in contrast with 15% of men), meanwhile in this study there is 56.4% of dissatisfied girls and 66% of boys who are dissatisfied with their image.

Along the same lines as the previous study, Díaz & Blanquez (2001) also indicated that there is a larger percentage of women, in comparison with men, who do not accept their body image and feel dissatisfied with it, differing from the current study.

Another interesting study is that of Ramos, Rivera & Moreno (2010), who studied body image and the BMI of 21811 Spanish teenage boys and girls between the ages of 11 and 18. Despite the fact that the girls had a more adjusted BMI and presented a lower level of excess weight and obesity, they found that it was them who perceived themselves as more obese, who were dissatisfied with their body image and frequently went on diets in order to lose weight. In this study, they also found a larger discrepancy or average dissatisfaction in the female gender, even though the percentage of dissatisfied males is higher. Ramos et al. (2010) also showed that 22.16% of the boys perceived themselves as a little or too thin, in contrast with 13.86% of the girls. These results are similar to the results of the present study, in which 21.3% of boys and 10.4% of girls had the desire of being bigger. Lastly, according to Ramos et al. (2010) 39.78% of girls felt that they were a bit or too fat, in contrast with 27.85% of boys. However, in this study 44.7% of boys and 46% of girls show a wish to be slimmer.

Finally, the research of Trejo et al. (2010) is noteworthy. They studied the body image and body mass index of 231 adolescents (104 boys and 127 girls) between the ages of 12 and 15 from the Municipality of Fresnillo, Zacatecas, Mexico, finding that 81.8% of the adolescents showed no dissatisfaction with their body image. This result clearly differs from the current study, in which 38.8% of the sample were satisfied with their bodies, meanwhile 61.2% of the children and adolescents analysed showed dissatisfaction with their body image.

Conclusions

According to the studied sample, most of the Spanish children and adolescents showed dissatisfaction with their body image, highlighting those who wished to be slimmer. Moreover, the psychological problem of bodily dissatisfaction is more prominent than the physiological problem of obesity. In terms of gender, there are more boys who wished they were larger, more satisfied girls and a similar number of boys and girls with the desire to be slimmer.

In the total of 9 silhouettes from slimmest to biggest, the most frequent silhouette or current image is number 4. In terms of the most desired image, the silhouettes who stand out as the most desired are 4 and 3. One of every three students would like to have an immediately inferior (slimmer) silhouette than their current silhouette.

The average desired image is inferior to the average current image, in other words the average desired image is 'slimmer' than the current one. Moreover, the ideal silhouette of the girls is slimmer than that of the boys.

In terms of age, it is worth stressing that in all ages the average discrepancy is negative (desire to be slimmer), with

the exception of the students of 3 and 4 years of age who presented positive discrepancies (desire to be bigger).

The main strength of this study is the wide sample of students and age range which covers the phases of Kindergarten, Elementary School, and Middle School. The main limitation is that the BMI was measured through the association between the silhouettes and the cut-off points of the BMI. In future research it is recommended to measure the BMI objectively and use the cut-off points of the World Health Organization or of the International Obesity Task Force.

Looking at the future and as practical applications, the authors recommend carrying out physical activity intervention programs, of different durations and with different methodologies, to try and improve the body image of children and adolescents, due to the fact that the children who regularly do physical activity and who have a better physical fitness and body composition tend to be more satisfied with their bodies (Borrego, López, & Díaz, 2012, 2014; López, López, & Díaz, 2015).

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