International Journal of Psychology and Psychological Therapy, 2015, 15, 1, 17-32

Assessment of Implicit Anti-Fat and Pro-Slim Attitudes in Young Women Using the Implicit Relational Assessment Procedure

Paloma Maroto Expósito, Mónica Hernández López*, Miguel Rodríguez Valverde

Universidad de Jaén, España

Abstract

Research on implicit attitudes to both male and female body size has produced evidence for the existence of an attitudinal bias in the form of preference for images of thinness over images of fatness. Studies that have employed the Implicit Relational Assessment Procedure (IRAP) have shown that this bias is specifically attributable to a pro-slim attitude, rather than to an anti-fat one. It is not clear, however, if the same type of specific pro-slim bias will be found when attitudes are measured exclusively for female participants and only to female targets. The present study has employed the IRAP for the assessment of implicit attitudes towards fatness and slimness in a sample of 40 Spanish young female college students. The task required participants to respond relationally in alternating trial-blocks. In pro-slim/anti-fat blocks, they had to respond as if photos of underweight women were pleasant and photos of overweight women were unpleasant. In anti-fat/pro-slim blocks they had to respond according to the opposite pattern (overweight as pleasant and underweight as unpleasant). Additionally, participants had to produce explicit ratings of pleasantness for the same photos used in the IRAP (with a visual analogue scale: VAS), and answer measures of body dissatisfaction and of eating disorders symptomatology. Results showed no evidence of implicit bias for body size (neither pro-slim nor anti-fat). Besides, no significant correlations were found between implicit and explicit measures. These results are consistent with prior evidence suggesting that women show less anti-fat prejudice than men, and with studies that find less anti-fat bias in Spanish population than in Anglo-Saxon population.

Key words: implicit attitudes; anti-fat/pro-slim bias; IRAP, RFT.

Novelty and Significance

What is already known about the topic?

- The literature on implicit and explicit attitudes to body size reveals the existence of prejudice in the form of anti-fat/pro-slim attitudinal biases.
- Previous studies with Implicit Relational Assessment Procedure (IRAP) have isolated the direction of implicit bias as a pro-slim (and not an anti-fat) attitude.
- There is evidence that anti-fat/pro-slim bias is stronger in men than in women. There is evidence that there are cultural differences in implicit anti-fat bias.

What this paper adds?

- This is the first published study to employ the IRAP to study implicit attitudes to slimness and fatness with Spanish population.
- This is the first IRAP study to assess implicit attitudes towards fatness/slimness pictures of others (not self-referred) that has a female-only sample and female-only targets.
- Participants showed implicit positive attitudes both to photos of slim women and to photos of overweight women (and thus no implicit pro-slim or anti-fat bias). This result is different to the findings from previous IRAP studies with samples from both genders, where pro-slim bias was the most prominent result.

A growing interest in the study of attitudes towards weight and body image has been observed in recent years (e.g., Brownell, Puhl, Schwarz, & Rudd, 2005; Rozin & Fallon, 1988; Schwarz, O'Neal Chambliss, Brownell, Blair, Billington, 2003). Substantial

* Correspondence concerning this article: Mónica Hernández-López, Departmento de Psicología, Universidad de Jaén, 23071 Jaén, España. E-mail: mhlopez@ujaen.es

evidence has accumulated that points to the existence of a negative attitudinal bias towards overweight and obese people (anti-fat bias). That is, in general, overweight and obese people are viewed as less attractive, competent, and successful (Crandall, 1994; Schwarz, Vartanian, Nosek, & Brownell, 2006; Teachman, Gapinski, Brownell, Rawlins, & Jeyaram, 2003). Different authors have pointed out that these negative attitudes in the population may foster discrimination against overweight and obese people in different contexts (school, work, social relations, etc.) (see: Puhl & Brownell, 2001; Puhl & Heuer, 2009), with negative consequences on their well-being (e.g., Magallares, Morales, & Rubio, 2011, 2014). There is also evidence for a positive attitudinal bias towards thin people (pro-thin or pro-slim bias), who are viewed as more attractive, competent, and successful (Anselmi, Vianello, & Robusto, 2013; Carels & Musher-Eizenman, 2010;). Indeed, a common view in the field is the so-called idealization of thinness. According to it, being thin would become an ideal that teenage and young adult women feel socially pressured to pursue (Thompson & Stice, 2001). The internalization of the thin ideal is associated to high levels of dissatisfaction with one's own body (even for women who keep a healthy weight) as well as to an increased risk for the development of eating disorders (Stice & Whitenton, 2002; Thompson & Stice, 2001).

A substantial part of the research on body image attitudes has been carried out with questionnaires and other self-report measures (e.g., Crandall, 1994). Although these instruments are useful and convenient, especially for obtaining information from large samples, it has been questioned to which extent they are appropriate for the assessment of attitudes regarding socially controversial issues (e.g. areas that might involve social prejudice) (e.g., Dovidio, Kawakami, Johnson, Johnson, & Howard, 1997). Participants might modify their responding in order to present themselves in a socially desirable manner, in accordance with the social norm, or just try to respond in accordance with what they believe the researcher is expecting from them (Holtgraves, 2004). Even when participants respond honestly, it is not clear to which extent they can accurately introspect and be aware of their potential social biases (Nisbett & Wilson, 1977; Wilson, 2009). These limitations have been addressed by utilizing research procedures that rely on behavioral measures other than self-report (like response latency and response accuracy) under time pressure conditions. These procedures, usually termed implicit measures, are supposed to assess automatic, immediate, non-declarative attitudes (Fazio & Olson, 2003). They do not require the participant to deliberately evaluate their preference and consciously produce a value judgment, but their attitudes are inferred from their performance in the experimental task. For instance, participants' implicit racial bias would be inferred from the difference in their speed in categorizing images of white people with positive attributes (and of black people with negative attributes) compared to their speed in categorizing images of black people with positive attributes (and of white people with negative attributes). Being faster in the former would be indicative of an anti-black/pro-white racial bias.

The most popular of implicit attitude measures is the Implicit Association Test (IAT: Greenwald, McGhee, & Schwarz, 1998). It is a computerized task based on the assumption that participants should be faster in categorizing concepts that are strongly associated in their memory, as compared to concepts that are not. The IAT is a latency-

based double categorization task where participants are required to quickly respond by indicating the category to which the stimuli presented on-screen belong. These stimuli can either be exemplars of the attitudinal object of interest (e.g. pictures of overweight and slim people) or exemplars of the attribute categories (e.g., positive and negative words). For instance, in trial-blocks consistent with an anti-fat/pro-slim bias, the same response key would be assigned to the categories "slim" and "positive", and the same response key would be assigned to the categories "fat" and "negative". In trial-blocks inconsistent with the aforementioned bias, the assignation would be reversed (slim-negative, fat-positive). If participants respond faster on consistent than on inconsistent trials, then the differential in their response latencies is interpreted in terms of an anti-fat/pro-slim bias. The IAT has been successfully employed in the measurement of implicit bias in various socially sensitive domains (see Greenwald, Poehlman, Uhlmann, & Banaji, 2009), where participants generally show a larger degree of implicit than of explicit bias (e.g. Teachman et al., 2003). More specifically, the IAT has been used for the assessment of implicit attitudes to fatness (see Ahern & Hetherington, 2006; Brochu and Morrison, 2007; Gapinski, Schwartz, & Brownell, 2006; Schwartz, et al., 2006; Teachman & Brownell, 2001; Teachman *et al*., 2003), showing evidence of an anti-fat bias. For instance, in Brochu and Morrison (2007) participants had to categorize pictures of average and overweight men and women with positive and negative words. They were faster in pairing pictures of average-weight people with positive words and pictures of overweight people with negative words, than in pairing the same pictures and words according to the opposite pattern. Although these results were clearly indicative of a an anti-fat/pro-average-weight bias, it is impossible to know whether participants actually had a negative bias against overweight people and a positive bias towards average-weight people, or rather they had only one of those biases (e.g., anti-fat) and were neutral regarding the other. The IAT does not allow the researcher to establish the direction of the observed attitudinal bias, but only a relative measure of preference for one category over the other (see De Houwer, 2002). In the case of anti-fat/pro-slim attitudes, it does not provide a metric of the relative strength of each specific component (Roddy, Stewart, & Barnes-Holmes, 2010).

A more recent procedure for the measurement of implicit attitudes, the Implicit Relational Assessment Procedure (IRAP: Barnes-Holmes, Barnes-Holmes, Hayden, Milne, Power, & Steward, 2006) successfully overcomes this limitation. The IRAP is similar to the IAT in several respects: it presents alternating blocks of consistent (with the alleged bias under study) and inconsistent trials where participants are required to choose between two response options under time pressure; and its main source of data is the differential in averaged response latencies to consistent and inconsistent trials. However, the IRAP is based on a theoretical model that has completely different assumptions regarding the nature of implicit attitudes and beliefs (Relational Frame Theory: Hayes, Barnes-Holmes, & Roche, 2001; see also Hughes & Barnes-Holmes, 2013). Instead of conceiving them as pre-experimentally learned associations between memory representations, they are viewed as pre-experimentally learned relational responses (Hughes, Barnes-Holmes, & De Houwer, 2011). Besides, the IRAP appears to be more resistant to faking attempts than the IAT (McKenna, Barnes-Holmes, Barnes-Holmes, & Stewart, 2007). The IRAP

focuses on directly analyzing different types of relational responses to the same four types of stimulus configurations across consistent and inconsistent trial-blocks, rather than on inferring hypothetical constructs based on differences in performance under different (consistent and inconsistent) stimulus configurations. The description of a recent IRAP used in anti-fat/pro-slim implicit bias research (Roddy *et al*., 2010) comparing the IRAP and the IAT may serve to illustrate how the former procedure works. In this study, participants were presented in each trial with one of two sample stimuli (either the word "Good" or the word "Bad"), with one of a range of target photos of either overweight or average-weight people (as in Brochu & Morrison, 2007), and with two relational response options ("Similar" and "Opposite"). The combination of both samples with both sets of targets yielded four types of trials (Good-Slim, Bad-Fat, Good-Fat, Bad-Slim) that were presented in alternating blocks wherein the required correct responses were different. In blocks consistent with an anti-fat/pro-slim bias, participants were required to respond as if pictures of overweight people were bad and pictures of average-weight people were good (e.g., good-overweight-opposite, good-thin-similar), whereas in inconsistent blocks they were required to respond in accordance with the opposed pattern (e.g., bad-thin-similar, bad-overweight-opposite). Participants responded faster to consistent trials, producing a differential score indicative of a pro-slim/anti-fat bias similar to that observed for the IAT (Roddy *et al*., 2010). However, the fact that the IRAP made use of relational response terms (Similar and Opposite) and presented four trial-types allowed for the detection of the direction of this attitudinal bias. Specifically, participants were faster in responding to consistent (compared to inconsistent) trials that presented photos of average-weight people. However, this effect was not observed for trials that presented photos of overweight people (they were equally fast both with consistent and inconsistent trials). This means that the IRAP successfully detected a specific pro-slim bias (and not an anti-fat one) that was impossible to detect through the IAT (Roddy *et al*., 2010), a result that has been replicated in a later study (Roddy, Stewart, & Barnes-Holmes, 2011). A potential limitation of the studies by Roddy and colleagues is that the sample consisted of both male and female participants. Besides, the target pictures that were used in the IRAP portrayed both men and women. While prior research with the IAT (Brochu & Morrison, 2007) found no differences between men and women in implicit anti-fat bias (and no differences between male and female targets), there is ample evidence that men show more explicit anti-fat prejudice than women (e.g. Bacardi-Gascon, Leon-Reyes, & Jimenez-Cruz, 2007; Crandall, 1994; Ferguson, Kornblet, & Muldoon, 2009; Magallares & Morales, 2013). A more recent study with the IRAP (Nolan, Murphy, & Barnes-Holmes, 2013) found differences between male and female participants' implicit pro-slim bias. In this study, target pictures of overweight and slim people (pictures of the same persons before and after losing a substantial amount of weight) were presented with positive (e.g., intelligent, smart, successful) and negative (e.g., dumb, foolish, brainless) label words regarding intelligence. While male participants showed clear evidence of a pro-slim bias, female participants showed no bias at all to either type of target pictures (male or female). There is another potential limitation in prior studies that is also worth noting. Although Roddy and colleagues refer to their findings as indicative of a pro-slim bias, the target pictures actually used in

their IRAP were of average-weight people as compared to those of overweight people. There are large differences between explicit subjective evaluations of images depicting different ranges of body size (as determined by body mass index: BMI) (see Carels & Musher-Eizenman, 2010). Perhaps the use of pictures that actually depicted slimness (e.g., just below the low normal BMI threshold of 18.5) would produce different results in an IRAP similar to those conducted by Roddy *et al*. (2010, 2011). It remains to be seen whether the pro-slim bias would be maintained if photos of slim girls were used.

The present study is an attempt to test the usefulness of the IRAP for the assessment of implicit attitudes towards slimness and fatness in sample of young Spanish women. It also purports to see if there is an implicit-explicit correspondence with another measure that employs the same photos (visual analogue scales: VAS), as well as to determine if individual features like participants' body mass index (BMI), body dissatisfaction, and symptoms of eating disorders, are in any way related to implicit and explicit attitudes. The main novelty in regard to previous studies that have used the IRAP for the measurement of attitudes to slimness and fatness, is the utilization of target pictures of actual underweight (BMI<18.5) and overweight (BMI>25) women for the assessment of a female-only sample.

Method

Participants

Forty women, aged 22-26 years old (*M*= 23.35; *SD*= 1.35) participated in the study. Participants were undergraduate and postgraduate students at University of Jaén, without a history of Eating Disorders (ED) or other severe psychopathologies. None of them had previous experience with implicit measures. Course credits were offered for participation in the experiment. Data from six participants who failed to meet IRAP criteria (see *Procedure*) were removed, leaving a total of 34 participants.

Materials and stimuli

- *Implicit Relational Assessment Procedure* (IRAP). The software used in this study was originally programmed by Dermot Barnes-Holmes, at National University of Ireland, Maynooth (for a current version, see http://irapresearch.org/wp/downloads-and-training/). The third author translated the program interface in order to adapt it for use with Spanish-speaking population. The IRAP is a computerized tool for the direct assessment of implicit beliefs. In this study, the words "Pleasant" and "Unpleasant" served as samples or label stimuli. Twelve different photographs were used as targets, each of them depicting one young woman: six portrayed underweight women (BMI<18.5) and the other six portrayed overweight women (BMI>25). These categories are in accordance with the World Health Organization BMI classification (WHO, 1995). All of the women in the pictures were undergraduates (from a different university to the one where the study was conducted) who willingly offered to serve as models. In each photograph, a woman appeared in the middle of the picture, standing up with her arms close to her body and her face blurred, in order to keep her anonymous. In all pictures the women were similarly dressed with jeans and a top that allowed

the viewer to easily perceive their silhouette. The background of each picture was as neutral as possible so that no distracting elements would be introduced. The size of each picture was 432 x 576 ppi with RGB color. Additionally, in each IRAP trial, participants were presented with two relational response options, "True" and "False" (for more details, see Procedure).

- *Visual Analogue Scales* (VAS) were used to assess explicit attitudes towards the same photographs used in the IRAP. Each VAS consisted of a 100 mm line with the word "Unpleasant" located below the left end of the line, and the word "Pleasant" located below the right end. The ratings (in mm) were transformed to a scale ranging from -50 (unpleasant) to +50 (pleasant) for pictures of underweight women, and from +50 (unpleasant) to -50 (pleasant) for pictures of overweight women. This transformation was performed in order to make the explicit scores comparable to the scores produced by the IRAP, where positive scores were indicative of pro-slim/anti-fat attitudes and negative scores were indicative of pro-fat/anti-slim attitudes.
- *Brief General Questionnaire*. Age, weight, height, information about previous experience in experiments with implicit measures, and other relevant data were recorded. Body-mass index (weight/height^2) (kg/m^2) was calculated for each participant, based on self-reported weight and height.
- *The Body Shape Questionnaire* (BSQ; Cooper, Taylor, Cooper, & Fairburn, 1987) was used. It consists of 34-items that assess dissatisfaction with one's own body-shape. Participants had to express their agreement with each statement on a 6-point rating scale. The Spanish version of the BSQ (Raich, Mora, Soler, Ávila, Clos, & Zapater, 1996) has shown good psychometric properties (Warren, *et al*., 2008).
- *The Eating Attitudes Test* (EAT-40; Garner & Garfinkel, 1979; Garner, Olmsted, Bohr, & Garfinkel, 1982) is a measure with 40 items that assess symptoms of eating disorders (anorexia and bulimia nervosa). Participants rated their agreement with each statement on a 6-point rating scale, but only the three highest options count. The Spanish version of this test (Castro, Toro, Salamero, & Guimerá; 1991), which has shown good psychometric properties (de Irala, Cano Prous, Lahortiga Ramos, Gual García, Martínez González, & Cervera Enguix, 2008), was used in the present study.

Procedure

The *University of Jaén Ethics Board* approved all of the procedures in this study. Participants were recruited through in-class announcements. They were informed that they would take part in a study about implicit attitudes and that they would receive course credit for participation. Participants underwent the procedures individually in an experimental cubicle equipped with a Pentium 4 computer running Windows XP. They were explained the features of the study before they signed a statement of informed consent. All participants performed the IRAP task first, followed by the completion of the different explicit measures (VAS, EAT and BSQ) and of the brief general questionnaire in paper and pencil format.

The IRAP program began with the on-screen presentation of a series of instructions describing the task. After the participants had finished reading them, the experimenter asked if they had any doubts and requested them to briefly explain the essentials of the task (in order to assess instruction comprehension). Once the experimenter made sure that the participant had understood the instructions, the IRAP task began. In a

typical IRAP preparation, a minimum of two practice blocks are presented, followed by six test blocks. Blocks are always presented in pairs. In this study, one block of each pair was pro-slim/anti-fat and the other was pro-fat/anti-slim. Participants had to achieve specific criteria (80% correct responding and a median latency under 2500 ms) in each practice block (of the same pair) in order to advance to the test blocks. If they failed to meet the criteria on the first two practice blocks, they were re-exposed to practice blocks up to a maximum of six pairs. If they still failed to meet the criteria, they finished their participation and their data were discarded. The same accuracy and latency criteria were applied in order to consider data from the test blocks to be valid (although these criteria were not required to continue from one test block to the next). If participants failed to maintain these criteria for any of the three pairs of test blocks, their data for that specific pair were discarded. Half of the participants were presented first with a pro-slim/anti-fat block, followed by a pro-fat/anti-slim block. The subsequent blocks, either practice or test, then alternated according to this sequence, with one type of block always followed by the other type in a fixed manner. The other half of the participants were presented with the opposite sequence: pro-fat/anti-slim first, followed by pro-slim/anti-fat.

Each block consisted of 24 trials of the twelve target stimuli (the photographs) presented twice in quasi-random order, once in the presence of each of the two label stimuli ("Pleasant" and "Unpleasant"). In each trial, the label stimulus was presented at the top center of the screen, a photograph was presented below the label, in the middle of the screen, and two response options ("True" and "False") were presented at the bottom, one on the left and the other on the right. Participants were required to "indicate" the relation between the label and the photograph by choosing either "True" or "False" by pressing the keyboard keys "d" (for the option on the left) or "k" (for the option on the right). The allocation of each response option to the left or right sides was randomized across trials (with no more than two consecutive trials on the same positions). Participants had to respond as fast as possible in each trial. If they took longer than 2500 ms to respond, the words "very slow" appeared and remained on screen until the participant pressed either "d" or "k". A correct response started a 400 ms inter-trial interval where the screen went blank, followed by the presentation of another trial. An incorrect response produced a red "X" that remained in the middle of the screen until the participant gave the correct response for that trial. Four specific types of trials were presented during the task: the label "Pleasant" and a photograph of an underweight girl; the label "Unpleasant" and a photograph of an underweight girl; the label "Pleasant" and a photograph of an overweight girl; and the label "Unpleasant" and a photograph of an overweight girl (see Figure 1). In pro-slim/anti-fat blocks, if the label "Pleasant" and a photograph of an underweight girl appeared in the screen, the participant had to press the response option "True"; but if the label "Unpleasant" and a photograph of an underweight girl were presented, the participant had to press the option "False". Accordingly, if the label "Pleasant" and a photograph of an overweight girl were presented, they had to respond "False"; but if the label "Unpleasant" and a photograph of an overweight girl were presented they had to respond "True". In pro-fat/anti-slim blocks, participants had to respond in accordance with the opposite pattern.

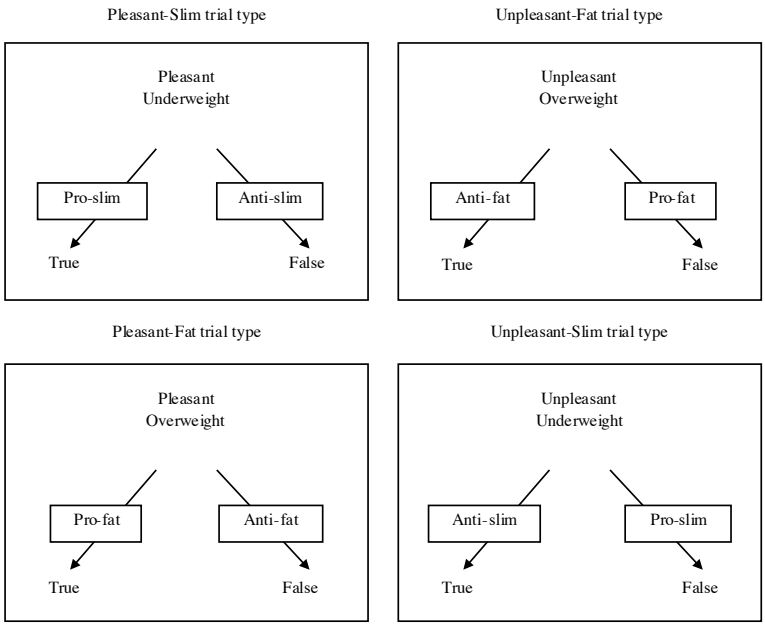

Figure 1. Representations of the four IRAP trial-types. The attribute label stimulus ("Pleasant" or "Unpleasant") appeared at the top of the screen while the target stimulus (a photo of either an underweight or an overweight young woman) appeared in the middle of the screen. The response options "True" and "False" appeared simultaneously on each trial at the bottom of the screen. The arrows and the labels superimposed on them indicate, for each trial-type, the correct response in either pro-slim/anti-fat blocks or in pro-fat/anti-slim blocks (the boxes and arrows did not appear on screen on actual trials during the task, and they have been included here for illustration purposes only).

The procedure was almost identical for the practice and test bocks. When participants finished a block, they received feedback on screen about the percentage of correct responses and the median response latency for that block, and they proceeded to the next block with the instruction that now they would have to respond in an opposite manner to their responding in the previous block. The main difference between practice and test was that after each pair of practice blocks, participants received a more complete feedback, reminding them of the criteria required to pass the task. This information was not presented after each pair of test blocks. Besides, while practice blocks started with the instruction "This is practice. It is normal to make mistakes. Please try to respond quickly and correctly", test blocks began with the instruction "This is a test, try to respond quickly and correctly".

When participants finished with the IRAP task, they completed the different explicit measures. The experimenter reminded them that all data were confidential and anonymous and that they must respond sincerely. The order of presentation of these measures was: VAS, BSQ, EAT, and brief general questionnaire. All in all, the procedure took around 40 minutes.

Results

The primary datum for the IRAP was response latency, defined as the time elapsed (in milliseconds) in each trial between the onset of visual stimulus presentation on the screen and the emission of a correct response by the participant. The latency data from each participant were transformed to differential scores (D-IRAP scores) using an adaptation of the D-algorithm (Greenwald, Nosek, & Banaji, 2003) (for a detailed description see Barnes-Holmes, Waldron, Barnes-Holmes, & Stewart, 2009). This transformation is intended to minimize the impact of individual differences associated with extraneous factors on latency data (Greenwald, Nosek, & Banaji, 2003).

The following steps were taken for the calculation of the D-IRAP scores: (1) only latency data from the six test blocks were used; (2) latencies over 10000 ms were removed from the dataset; (3) all data from a participant were removed if they had latencies less than 300 ms in more than 10% of test-block trials; (4) 12 standard deviations for the four trial types were computed: four for the response latencies from test blocks 1 and 2, four for the latencies from test blocks 3 and 4, and another four from test blocks 5 and 6; (5) 24 mean latencies for the four trial types in each test block were calculated; (6) difference scores were calculated for each of the four trial types, for each pair of test blocks, by subtracting the mean latency of the pro-slim/anti-fat block from the mean latency of the corresponding pro-fat/anti-slim block; (7) each difference score was divided by its corresponding standard deviation from step 4, yielding 12 D-IRAP scores, one score for each trial type for each pair of test blocks; (8) four overall trial-type D-IRAP scores were calculated by averaging the three scores for each trial type across the three pairs of test blocks (for participants who had failed to maintain the accuracy and latency criteria in any block, only the data from valid block pairs were averaged); (9) an overall relative D-IRAP score was calculated by averaging all 4 D-IRAP scores from step 8. Positive overall D-IRAP scores were indicative of general pro-slim/anti-fat bias, and negative ones were indicative of general pro-fat/anti-slim bias. For the two specific trial-type D-IRAP scores based on pictures of underweight girls (*Pleasant-Slim* and *Unpleasant-Slim*), positive scores were indicative of a specific pro-slim bias, and negative scores were indicative of a specific anti-slim bias. For the two specific trial-type D-IRAP scores based on pictures of overweight girls, positive scores were indicative of a specific anti-fat bias, and negative scores were indicative of a specific pro-fat bias.

For the analysis of our results, we have considered the general D-IRAP score, and the four specific trial-type D-IRAP scores. Five one sample t-tests were conducted to determine if each of these measures was significantly different from zero. The overall mean D-IRAP score (averaging all four trial-types) was 0.05 (SD= 0.36), and it was not significantly different from zero (t[33]= 0.86; p= 0.39). This indicates the absence of any significant bias towards either type of picture when both types of pictures are considered together. When the four trial-types were analyzed individually (see Figure 2), a relatively strong pro-slim attitude was found for both *Pleasant-Slim* (M= 0.36; SD= 0.48) and *Unpleasant-Slim* (M= 0.22; SD= 0.40) trial types, with both scores significantly differing from zero (*Pleasant-Slim*: t[33]= 4.31; p <0.001; *Unpleasant-*

Slim: t[33]= 3.18; p= 0.003). That is, participants were significantly faster in responding *Pleasant-Slim-True* than *Pleasant-Slim-False*, as well as significantly faster in responding *Unpleasant-Slim-False* than *Unpleasant-Slim-True*. A similarly strong pro-fat attitude was found for the *Pleasant-Fat* trial-type (M=-0.30; SD= 0.65; t[33]= -2.68; p= 0.011), but not for the *Unpleasant-Fat* trial type (M= -0.06; SD= 0.56; t[33]=-0.65; p= 0.53). That is, participants were significantly faster in responding *Pleasant-Fat-True* than *Pleasant-Fat-False*, but they were equally fast in responding *Unpleasant-Fat-True* and *Unpleasant-Fat-False*. In summary, participants showed both pro-slim and pro-fat tendencies of similar magnitude, and hence the IRAP results show no evidence of any type of implicit bias regarding body size.

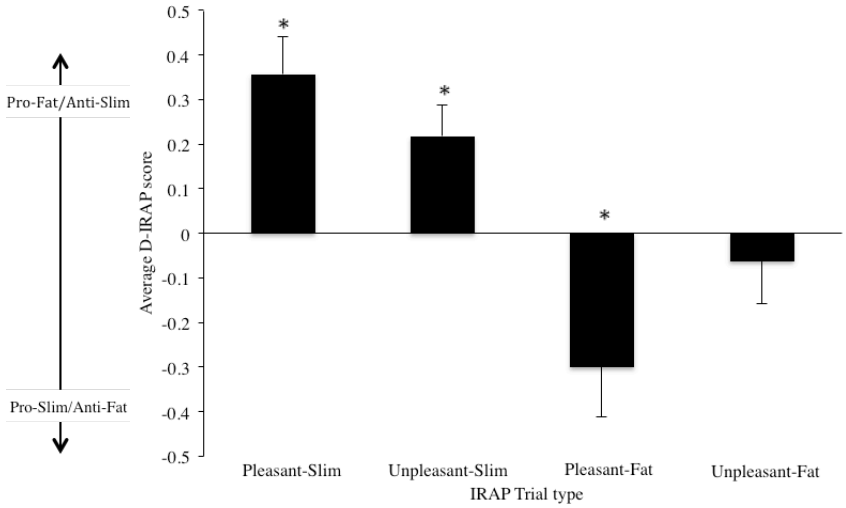

Figure 2. Mean (plus/minus s.e.m.) D-IRAP scores for the four IRAP trial-types. Positive scores are pro-slim/anti-fat, and negative scores are pro-fat/anti-slim. Asterisks indicate that the score is significantly different from zero (p<0.05).

The same type of analysis was conducted for explicit VAS-based ratings of pleasantness (see Figure 3). The overall mean explicit rating (averaging both types of pictures, underweight and overweight) was 7.79 (SD= 4.21), and it differed significantly from zero (t[33]=10.79; p <0.001). More specifically, the mean explicit rating for pictures of underweight girls was 5.88 (SD= 14.60), and the mean explicit rating for pictures of overweight girls was 9.70 (SD= 11.76). Both specific ratings significantly differed from zero (VASslim: t[33]= 2.35; p= 0.025; VASfat: t[33]= 4.81; p <0.001). This pattern of VAS ratings is clearly indicative of both pro-slim and anti-fat explicit biases.

Table 1 presents the means and standard deviations for age, BMI, and BSQ and EAT scores. Pearson product-to-moment correlations were computed to examine the relationships between each D-IRAP score and each VAS rating score, as well as between each of these and BSQ, EAT, age and BMI. Besides a strong positive correlation between the BSQ and EAT scores (r= 0.79; p <0.001) only a modest positive correlation between

BMI and explicit VAS rating (averaging both types of pictures) was found (r= 0.36; p= 0.037). We explored individual data for the BSQ and EAT in order to find out how many participants scored over the clinical cutoff scores (i.e., scores indicative of eating disorders) for each questionnaire. Only four of the 34 participants scored higher than 105 in the BSQ (see Raich *et al*., 2000), with two of them also scoring higher than 30 in the EAT (Castro *et al*., 1991). The removal of these participants' scores from the dataset did not introduce any significant change in the results of data analysis.

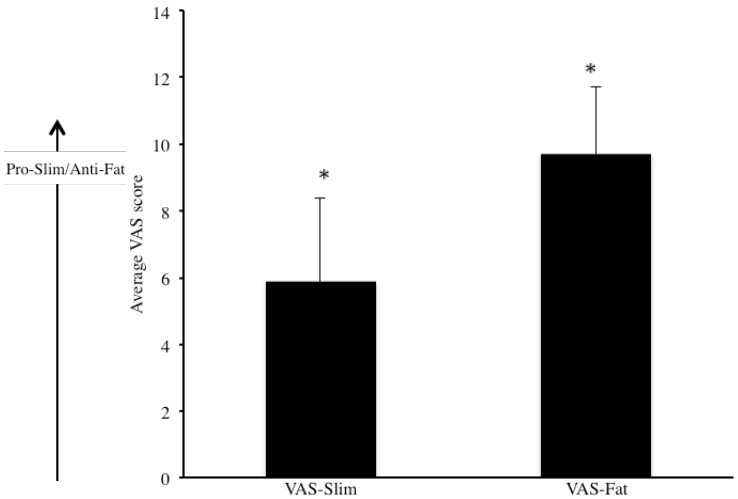

Figure 3. Mean (plus s.e.m.) explicit VAS ratings for pictures of underweight women (VASslim) and overweight women (VASfat). Positive scores are pro-slim/anti-fat. Asterisks indicate that the score is significantly different from zero (p<0.05).

Table 1. Descriptive statistics for age, body mass index (BMI), score on the body shape questionnaire (BSQ), and on the eating attitudes test (EAT).

	N	*M*	*SD*
Age	34	22.00	1.35
BMI	34	22.25	2.32
BSQ	34	73.23	26.01
EAT	34	10.12	9.57

DISCUSSION

To our knowledge this is the first published study that used the IRAP for the assessment of implicit attitudes in Spanish population. Specifically, this study focused in the assessment of implicit attitudes to body size (slimness and fatness), and their relation with body dissatisfaction and symptoms of eating disorders. The IRAP had already been used in other studies on this topic, with samples of college students of

both sexes (Nolan *et al*., 2013; Roddy *et al*., 2010, 2011), as well as in other studies about self-referred implicit attitudes regarding body image with female population (Juarascio *et al*., 2011; Parling *et al*., 2012; Timko, England, Herbert, & Forman, 2010). To date, however, no study had previously used this procedure in order to assess non-self-referred implicit attitudes towards images of underweight and overweight women in a female-only sample. The selection of this particular sample is relevant given the greater vulnerability of women to experiencing dissatisfaction with one's own body and to suffering eating disorders (Green & Pritchard, 2003; Paxton, Wertheim, Gibbons, Szmukler, Hillier, & Petrovich, 1991).

The results in the present study showed no evidence of a pro-slim bias like that found in previous studies with the IRAP (Roddy *et al*., 2010, 2011). The average general D-IRAP score (with all trial types collapsed) was not significantly different from zero, which indicates that participants were equally fast in responding to pro-slim/anti-fat and pro-fat/anti-slim blocks. When the D scores for each trial type were analyzed, a clear pro-slim attitude was observed (faster affirmation than negation that photographs of underweight women were pleasant, and faster negation than affirmation that these photographs were unpleasant). This is consistent with the results from Roddy *et al*. (2010, 2011) for the same types of trials. The difference appears when we consider trial types involving the presentation of photographs of overweight women. While Roddy and colleagues found a neutral implicit attitude for these trial types, we found a moderate pro-fat attitude (faster affirmation than negation that photographs of overweight women were pleasant, and equal speed for affirmation and negation that these photographs were unpleasant). Overall, the two sets of positive attitudes of similar magnitude found in our study (pro-slim and pro-fat) cancelled each out, rendering no significant bias. This sort of analysis of the results by trial types that allows for a much more nuanced characterization of the implicit attitudes under study, would not be possible with the IAT (Greenwald *et al*., 1998). A D-IAT score similar to the overall D-IRAP score found in the present study would just indicate an absence of bias, but it would not give information as to the pattern of implicit attitudes responsible for such result.

The absence of a pro-slim or an anti-fat bias is a finding that has been observed in previous IRAP studies where the sample consisted of women with no history of eating disorders. A study by Parling *et al*. (2012) that compared implicit attitudes to others' fatness/thinness with attitudes to one's own fatness/thinness, found neither pro-slim nor anti-fat significant effects in their control group (when these attitudes referred to others' body size). In another recent IRAP study (Nolan *et al*., 2013), where weight bias was analyzed in terms of how participants judged intelligence and success of the fat and thin models in photographs, no significant bias was observed for a subsample consisting of female college students. Therefore, it can be argued that the pro-slim bias found by Roddy *et al*. (2010, 2011) might be attributable to the presence of mixed males and females both in their sample and in their target pictures. This might have facilitated the potential effect of other variables, like the attractiveness of the models in the different photos. Recently, Murphy, MacCarthaigh, and Barnes-Holmes (2014) have found that the IRAP is sensitive to differences in the attractiveness of target pictures when judging them in terms of success. Both male and female participants are positively

biased towards pictures depicting attractive faces, with males showing a significantly stronger bias than women. This is at least partially controlled in our study, as the models' faces were blurred and non-recognizable. In Nolan *et al*. (2013) this potential effect seems to be controlled too, as they used pictures of the same people before and after a substantial weight loss. In any case, the foregoing rationales are rather speculative and further research is needed in order to isolate the factors responsible for the absence of bias observed in our study.

Cultural differences is another potentially relevant variable that, in our opinion, has received little attention and could also explain some of our findings, as compared to those from Roddy *et al*. (2010, 2011). Although there is broad evidence for anti-fat/pro-slim implicit and explicit bias, the few studies on anti-fat attitudes that have been undertaken with Spanish samples have found smaller bias than similar studies from the USA or from Northern Europe (see Solbes & Enesco, 2010). This seems consistent with a large recent transnational study that has found relevant differences in anti-fat implicit attitudes among various nations based on variables like each nation's obesity prevalence (Marini *et al*., 2013). Although steadily increasing, the overall prevalence rate for obesity in Spain is significantly smaller than that in the USA or the UK (see Bassett, Pucher, Buehler, Thompson, & Crouter, 2008). Perhaps in assuming a pro-slim/anti-fat implicit bias as a starting point we may have taken for granted something that has not been yet adequately studied in our local geographical and cultural context.

In regard to explicit measures, it is worth noting that our findings are not in accordance with most of the research comparing implicit and explicit anti-fat attitudes, where implicit attitudes are usually indicative of stronger anti-fat bias than explicit measures (Teachman *et al*., 2003). VAS responses to photos of underweight women are clearly indicative of explicit pro-slim attitudes, which is consistent with the results from the IRAP trial-types that involved the presentation of the same photos. However, no significant correlation was obtained of any IRAP measure with any explicit measure. VAS responses to photos of overweight women are indicative of strong implicit anti-fat attitudes. This pattern of VAS responding is opposed to IRAP responding in trial-types presenting the same photos. The lack of correspondence between explicit and implicit measures is not uncommon in this area of research (e.g., Brochu & Morrison, 2007). What is less usual is the finding of strong explicit anti-fat attitudes in the absence of implicit anti-fat attitudes. Numerous studies have revealed anti-fat bias through implicit measures that was not apparent through explicit measures (Nolan *et al*., 2013; Roddy *et al*., 2010, 2011; Teachman *et al*., 2003). This is consistent with the general pattern of explicit bias that does not become apparent through questionnaires, interviews, semantic differentials, or other measures that allow the participant to spend time elaborating their response, in situations where the participant might be motivated to conceal their more immediate response, or to self-present in a socially desirable manner. A potential explanation for this finding in our study is that the explicit measure that was employed (VAS) required participants to rate specific images (the same ones presented in the IRAP) rather than requiring them to produce generic evaluative responses to the relatively abstract categories of "thin people" and "overweight people". This might have been less susceptible to social desirability effects than other frequently employed explicit

measures. A recent study by Tomiyama et al. (in press) has found a decrease in implicit and an increase in explicit anti-fat/pro-thin attitudes over time (since 2001 until 2013), for a sample of professionals attending an important professional meeting in the field of obesity. This appears to be consistent with our results, if we compare them to others clearly showing anti-fat/pro-thin bias. In any case, this is something that cannot be clarified on the basis of our present findings, and further research should address this specific type of explicit-implicit non-correspondence.

As already mentioned, none of the IRAP measures correlated with any of the explicit measures, including BSQ, EAT, and BMI. It is likely that the sample in this study (healthy participants with no history of eating disorders and average BSQ and EAT scores) was too small and had too narrow a range of scores to find such correlations. Future research should clarify whether a wider sample with larger variations in BSQ and EAT scores could produce significant implicit-explicit correlations.

All in all, this is the first study that has used the IRAP for the assessment of implicit attitudes towards slimness and fatness in Spanish population, with no evidence of implicit bias at all. In spite of its limitations, we believe that its findings will contribute to the advancement of the study of implicit weight bias and its relationship with body dissatisfaction and eating disorder symptomatology.

REFERENCES

Ahern AL & Hetherington MM (2006). The thin ideal and body image: an experimental study of implicit attitudes. *Psychology of Addictive Behaviors, 20,* 338-342.

Anselmi P, Vianello M, & Robusto E (2013). Preferring thin people does not imply derogating fat people. A Rasch Analysis of the implicit weight attitude. *Obesity, 21,* 261-265.

Bacardi Gascón M, León Reyes M, & Jiménez Cruz A (2007). Stigmatization of overweight Mexican children. *Child Psychiatry and Human Development, 38,* 99-105.

Barnes-Holmes D, Barnes-Holmes Y, Hayden E, Milne R, Power P, & Steward, I (2006). Do you really know what you believe? Developing the Implicit Relational Assessment Procedure as a direct measure of implicit beliefs. *The Irish Psychologist, 32,* 169-177.

Barnes-Holmes D, Waldron D, Barnes-Holmes Y, & Stewart I (2009). Testing the validity of the Implicit Relational Assessment Procedure (IRAP) and the Implicit Association Test (IAT): Measuring attitudes towards Dublin and country life in Ireland. *The Psychological Record, 59*, 389-406.

Bassett DR, Pucher J, Buehler R, Thompson DL, & Crouter SE (2008). Walking, cycling, and obesity rates in Europe, North America, and Australia. *Journal of Physical Activity and Health, 5*, 795-814.

Brochu PM & Morrison MA (2007). Implicit and explicit prejudice toward overweight and average weight men and women: Testing their correspondence and relation to behavioral intentions. *Journal of Social Psychology, 147,* 681-706.

Brownell KD, Puhl RM, Schwarz MB, & Rudd, L (2005). *Weight Bias: Nature, Consequences, and Remedies*. New York: Guilford Press.

Carels RA & Musher-Eizenman DR (2010). Individual differences and weight bias: do people with an anti-fat bias have pro-thin bias? *Body Image, 7,* 143-148.

Castro J, Toro J, Salamero M, & Guimerá E (1991). The Eating Attitudes Test: Validation of the Spanish version. *Evaluación Psicológica/Psychological Assessment, 7,* 175-189.

Cooper PJ, Taylor MJ, Cooper Z, & Fairburn CG (1987). The development and validation of the Body Shape Questionnaire. *International Journal of Eating Disorders, 6,* 485-494.

Crandall CS (1994). Prejudice against fat people: ideology and self-interest. *Journal of Personality & Social Psychology, 66*, 882-894.

De Houwer J (2002). The implicit association test as a tool for studying dysfunctional associations in psychopathology: Strengths and limitations. *Journal of Behavior Therapy & Experimental Psychiatry, 33,* 115-133.

de Irala J, Cano-Prous A, Lahortiga-Ramos F, Gual García P, Martínez González MA, & Cervera Enguix S (2008). Validación del cuestionario Eating Attitudes Test (EAT) como prueba de cribado de trastornos de la conducta alimentaria en la población general. *Medicina Clínica, 130*, 487-491.

Dovidio JF, Kawakami K, Johnson C, Johnson B, & Howard A (1997). On the nature of prejudice: Implicit and controlled processes. *Journal of Experimental Social Psychology, 33*, 510-540.

Fazio R & Olson M (2003). Implicit measures in social cognition research: Their meaning and use. *Annual Review of Psychology, 54*, 297-327.

Ferguson C, Kornblet S, & Muldoon A (2009). Not all are created equal: Differences in obesity attitudes between men and women. *Women's Health Issues, 19*, 289-291.

Gapinski KD, Schwartz MB, & Brownell KD (2006). Can television change anti-fat attitudes and behaviour? *Journal of Applied BioBehavioural Research, 11*, 1-28.

Garner DM & Garfinkel PE (1979). The Eating Attitudes Test: An index of the symptoms of anorexia nervosa. *Psychological Medicine, 9*, 273-279.

Garner DM, Olmsted MP, Bohr Y, & Garfinkel PE (1982). The Eating Attitudes Test: psychometric features and clinical correlates. *Psychological Medicine, 12*, 871-878.

Green SP & Pritchard ME (2003). Predictors of body image dissatisfaction in adult men and women. *Social Behavior and Personality, 31*, 215-222.

Greenwald AG, McGhee AD, & Schwartz JL (1998). Measuring individual differences in implicit cognition: The Implicit Association Test. *Journal of Personality & Social Psychology, 74*, 1464-1480.

Greenwald AG, Nosek BA, & Banaji MR (2003). Understanding and using the Implicit Association Test: An improved scoring algorithm. *Journal of Personality and Social Psychology, 85*, 197-216.

Greenwald AG, Poehlman TA, Uhlmann EL, & Banaji MR (2009). Understanding and using the Implicit Association Test: III. Meta-analysis of predictive validity. *Journal of Personality and Social Psychology, 97*, 17-41.

Hayes SC, Barnes-Holmes D, & Roche B (2001). *Relational Frame Theory: a post-Skinnerian Account of Human Language and Cognition*. New York: Kluwer/Plenum.

Holtgraves T (2004). Social desirability and self-reports: Testing models of socially desirable responding. *Personality and Social Psychology Bulletin, 30*, 161-172.

Hughes S & Barnes-Holmes D (2013). A functional approach to the study of implicit cognition: the Implicit Relational Assessment Procedure (IRAP) and the Relational Elaboration and Coherence (REC) model. In S Dymond & B Roche (Eds.) *Advances in Relational Frame Theory. Research and Applications* (pp. 97-125). Oakland, CA: Context Press/New Harbinger Publications.

Hughes S, Barnes-Holmes D, & De Houwer J (2011). The dominance of associative theorizing in implicit attitude research: Propositional and behavioral alternatives. *The Psychological Record, 61*, 465-496.

Juarascio AS, Forman EM, Timko CA, Herbert JD, Butryn M, & Lowe M (2011). Implicit internalization of the thin ideal as a predictor of increases in weight, body dissatisfaction, and disordered eating. *Eating Behaviors, 12*, 207-213.

Magallares A & Morales JF (2013). Gender differences in antifat attitudes. *Revista de Psicología Social/ International Journal of Social Psychology, 28*, 113-119.

Magallares A, Morales JF, & Rubio MA (2011). The effect of work discrimination on the well-being of obese people. *International Journal of Psychology and Psychological Therapy, 11*, 255-267.

Magallares A, Morales JF, & Rubio MA (2014). Group identification, discrimination and psychological health in an obese sample. *International Journal of Psychology and Psychological Therapy, 14*, 421-431.

McKenna IM, Barnes-Holmes D, Barnes-Holmes Y, & Stewart I (2007). Testing the fake-ability of the Implicit Relational Assessment Procedure (IRAP): The first study. *International Journal of Psychology and Psychological Therapy, 7*, 253-268.

Murphy C, MacCarthaigh S, & Barnes-Holmes D (2014). Implicit Relational Assessment Procedure and attractiveness bias: directionality of bias and influence of gender of participants. *International Journal of Psychology and Psychological Therapy, 14*, 333-351.

Nisbett RE & Wilson TD (1977). Telling more than we can know: Verbal reports on mental processes. *Psychological Review, 84*, 231-259.

Nolan J, Murphy C, & Barnes-Holmes D (2013). Implicit Relational Assessment Procedure and Bodyweight bias: influence of gender of participants and targets. *The Psychological Record, 63*, 467-488.

Parling T, Cernvall M, Stewart I, Barnes-Holmes D, & Ghaderi A (2013). Using the Implicit Relational Assessment Procedure to compare implicit pro-thin/anti-fat attitudes of patients with Anorexia Nervosa and Non-clinical controls. *Eating Disorders, 20,* 127-143.

Paxton SJ, Wertheim EH, Gibbons K, Szmukler GI, Hillier L, & Petrovich JL (1991). Body image satisfaction, dieting beliefs, and weight loss behaviors in adolescent girls and boys. *Journal of Young and Adolescence, 20*, 361-379.

Puhl R & Brownell KD (2001). Bias, discrimination, and obesity. *Obesity Research, 9,* 788-805.

Puhl R & Heuer C (2009). The stigma of obesity: A review and update. *Obesity, 17*, 941-964.

Raich RM, Mora M, Soler A, Ávila C, Clos I, & Zapater L (1996). Adaptación de un instrumento de evaluación de la insatisfacción corporal. *Clínica y Salud, 7,* 51-66.

Roddy S, Stewart I, & Barnes-Holmes D (2010). Anti-fat, pro-slim, or both? Using two reaction-time based measures to assess implicit attitudes to the slim and overweight. *Journal of Health Psychology, 15,* 416-425.

Roddy S, Stewart I, & Barnes-Holmes D (2011). Facial reactions reveal that slim is good but fat is not bad: Implicit and explicit measures of body-size bias. *European Journal of Social Psychology, 41,* 688-694.

Rozin P & Fallon A (1988). Body image, attitudes to weight, and misperceptions of figure preferences of the opposite sex: A comparison of men and women in two generations. *Journal of Abnormal Psychology, 97,* 342-345.

Schwarz MB, O'Neal Chambliss H, Brownell KD, Blair SN, & Billington, C (2003). Weight bias among health professionals specializing in obesity. *Obesity Research, 11,* 133-139.

Schwarz MB, Vartanian LR, Nosek BA, & Brownell KD (2006). The influence of one's own body weight on implicit and explicit anti-fat bias. *Obesity, 14*, 444-447.

Solbes I & Enesco I (2010). Explicit and implicit anti-fat attitudes in children and its relationship with their body image. *Obesity Facts, 3*, 23-32.

Stice E & Whitenton K (2002). Risk factor for body dissatisfaction in adolescent girls: a longitudinal investigation. *Developmental Psychology, 38,* 669-678.

Teachman BA & Brownell KD (2001). Implicit antifat bias among health professionals: Is anyone immune? *International Journal of Obesity, 25*, 1525-1531.

Teachman BA, Gapinski KD, Brownell KD, Rawlins M, & Jeyaram S (2003). Demonstrations of implicit anti-fat bias: the impact of providing causal information and evoking empathy. *Health Psychology, 22*, 68-78.

Thompson JK & Stice E (2001). Thin-ideal internalization: mounting evidence for a new risk-factor for body-image disturbance and eating pathology. *Current Directions in Psychological Science, 10,* 181-183.

Timko CA, England EL, Herbert, JD, & Forman EV (2010). The Implicit Relational Assessment Procedure as a measure of self-esteem. *The Psychological Record, 60*, 679-698.

Tomiyama AJ, Finch LE, Incolligo Belsky AC, Buss J, Finley C, *et al*. (*in press*). Weight Bias in 2001 versus 2013: contradictory attitudes among obesity researchers and health professionals. *Obesity*. doi:10.1002/oby.20910

Warren CS, Cepeda-Benito A, Gleaves DH, Moreno S, Rodríguez S, Fernández MC, *et al*. (2008). English and Spanish version of the Body Shape Questionnaire: Measurement equivalence across ethnicity and clinical status. *International Journal of Eating Disorders, 41,* 265-272.

Wilson TD (2009). Know thyself. *Perspectives on Psychological Science, 4*, 384-389.

World Health Organization (1995). *Physical Status: The Use and Interpretation of Anthropometry*. Geneva: World Heath Organization.

Received, December 2, 2014
Final Acceptance, January 13, 2015