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**FITNESS**

# Comparing Levels of Anti-Fat Bias Between American and Mexican Athletes and Undergraduate Physical Education and Exercise Science Students

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## Abstract

*Stigmatization consequent to anti-fat bias (AFB) may affect the services people who are obese receive from health professionals, including physical education and exercise science (PEX) professionals. In this study, we compared AFB levels of American and Mexican PEX students and Mexican athletes. We also investigated if socially desirable (SD) response tendencies threaten the validity of the explicit AFB measure used in this study. Participants (N = 118) completed measures of explicit and implicit AFB. Explicit AFB scores were not different between groups, but there were some subsample differences and interactions on the implicit AFB measure. Most implicit AFB subsample scores were significantly different from 0, indicating the participants were, to some extent, implicitly biased against fat people. The correlations between SD scales and the explicit AFB scales indicated no substantive threat to the validity of those scales. These results indicate AFB may be an issue with future PEX professionals, and thus, further research on incidence levels and prevention strategies is warranted. Also, because explicit and implicit AFB scores were not significantly correlated, researchers should investigate whether implicit bias affects an individual's explicit bias.*

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In 2012, the Organisation for Economic Co-operation and Development (OECD) reported that 35.5% of American men and 32.2% of American women are obese. Similarly, 34.5% of Mexican men are obese and 24.2% of Mexican women are obese. These statistics indicate that the United States and Mexico rank as the top two countries with the most people who are obese in the hemisphere. Along with the data on obesity, researchers have linked body image perceptions with ethnicity, finding that Caucasian Americans and Hispanics have unrealistic body image perceptions compared to other groups and define the ideal male physique as toned and the ideal female figure as thin or thinner than average (Altabe, 1998). Thus, not only do these two countries have high obesity rates, but they also have a cultural tendency to judge people who are obese as not as socially acceptable as slimmer people. This raises the question of whether those body-related social biases could affect health and wellness programming and care of individuals who are obese.

Indeed, current research indicates the reasons for poor participation in health-exercise programs include reduced access to facilities, lack of confidence and enjoyment, health issues, and the discouragement that stems from negative comments toward the obese by professionals in the health and medical field (Chambliss, Finley, & Blair, 2004). These experiences can affect the confidence and health of many people who are obese, and the prevalence of such negative events provides evidence of what may be a pervasive anti-fat bias.

Anti-fat bias is "an obesity prejudice in which the attribute of being obese influences the expectations about the individuals, often in terms of negative character assessment such as laziness, lack of discipline, and incompetence" (Chambliss et al., 2004, p. 468). Many researchers have investigated anti-fat bias (e.g., Chambliss et al., 2004; O'Brien, Hunter, & Banks, 2007; Puhl & Brownell, 2001; Schwartz, Vartanian, Nosek, & Brownell, 2006). These researchers have also advocated for anti-bias educational interventions because individuals who are obese are being discriminated against on a constant basis.

Anti-fat biases can be held in either implicit or explicit ways. Implicit attitudes are "unidentified traces of the past experiences that mediate favorable or unfavorable feeling, thought, or action toward social objects" (Greenwald & Banaji, 1995, p. 8) that are produced in unconscious and automatic mode (Teachman & Brownell, 2001). In short, an implicit anti-fat bias is subconsciously (outside of an individual's conscious control or even awareness) leaning toward thinking that obesity goes hand in hand with being a bad per-

son. On the other hand, explicit anti-fat bias is the set of beliefs and self-reported assumptions attributed to individuals who are obese (Chambliss et al., 2004). Similarly, Teachman and Brownell (2001) referred to the explicit bias as the negative attitude associated with being obese. In short, an example of an explicit anti-fat bias would be to express the opinion that people who are obese are lazy.

Professionals in many fields have been shown to hold anti-fat biases, and physical educators are no exception. Many researchers have found that weight or anti-fat bias may harm individuals who are obese in many situations. Individuals who are obese struggle with prejudice, weight discrimination, and anti-fat bias in school, in public settings, when seeking jobs and health treatment, when buying or renting a house, and in legal procedures (Candrall & Martinez, 1996; Chambliss et al., 2004; Pepper & Ruiz, 2007; Puhl & Brownell, 2001; Puhl, Wharton, & Heuer, 2009; Teachman & Brownell, 2001).

Weight bias has even been found among health professionals specializing in obesity. Schwartz, Chambliss, Brownell, and Blair (2003) studied professional researchers and clinical managers of obesity with a focus on the attributes these professionals associate with obesity, including categories such as good–bad, motivated–lazy, smart–stupid, and valuable–worthless, and they found significant explicit anti-fat bias. According to Schwartz et al. (2003), this bias could affect job performance. For example, physicians reported a weight bias when taking care of patients who are overweight and often shortened the examination of the patient (Schwartz et al., 2003). These are barriers clients who are obese encounter in the health-exercise field, and consequently, a less comfortable environment becomes an obstacle to successful treatment.

In the physical education and exercise science (PEX) field, there is also evidence of discrimination, weight bias, and anti-fat bias against people who are obese. Studies have shown that compared to psychology students, PEX students display a strong implicit negative prejudice toward individuals who are obese. In addition, they are more explicit in the belief that people who are obese are not persistent in their efforts to lose weight (Chambliss et al., 2004; O'Brien et al., 2007). Again, these findings indicate bias against individuals who are obese may produce a less supportive environment and consequently hinder their chances of successful weight management.

Robertson and Vohora (2008) also examined the presence of bias within fitness professionals and regular exercisers. Both groups displayed a significant anti-fat bias. In fact, female exercisers displayed

greater anti-fat bias in implicit and explicit evaluations. Likewise, fitness professionals and regular exercisers who have never been overweight showed a greater anti-fat bias, in a similar manner to the bias that has been shown to exist in other health-related professionals. Robertson and Vohora concluded their study indicates a need for intervention to improve professionals' attitudes and behaviors so their services could better contribute to clients' healthier life.

More recently, Fontana, Furtado, Marston, Mazzardo, and Gallagher (2013) investigated the implicit and explicit attitudes about students who are obese held by physical educators and physical education students. They also administered the Perceptions of Obese Students by Physical Education Teachers (POSPET) questionnaire—a scale used to track how the physical education teachers feel about students who are obese during class time. A neutral attitude was found on the explicit measure, and even a pro-fat bias in the POSPET measure, meaning the future professionals ostensibly cared for the students who are obese and aimed to give equal treatment during class time. However, in contrast to the explicit measures, the physical educators showed negative attitudes toward students who are obese on the implicit bias measure.

This latter study especially highlights the common discrepancy between implicit and explicit attitude scores that others have noted. For example, in the Chambliss et al. (2004) study on exercise science students, the participants did not display a high bias score on the explicit scale, but many showed a strong implicit anti-fat bias. Thus, these results raise a methodological (validity) issue regarding the possibility that explicit measures of anti-fat bias have a tendency to elicit socially desirable responses (i.e., respondents do not openly admit their prejudices). The researchers (Lewis, Cash, Jacobi, & Bubb-Lewis, 1997) who developed the explicit measure—the AFAT—have argued the instrument is not susceptible to socially desirable responding because they tested that possibility by checking for correlations of the AFAT items with scores on Crowne and Marlowe's (1960) Social Desirability Scale. Why then, don't the explicit biases show up when implicit bias is revealed by the Implicit Association Test? One possibility could be that the Crowne and Marlow scale is not sufficiently sensitive or is not sophisticated enough to reveal socially desirable responding on the explicit measure. However, newer and more sophisticated measures are now available, such as the Balanced Inventory of Desirable Responding (BIDR; Paulhus, 1988, 1991, 2002), that may be more effective in

revealing if any socially desirable (SD) response tendencies are an issue regarding the validity of the AFAT. This question is of obvious concern because if the validity of explicit measures is in doubt, the methodological integrity of research in this area could be seen as questionable.

In summary, the literature on anti-fat bias (and its consequences) indicates that it is an issue of sufficient concern to health professionals, including exercise professionals and physical educators, to warrant further research, including in cross-cultural contexts. Thus, the primary purpose of this study was to study and compare explicit and implicit anti-fat bias ratings of Mexican and American samples of undergraduate PEX students and Mexican athletes. As a secondary issue, we also investigated a relevant psychometric concern: the possibility the explicit (AFAT) measure is prone to eliciting SD response tendencies.

## Method

### Participants

Data from 114 (45 women, 69 men) Mexican and American PEX students ($n_{\text{American}} = 63$, $n_{\text{Mexican}} = 40$) and Mexican athletes ($n = 15$) were ultimately included in the study (see Results section for reasons for exclusion of some participants). The PEX students were recruited from their university programs. Athletes were recruited through their current coaches or directly in person. Their ages ranged from 18 to 65 years old. The sample was predominantly of Caucasian and Hispanic ethnicity. Participants were either American or Mexican citizens. IRB approval was obtained from the American university and a collaboration letter from the Mexican university was filed prior to the study being conducted.

### Instrumentation

Two measures of anti-fat bias were used in this study. The Antifat Attitudes Test (AFAT) is a questionnaire designed to measure explicit bias toward individuals who are obese using traditional self-report format (Lewis et al., 1997). The instrument consists of 47 statements about people who are fat, and items are rated using a 5-point Likert-type scale with verbal anchors ranging from *strongly disagree* to *strongly agree.* The questionnaire has three subscales—social/character disparagement, physical/romantic unattractiveness, and weight control/blame—as well as a total composite score. Sub-

scale internal consistencies ranging from .77 to .85 and an overall internal consistency of .95 have been reported in the literature (Lewis et al., 1997).

The Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998) is used to measure individual differences in implicit cognition that stem from automatic associations between descriptors by comparing participants' reaction times when they classify positive or negative bias-related words that are alternatively paired with the object of the bias (for details see http://www.yaleruddcenter.org/resources/upload/docs/what/bias/iat_instructions.pdf). IAT measures have primarily been used to examine social prejudice against different groups (e.g., racial stereotypes). However, the IAT has also been used to assess implicit anti-fat bias in physical educators (O'Brien et al., 2007), attitudes toward individuals who are obese among exercise science students (Chambliss et al., 2004), and weight bias among health professionals specializing in obesity (Schwartz et al., 2003).

Participants completed the IAT to assess the attributes of good –bad, smart–stupid, and motivated–lazy with the target categories of fat people and thin people. These attributes were selected because they represent common anti-fat stereotypes and have been examined in prior studies in which the IAT was used (Schwartz et al., 2003). Participants completed the IAT by classifying words into categories. Checkmarks were used to classify the words into categories indicated at the top of each page.

Participants had 20 s to complete each of the IAT tasks, and each measure was repeated with the pairing reversed. The IAT was then scored by subtracting the number of words correctly classified when the term *fat people* was paired with the negative attributes (i.e., bad or lazy) from the number of words correctly classified when the term *fat people* was paired with the positive attribute, or implicit anti-fat bias. See Figure 1.

To adjust for differences in number of items completed, the difference scores were inserted into the following algorithm (Teachman & Brownell, 2001) in which maximum and minimum represent the category pairing with highest versus lowest number of items correctly classified: (max/min − 1) × square root of (max − min). Unlike traditional self-report questionnaires, the IAT is used to measure associations and preferences that exist beyond conscious evaluation, thereby providing an operational measure of bias of which people may be unaware or unwilling to report.

| **Fat People** | | **Thin People** |
|---|---|---|
| fat | | slim |
| obese | | thin |
| large | | skinny |
| **Motivated** | | **Lazy** |
| determined | | slow |
| motivated | | lazy |
| eager | | sluggish |
| | | |
| **Fat People Motivated** | | **Thin People Lazy** |
| | obese | |
| | sluggish | |
| | slim | |
| | eager | |
| | large | |

| **Fat People** | | **Thin People** |
|---|---|---|
| fat | | slim |
| obese | | thin |
| large | | skinny |
| **Lazy** | | **Motivated** |
| slow | | determined |
| lazy | | motivated |
| sluggish | | eager |
| | | |
| **Fat People Lazy** | | **Thin People Motivated** |
| | obese | |
| | sluggish | |
| | slim | |
| | eager | |
| | large | |

***Figure 1.*** Example of the IAT for the stereotypes of motivated versus lazy. On the left, fat is paired with motivated and thin with lazy. On the right, the categories are reversed: Fat is paired with lazy and thin with motivated.

Because differences between implicit and explicit bias often occur, we also investigated the possibility that SD response tendencies could affect the validity of explicit measures. Specifically, the Balanced Inventory of Desirable Responding questionnaire version 6 (BIDR-6) was used to evaluate social desirability issues regarding the AFAT. The BIDR-6 (Paulhus, 1988, 1991, 2002) is used to assess two dimensions of social desirability termed *self-deceptive enhancement* (SDE) and *impression management* (IM). In previous research, it has been found the IM scores can indicate when participants are "faking" their understanding of the instructions to deny a "self-representation" (Paulhus, 2002). Similarly, the SDE component can indicate "self-deceptive distortions" (Hoorens, 1995; Paulhus, 1988).

The IAT, the AFAT, the BIDR-6, and the demographic questionnaires were translated by the principal investigator and three others

using a reverse translation method. First, the IAT, the AFAT, and the BIDR-6 were translated from English to Spanish. Then bilingual (English and Spanish) speakers were asked to translate the questionnaires in Spanish back to English. This process was repeated until the translations matched their original versions

### Procedures

The instruments were administered in both countries to groups of PEX students during class time. Athletes were given the questionnaires before practice. The data collection process spanned 2.5 weeks in the United States and 2 weeks (two trips) in Mexico.

**Step 1.** The participants were informed about the study and asked to sign an informed consent form. Participants' responses to the questionnaires were coded with a number after administration so the responses remained anonymous.

**Step 2.** The participants started the process by listening to the researcher instructions and guidance (doing the timing as well) throughout the IAT test (pencil and paper version). After completing the IAT timed test, the participants answered the AFAT questionnaire, followed by the BIDR-6 questionnaire and the demographic questionnaire.

**Step 3.** After the measures were completed and collected, the students and athletes were debriefed on the purpose of the study and the problem of anti-fat bias within the health environment. The same procedure was followed in Mexico, except Spanish versions of the instruments were used.

## Results

The initial data screening was $N = 127$. After a second data examination, six participants were removed because they only classified four or fewer words per IAT test administered or classified more than 35% incorrectly. Another two participants were removed from the main data because they were not citizens of the United States or Mexico.

The descriptive statistics for the overall sample and for the Mexican and American samples are presented in Table 1. The intercorrelations between variables are presented in Table 2.

**Table 1**
*Descriptive Statistics*

| Group | Variables | *N* | *M* | *SD* | Minimum | Maximum | Scale alpha |
|---|---|---|---|---|---|---|---|
| Total | Age | 116 | 23.80 | 9.12 | 18.00 | 68.00 | |
| | Height | 113 | 67.95 | 15.39 | 60.00 | 79.00 | |
| | Weight | 118 | 164.26 | 30.23 | 104.00 | 300.00 | |
| | AFATTot | 115 | 2.39 | .50 | 1.47 | 3.83 | .92 |
| | AFATSoc | 119 | 1.88 | .56 | 1.00 | 3.40 | .84 |
| | AFATPhys | 117 | 2.85 | .62 | 1.40 | 4.50 | .76 |
| | AFATBlame | 117 | 3.09 | .63 | 1.44 | 4.78 | .73 |
| | IATgood-bad | 118 | 3.79 | 3.40 | −6.00 | 14.14 | |
| | IATsmart-stupid | 118 | 4.74 | 3.91 | −4.08 | 16.97 | |
| | IATmot-lazy | 118 | 3.19 | 4.85 | −16.66 | 18.40 | |
| | SDE | 105 | 4.47 | .67 | 2.95 | 6.20 | |
| | IM | 108 | 3.83 | .82 | 1.95 | 6.45 | |

**Table 1 (cont.)**

| Group | Variables | *N* | *M* | *SD* | Minimum | Maximum | Scale alpha |
|---|---|---|---|---|---|---|---|
| Mexican | Age | 53 | 27.23 | 12.57 | 18 | 68 | |
| | Height | 53 | 67.02 | 3.48 | 60.0 | 75.0 | |
| | Weight | 55 | 156.57 | 24.54 | 104.00 | 203.00 | |
| | AFATTot | 52 | 2.34 | .50 | 1.47 | 3.49 | .91 |
| | AFATSoc | 56 | 1.83 | .54 | 1.00 | 3.27 | .82 |
| | AFATPhys | 54 | 2.71 | .65 | 1.40 | 4.50 | .73 |
| | AFATBlame | 54 | 3.19 | .60 | 1.44 | 4.56 | .61 |
| | IATgood-bad | 56 | 2.55 | 3.37 | −6.00 | 14.14 | |
| | IATsmart-stupid | 55 | 5.80 | 4.46 | −4.08 | 16.97 | |
| | IATmot-lazy | 55 | 1.82 | 5.61 | −16.66 | 18.40 | |
| | SDE | 47 | 4.54 | .73 | 3.30 | 6.20 | |
| | IM | 50 | 3.87 | .86 | 2.15 | 6.45 | |

**Table 1 (cont.)**

| Group | Variables | *N* | *M* | *SD* | Minimum | Maximum | Scale alpha |
|---|---|---|---|---|---|---|---|
| American | Age | 59 | 20.85 | 1.85 | 18 | 28 | |
| | Height | 57 | 68.68 | 4.22 | 61.0 | 79.0 | |
| | Weight | 59 | 170.49 | 33.26 | 123.00 | 300.00 | |
| | AFATTot | 59 | 2.41 | .51 | 1.53 | 3.83 | .94 |
| | AFATSoc | 59 | 1.92 | .57 | 1.00 | 3.40 | .86 |
| | AFATPhys | 59 | 2.94 | .59 | 1.80 | 4.30 | .80 |
| | AFATBlame | 59 | 2.97 | .65 | 1.89 | 4.78 | .82 |
| | IATgood-bad | 58 | 4.94 | 3.07 | −2.77 | 12.60 | |
| | IATsmart-stupid | 59 | 3.80 | 3.09 | −2.42 | 15.17 | |
| | IATmot-lazy | 59 | 4.44 | 3.78 | −3.83 | 17.59 | |
| | SDE | 55 | 4.41 | .63 | 2.95 | 5.75 | |
| | IM | 54 | 3.77 | .76 | 1.95 | 5.70 | |

*Note.* AFATSoc = social/character disparagement; AFATPhys = physical/romantic unattractiveness; AFATBlame = weight control/blame; SDE = self-deceptive enhancement; IM = impression management.

**Table 2**
*Intercorrelations Between AFAT and IAT Subscales*

| Subscale | AFAT Soc | AFAT Phys | AFAT Blame | IATgood-bad | IATsmart-stupid | IATmot-lazy | SDE | IM |
|---|---|---|---|---|---|---|---|---|
| AFATSoc | | .67**** | .51**** | .06 | .14 | .15 | −.07 | −.10 |
| AFATPhys | | | .58**** | .11 | .03 | .21 | −.11 | −.10 |
| AFATBlame | | | | .00 | .19* | .03 | −.00 | −.01 |
| IATgood-bad | | | | | .19* | .43**** | −.00 | .19* |
| IATsmart-stupid | | | | | | -.03 | −.04 | −.11 |
| IATmot-lazy | | | | | | | −.03 | .03 |
| SDE | | | | | | | | .39**** |

*Note.* AFATSoc = social/character disparagement; AFATPhys = physical/romantic unattractiveness; AFATBlame = weight control/blame; SDE = self-deceptive enhancement; IM = impression management.
*$p < .05$. **$p < .01$. ***$p < .005$. ****$p < .001$.

## Explicit Attitudes

Because the AFAT was translated into Spanish, Cronbach's alpha reliability coefficients were computed as a check on the internal consistency of the subscales of the instrument. For the overall scale (AFAT), the alpha coefficients were .92 for the total sample and .91 and .94 for the Mexican and American subsamples, respectively. In no case would removal of any items have raised the scale alphas. For the Social/Character Disparagement (AFATSoc) subscale, the overall alpha was .84, but Items 21 and 31 were slightly problematic in that their removal would have raised the scale alpha slightly to .85 and .86, respectively. For the Mexican sample, the scale alpha was .82, but again, Items 21 and 31 were slightly problematic in that their removal would have raised the scale alpha to .83. For the Physical/Romantic Unattractiveness (AFATPhys) subscale, the overall alpha was .76, but Item 40 was problematic in that its removal would have raised it to .80. For the Mexican sample, the scale alpha was .73, but removal of Item 40 would have raised it to .77. For the American sample, the subscale alpha was .80, but removal of Items 40 and 42 would have raised it slightly to .82 in both cases. For the Weight Control/Blame (AFATBlame) subscale, the overall alpha was .73. For the Mexican sample, the scale alpha was .61 and Item 4 was problematic in that its removal would have increased it to .63. For the American sample, the scale alpha was .82 and all items were satisfactory. Because the AFAT instrument is widely used (Lewis et al., 1997), and because any item deletions would have only resulted in minor scale coefficient changes, it was decided to leave the subscales unaltered for further analyses.

To check for gender differences, and because the Mexican sample included data from athletes who were not also PEX students, two-way (Gender × Subsample) ANOVAs were computed to see if the main analyses could simply compare Mexican to American participants or if more detailed analyses were necessary. There were no significant differences on any of the AFAT scales, so the whole Mexican sample was compared to the American sample (see Figure 2).

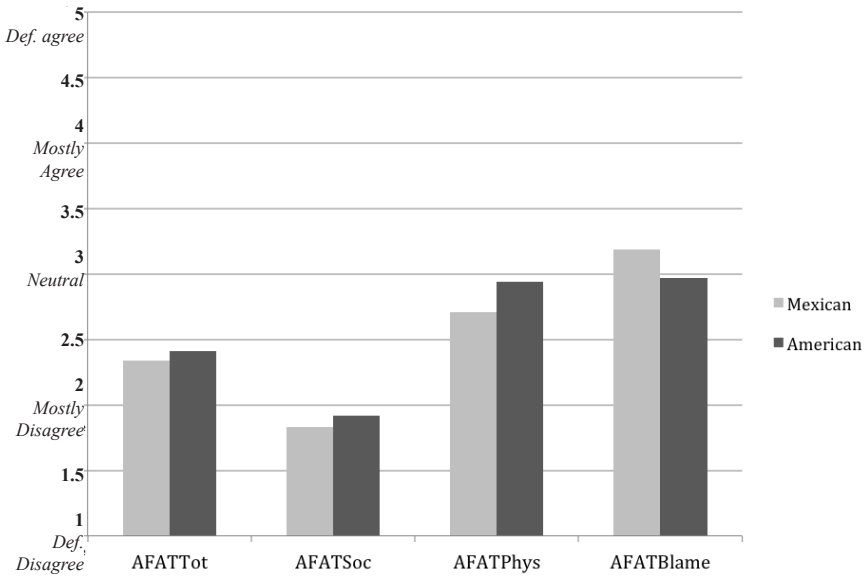


***Figure 2.*** Mexican and American AFAT scores. AFATSoc = social/character disparagement; AFATPhys = physical/romantic unattractiveness; AFATBlame = weight control/blame.

Generally, the mean scores on the total AFAT scale and its three subscales (Figure 2) do not represent anti-fat bias attitudes with the exception of the Mexican sample's score (3.19) on the Weight Control/Blame (AFATBlame) subscale, which was slightly above the theoretical midpoint of the scale (3.0). Independent *t* tests revealed no significant differences between Mexican and American scores on the total AFAT scale, or its three subscales, although the differences between American and Mexican scores neared significance ($p = .06$) on the AFATPhys and AFATBlame subscales.

## Implicit Attitudes

There were differences on each of the adjusted IAT scores. Specifically, when good–bad was paired with thin vs. fat, there was an effect for subsample, $F(2, 111) = 4.71$, $p < .05$. Post hoc tests (Tukey's) revealed American students scored higher than Mexican students ($M = 4.68$ vs. $2.63$, $p < .01$). Similarly, there was an effect for subsample when smart vs. stupid was linked to thin vs. fat, $F(2, 111) = 8.20$, $p < .001$. Post hoc tests (Tukey's) revealed the Mexican students ($M = 6.76$) scored higher ($p < .001$) than the Mexican athletes ($M = 4.08$) and significantly higher ($p < .05$) than the American

letes ($M = 4.08$) and significantly higher ($p < .05$) than the American students ($M = 3.62$). Finally, there were no main effects for gender or subsample when motivated–lazy was paired with fat vs. thin, but there was a significant interaction effect, $F$ (5, 111) = 3.66, $p < .05$. All scores are plotted in Figure 3 to allow a detailed view of which of them were different from 0, indicating implicit anti-fat bias.

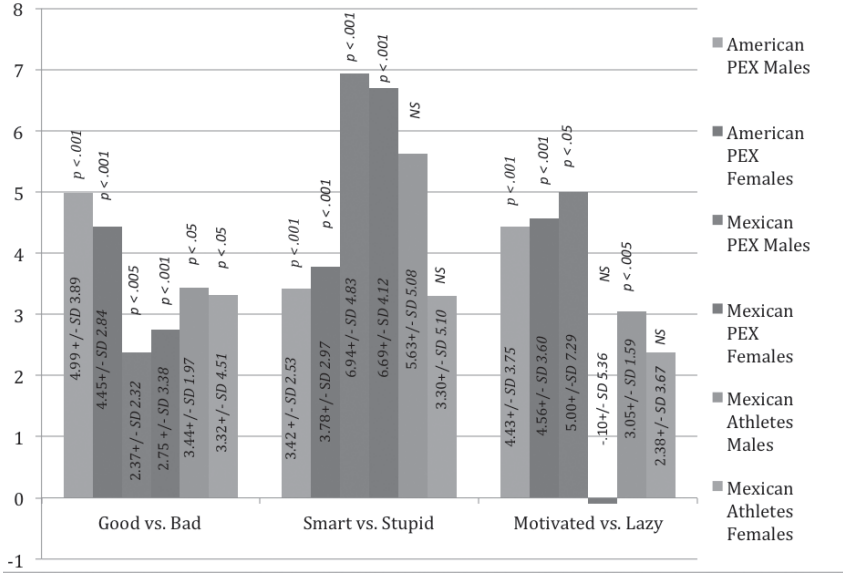


***Figure 3.*** Mexican and American adjusted IAT scores. This figure shows the levels of implicit anti-fat bias for each subsample. The *p*-values indicate if the scores are significantly different from 0, indicating anti-fat bias.

## Socially Desirable Response Tendency Issues

Pearson correlation coefficients were computed to ascertain the relationship between the elements of SD responses to the scales and individual items of the AFAT. None of the AFAT subscales were statistically significantly correlated with either the SDE scale or the IM scale of the BIDR-6 questionnaire. However, six of the 47 AFAT items were statistically significantly correlated with the IM scale, and one of those was also correlated with the SDE scale. The statistics of those six AFAT items are presented in Table 3. One of the implicit measures (IATgood–bad) was statistically significantly correlated with IM ($r = .19$, $p < .05$).

**Table 3**
*Correlations of AFAT Items With Self-Deceptive Enhancement and Impression Management*

| | Item | SDE | | IM | |
|---|---|---|---|---|---|
| **AFAT scale** | **#** | ***r*** | ***p*** | ***r*** | ***p*** |
| AFATSoc | 17 | | | −.22 | < *.01* |
| AFATPhys | 32 | −.27 | < *.01* | −.19 | < *.05* |
| | 36 | | | −.22 | < *.05* |
| AFATBlame | 43 | | | −.25 | < *.01* |
| AFATOthers | 3 | | | −.21 | < .05 |
| | 47 | | | −.21 | < *.05* |

*Note.* SDE = self-deceptive enhancement; IM = impression management; AFATSoc = social/character disparagement; AFATPhys = physical/romantic unattractiveness; AFATBlame = weight control/blame.

## Discussion

A key finding of this study was the scores of the American and Mexican samples did not show problematic levels of explicit anti-fat bias, and both samples scored similarly on all three subscales (Social/Character Disparagement, Physical/Romantic Unattractiveness, Weight Control/Blame) of the AFAT measure. Thus, these results were different from prior cross-cultural research. For example, Pepper and Ruiz (2007) found that European American women exhibited more anti-fat bias than highly acculturated Latina women, who in turn showed more anti-fat bias than low acculturated Latinas. Based on those results, Pepper and Ruiz, and others such as Candrall and Martinez (1996), predicted a higher level of anti-fat bias in the American groups on the basis that in the American culture, self-oriented ideals are generally followed and practiced, in this case, considering each other responsible for their own actions and consequences in regard to weight control. In contrast, the Mexican or Latino groups were seen as family oriented and to make decisions in groups, promoting acceptance toward each other (Candrall & Martinez, 1996). In both studies, the authors see Americans, because of their culture, as more likely to assign blame.

It is speculative, but one possibility why no explicit differences emerged is the Mexican sample (from Tijuana) of this study may be highly acculturated into the American "perspective" because of

the close geographical proximity with the U.S. border in California. However, direct comparisons of scores are not possible given that in the previous cross-cultural research, the researchers used the Anti-Fat Attitudes (AFA) questionnaire (Candrall, 1994), whereas we used the AFAT as the explicit measure questionnaire.

In regard to levels of implicit anti-fat bias, the results were somewhat different. Overall, the American sample scored higher in the good–bad and in the motivated–lazy subscales, but not the smart–stupid subscale. This means that in this study, the American sample was more prone to implicitly associate people who are fat with being bad and lazy (Figure 3). Our results are consistent with previous research (Chambliss et al., 2004; Schwartz et al., 2003; Teachman & Brownell, 2001) done on future exercise scientists and health professionals. In those studies, the participants displayed negative attitudes toward people who are obese, linking them with being bad and lazy. In the motivated–lazy link, the American sample showed a higher implicit bias in terms of stereotypically fatness with laziness. These results are also consistent with previous literature (Chambliss et al., 2004; Teachman & Brownell, 2001). Moreover, we investigated implicit anti-fat bias differences by gender; the results indicate no main effects, but the significant gender by group interaction is clearly a result of the Mexican PEX women not showing any stereotypical link between fatness and laziness (Figure 3). This result presents a contrast to previous findings; for example, Greenleaf, Chambliss, Rhea, Martin, and Morrow (2006) found similar levels of stereotypical bias, but no differences between Caucasian and Hispanic adolescents.

We also assessed the athletes' anti-fat bias because they are often perceived as role models. For instance, it is noted in the literature that fans tend to identify themselves with the athlete, the sport, or the team (Duncan, 2007). Thus, fans might be prone to endorse attitudes displayed by the athletes. Also, we examined this group because Chambliss et al. (2004) suggested that students tend to enroll in exercise science programs because they are interested in sports and physical activity, "which may contribute to a view of obesity as unacceptable" (p. 473). In our study, the male and female Mexican athletes displayed implicit anti-fat bias. However, there were no statistical significant gender differences in the Mexican or the American sample (Figure 3). Furthermore, cross-cultural investigation on athletes' implicit associations and stereotypes is needed.

Finally, prior research has shown only implicit anti-fat bias; thus, we speculated the students and the athletes self-report answers, on

the explicit measure, could be influenced by SD tendencies. Thus, we investigated the extent to which the explicit anti-fat bias subscales and individual items were prone to eliciting SD responses. Contrary to our initial hypothesis, the results indicate none of the AFAT subscales were significantly correlated with either the SDE scale or the IM scale of the BIDR-6 questionnaire (Table 3). Although six of the 47 AFAT items were statistically correlated with the IM scale, none of those associations were substantive enough to compromise the validity of the scales. At most, the correlations between the items and the IM only accounted for 6% of the variance explained. Thus, our results support the validity of the AFAT measure as it does not appear to be prone to eliciting SD responses.

## Limitations

Our study had limitations. First, convenience samples were used. The students involved were only from two universities; in the United States, the participants were students from an upper Midwestern university, and in Mexico, the students were from a university close to the southwestern U.S. border. Thus, our results cannot be generalized to Mexican or American students as a whole. Second, because of the close geographical proximity of the Mexican group to the border with California, those participants may show similar tendencies to the American group. Finally, we did not examine language as a possible bias factor. Previous findings in cross-cultural research (Pepper & Ruiz, 2007) have shown that language interacts with body image. Pepper and Ruiz (2007) found that the participants who chose to respond in English scored a higher level of body dissatisfaction in the AFA.

## Conclusions

The literature indicates anti-fat bias is a prevalent issue of prejudice and stereotype against people who are obese. Health and wellness professionals report they often hear statements such as this: "Our children will, instead of having to care for baby-boomers like we will, they will have to care for fat-boomers" (Duncan, 2007, p. 60). Some professionals think that perhaps it is okay to have biases, but they need to learn how to control them (Yale Rudd Center for Food Policy and Obesity, 2010). Specifically, explicit bias is an issue because "words can hurt, and they often do" (Duncan, 2007, p. 63).

In this study, the questionnaire responses of future physical educators, exercise science professionals, and athletes did not indicate

explicit bias, but their apparent levels of implicit bias may be an obstacle to their future roles in combating obesity in Mexico and the United States. According to Chambliss et al. (2004), there is no known link between implicit anti-fat biases and behavior. The Yale Rudd Center for Food Policy and Obesity (2010) suggested the anti-fat bias may be a product of the memory associations "between concepts" and the messages inherited in society in which *overweight* is a synonym of *bad*. However, what is known is anti-fat bias and weight discrimination are factors that could obstruct individuals who are obese from adopting a healthy lifestyle (Chambliss et al., 2004). This knowledge has important implications for practitioners, educators, and researchers.

In general terms, the implication for PEX professionals (e.g., physical education teachers, coaches, and exercise leaders) and those who prepare them (e.g., teacher and coach educators, exercise science professors) is it behooves them to try to prevent anti-fat bias from becoming a barrier that prevents students and clients who are overweight or obese from obtaining the many health and wellness benefits from participating in physical activity and sports. In a recent systematic review of qualitative studies of what "turns off" adolescents who are overweight or obese to exercise, Stankov, Olds, and Cargo (2012) highlighted the issue and gave excellent practical suggestions (e.g., having accommodating dress codes for PE, facilitating privacy in dressing rooms, adding greater physical activity choices to the curriculum, and providing leadership training to raise awareness and increase barrier prevention competencies). We concur, and we would add—from a public health perspective—that if physical education teachers, coaches, and exercise leaders genuinely subscribe to the value of physical activity as a health-promoting behavior, they should be prepared to make special efforts to allow those who need those benefits the most (students and clients who are obese and unfit) equal access and opportunity to obtaining them. These efforts would logically include using their professional skills and influence to make the ethos of physical education, exercise, and sport environments friendly and accepting of all body types and physical competencies. More simply put, students' peers and parents need to be enlisted as part of the solution to anti-fat bias as well.

Similarly, the implications for researchers include a need to investigate the effectiveness of educational strategies designed to reduce the levels of anti-fat bias in future health professionals such as PEX students. Such strategies could include workshops or clinics specialized in exercise psychology, ethics, and health and wellness

or be used with a "consciousness raising" strategy as Chambliss et al. (2004) proposed. For researchers with interests in psychometrics and methodology, the issue of SD responses remains a mystery. Logically, because anti-fat bias is manifested in implicit but not explicit measures, we were expecting an association between SD and the AFAT scales. However, we found the participants did not display any substantive SD response tendencies in the AFAT measure—and the AFAT scales did not correlate with the IAT measures—indicating a lack of cognitive linkage between them. Thus, researchers could consider whether implicit affects an individual's explicit bias because if it does not, there may be less reason for it to be a professional concern.

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