

EXERCISE SCIENCE**Anti-Fat Bias Among Physical Education Teachers and Majors**

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Abstract

Obesity has reached epidemic levels, and physical education teachers are on the front lines to combat it. However, anti-fat bias from physical education teachers may be a barrier against the participation of students who are obese in physical activity. Thus, our purpose was to investigate the attitude of physical education teachers and majors toward obese individuals. Forty-seven physical education teachers and 149 majors participated in the study. Participants answered three questionnaires: Anti-Fat Attitude Scale (AFAS measures explicit attitudes toward obese individuals), Perception of Obese Students by Physical Education Teachers questionnaire (POSPET measures how teachers perceive students who are obese during class), and Implicit Association Test (IAT is a timed assessment measuring automatic attitudes toward obese individuals through word categorizations: good–bad, lazy–motivated). Based on one sample t tests, AFAS results indicated a neutral attitude by teachers ($t_{46} = -1.63, p = .11$) and majors ($t_{148} = .80, p = .43$) toward obese individuals, and POSPET results indicated teachers have a pro-fat bias toward obese students ($t_{42} =$

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-8.99, $p < .01$). However, when answers were automatically evoked, good–bad and lazy–motivated IAT scores indicated a strong anti-fat bias by teachers ($t_{37} = 12.31, p < .01$ and $t_{35} = 13.12, p < .01$, respectively) and majors ($t_{137} = 16.96, p < .01$ and $t_{134} = 20.77, p < .01$, respectively). Using independent t tests, significant differences between teachers and majors were not found for good–bad ($t_{174} = .34, p = .74$) and lazy–motivated IAT ($t_{169} = -1.05, p = .21$). IAT scores showed a strong and similar anti-fat bias among physical education teachers and majors. Anti-fat bias should be an important part of PETE and continuing education programs because it could play a role in the prevention of obesity.

Obesity is a challenging public health issue that is strongly associated with adverse health consequences such as cardiovascular disease and diabetes (Daniels, 2006; Denker & Andersen, 2008; U.S. Department of Health and Human Services [USDHHS], 2010). The incidence of obesity in the United States is alarming with approximately 30% of the adult population considered obese and over 60% at least overweight (Flegal, Carrol, Ogden, & Curtin, 2010). Obesity is also on the rise among children and adolescents, more than tripling in the last four decades (USDHHS, 2010).

Although a large proportion of the population in the United States is obese, bias toward obese individuals has been documented in multiple spheres of society, such as television, employment, and health care. For example, overweight individuals are rarely portrayed in television programming. Extensive analyses of prime-time television shows and commercials indicated that only 3–5% of female and 7–9% of male characters were obese (Greenberg, Eastin, Hofschire, Lachlan, & Brownell, 2003; Lin, 1998). The obese characters also possessed more negative characteristics such as more likely to be shown eating, to be unemployed, and to be the center of humor and less likely to have romantic interactions (Greenberg et al., 2003).

Discrimination toward obese individuals has also been found in employment situations. Pingitore, Dugoni, Tindale, and Spring (1994) found that an actor posing as a job applicant was much more likely to be hired when he was presented in a simulated job interview videotape as having a normal weight than when the same actor was made overweight by the use of theatrical prostheses, in spite of both interviews being identical except for the weight

manipulation. Higher levels of obesity, measured by body mass index (DeBeaumont, 2009; Han, Norton, & Stearns, 2009) or bioelectrical impedance (Wada & Tekin, 2010), have also been associated with lower wages. Fat prejudice has detrimental effects on obese individuals in employment situations.

Health care professionals are trained to work with a variety of health problems; therefore, they are not expected to express animosity toward obese patients. However, anti-fat bias has been found among nurses, physicians, obesity researchers, and exercise science majors. Nursing students have indicated feeling repulsed by obese individuals; they find them lazy and lacking self-control (Petrich, 2000). A large proportion of primary care physicians view obese individuals as weak willed and lazy (Foster et al., 2003). Hebl and Xu (2001) indicated physicians' lack of desire to treat obese patients and their willingness to shorten the consultation duration for obese patients. Finally, a strong implicit anti-fat bias has been found even among obesity researchers (Schwartz, Chambliss, Brownell, Blair, & Billington, 2003) and exercise science students (Chambliss, Finley, & Blair, 2004). Anti-fat bias among health care professionals may reduce the quality of care provided to obese patients.

Physical educators are in the forefront of the battle against obesity. Several authors have cited promoting lifelong physical activity as the overall purpose of physical education (O'Brien, Hunter, & Banks, 2007; Pangrazi, 2007). Physical education is the only subject in the K–12 curriculum to focus on the teaching of physical activity. However, obesity bias possibly undermines the relationship between physical education teachers and students who are obese, becoming a barrier against the participation of these students in physical education classes. To date, only a few studies have focused on anti-fat bias by physical education teachers and majors. It has been found that physical education teachers (Greenleaf & Weiller, 2005) and majors (O'Brien et al., 2007) hold neutral explicit attitudes toward obese individuals, but strong implicit anti-fat bias. Consequently, the purpose of this study was to investigate the attitude of physical education teachers and majors toward obese individuals. We hypothesized that physical education teachers and majors would express a strong implicit bias toward obese individuals, but only a neutral attitude on the explicit questionnaire.

Demographic variables were also measured (i.e., professional experience, grade level taught, gender, age, and undergraduate academic level). Demographic variables will help identify whether

weight stigma is exclusive to a certain subpopulation. Men generally express stronger fat bias than women (Brochu & Morrison, 2007; Foster et al., 2003; Morrison & O'Connor, 1999), younger and less experienced individuals express more fat bias than older and more experienced professionals (Brown, 2006; Schwartz et al., 2003), and physical education majors express more implicit fat bias at the end of their academic program (O'Brien et al., 2007). To our knowledge, grade level taught has never been researched. Although differences in implicit bias across demographic variables have been found before, we hypothesized that they would be nonexistent in the current study. The focus of the physical education profession on fitness, ideal body weight, and health possibly exacerbates fat bias to the point where it is ubiquitous across demographic characteristics. The exception is undergraduate academic level. The focus of PETE programs on fitness, ideal body weight, and health issues may contribute to an increase in anti-fat bias as physical education majors progress through their academic studies.

Methods

Participants

Physical education teachers were recruited at two sites: a physical education state conference and graduate programs offered at two Midwestern higher education institutions in the United States. Physical education majors were recruited from undergraduate programs offered at the same two Midwestern higher education institutions. For recruitment of participants, signs were posted in the conference venue and in the physical education department of both universities. Participants of the conference were also invited as they approached the registration table, and university students were invited at the beginning of university classes. Participants were 47 physical education teachers (28 females, 19 males) and 149 physical education majors (50 females, 99 males). Physical education teachers were on average 37.07 ($SD = 13.22$) and majors 21.15 years of age ($SD = 1.77$). The majority of teachers (93.6%) and majors (97.3%) were Caucasian. IRB was approved by one author's university, and all participants signed informed consent prior to data collection.

Anti-fat attitude scale (AFAS). The AFAS is a questionnaire designed to measure explicit negative attitudes toward individuals who are obese. The AFAS contained five items: (a) fat people are less sexually attractive than thin people; (b) I would never date a

fat person; (c) on average, fat people are lazier than thin people; (d) fat people only have themselves to blame for their weight; and (e) it is disgusting when a fat person wears a bathing suit at the beach. Each item was evaluated on a 5-point Likert-type scale ranging from (1) *strongly disagree* to (5) *strongly agree*. Morrison and O'Connor (1999) provided evidence for the internal consistency and construct validity of the AFAS. The Cronbach's alpha for the AFAS in this study was equal to .709, indicating adequate internal consistency.

Perception of obese students by physical education teachers (POSPET). The POSPET, a questionnaire designed for this experiment, was used to acquire information about how physical education teachers explicitly perceive their students who are obese. Content analysis of the POSPET questionnaire was measured by interviewing five physical education teachers ($M = 13.1$ years of experience; $SD = 9.7$) about the appropriateness and clarity of the sentences. Based on these two criteria, two of the seven initial questions were eliminated. The final POSPET consisted of five items: (a) students who are obese are less coordinated than their normal weight counterparts, (b) students who are obese have difficulty following instructions, (c) I prefer working with students who are normal weight rather than students who are obese, (d) students who are obese disturb my classes more so than their normal weight counterparts, and (e) students who are obese do not make as much effort during class as their normal weight counterparts. The items were answered in a 5-point Likert-type scale ranging from (1) *strongly disagree* to (5) *strongly agree*. Among the participants, only physical education teachers answered the POSPET questionnaire. The Cronbach's alpha for the POSPET in this study was equal to .781, indicating that the POSPET had adequate internal consistency.

Implicit association test (IAT). The IAT is an implicit test used to assess different forms of social prejudice such as racial and gender prejudices (McConnell & Leibold, 2001; Rudman & Glick, 2001). In recent years, it has also become a common measure of obesity bias (Brochu & Morrison, 2007; Chambliss et al., 2004; Teachman, Gapinski, Brownell, Rawlins, & Jeyaram, 2003). Because the test is timed, it measures unconscious or automatic bias toward a certain group (Greenwald, McGhee, & Schwartz, 1998). In contrast to explicit measures of attitude where social desirability is a confounding factor, the IAT extracts attitudes that people may not be aware of or be willing to report (Schwartz et al., 2003). In addition, Bessenoff and Sherman (2000) have indicated that implicit

attitudes, as opposed to explicit, were good predictors of how far participants would choose to sit from a fat woman.

In this study, the paper-and-pencil version of the IAT was used. Procedures were consistent with similar studies using the paper-and-pencil IAT in physical education (O'Brien et al., 2007), in exercise science (Chambliss et al., 2004), in medicine (Schwartz et al., 2003), and in the general population (Teachman et al., 2003). First, participants were given a practice trial with four tasks. In practice task one, participants were asked to classify subordinate words such as *bugs* and *tulips* into the appropriate target superordinate categories *flower* and *insect*. In task two, the subordinate words similar to *joyful* and *nasty* were classified with the attribute superordinate categories *good* and *bad*. In the next two practice tasks, superordinate categories were combined to form pairs. Participants were given 20 s to classify the subordinate words into a pair of superordinate categories, for example, *flower good* and *insect bad*. These last two tasks were identical except for the pairs of superordinate categories. The pairs were reversed, so if in one task *flower* was paired with *good* and *insect* with *bad*, in the other task *flower* was paired with *bad* and *insect* with *good*. Participants generally found it easier to classify words when the subordinate words match their attitudes (*flower* paired with *good* and *insect* with *bad*).

Once finished with the practice trials, participants were asked to answer two experimental sequences of IAT tasks. Procedures were identical to practice trials. In both sequences, the target superordinate categories were *fat people* and *thin people*. The attribute superordinate categories were *good* and *bad* for the first and *lazy* and *motivated* for the second sequence of IAT tasks. As an example, if in one task *fat people* was paired with *lazy* and *thin people* with *motivated*, in the other *fat people* was paired with *motivated* and *thin people* with *lazy*. Under each task, a list of subordinate words was provided (i.e., *large, slender, energetic, sluggish*), and participants were given 20 s to classify as many words as possible. The number of correctly classified subordinate words was computed. The reversed pair (i.e., *fat people* paired with *motivated* and *thin people* with *lazy*) was subtracted from the matched pair (i.e., *fat people* paired with *lazy* and *thin people* with *motivated*). A positive score is consistent with anti-fat bias, a negative with pro-fat bias, and 0 indicates the absence of fat bias. The complete list of subordinate and superordinate words is available in Table 1, and an example is provided in Figure 1.

Table 1

Superordinate Categories and Subordinate Words for IAT Tasks

Superordinate Categories	Subordinate Words				
Target					
Fat People	obese	large	chubby	heavy	chunky
Thin People	slim	tiny	skinny	little	slender
Attribute					
Bad	terrible	sadness	hate	nasty	agony
Good	wonderful	happiness	love	joy	pleasure
Lazy	sluggish	unenergetic	slow	idle	lethargic
Motivated	eager	energetic	enthusiastic	determined	alert

Thin People Motivated		Fat People Lazy	Thin People Lazy		Fat People Motivated
	obese	✓		obese	✓
	slow	✓	✓	slow	
✓	tiny		✓	tiny	
✓	determined			determined	✓
	large	✓		large	✓
✓	energetic			energetic	✓
✓	slender		✓	slender	
	sluggish	✓	✓	sluggish	

Figure 1. Sample of the IAT tasks used to measure implicit attitudes toward individuals who are obese. Implicit bias is established by a higher number of correctly classified words for the task on the left.

Demographic questionnaire. The demographic questionnaire inquired about age, gender, race, and education. Physical education teachers were also asked about their teaching experience and the grade level they currently taught.

Procedures

Each participant received a package containing an informed consent form and demographic and explicit questionnaires (AFAS and POSPET). One of the investigators asked participants to sign

the informed consent, complete the demographic questionnaire, and read the instructions and complete the explicit questionnaires. Once the participants completed these steps, they received a complete copy of the IAT forms. First, one of the investigators read and explained instructions to participants before each form. Then, participants were asked to turn the page on the researcher's signal and complete the IAT form. Instructions asked participants to classify words as quickly and as accurately as possible and to avoid misclassifications, but to continue without stopping if misclassifications occurred. Once 20 s were up, they were asked to stop. Whether participants completed questionnaires in the conference or during campus classes, questionnaires were always answered during group sessions.

Statistical Analyses

Before statistical analyses were conducted, IAT forms were checked for participants who showed lack of understanding of the IAT procedures. Forms in which fewer than four subordinated words were classified or contained an error rate above 35% were eliminated. Based on these guidelines, a total of 10.2% (11 teachers and 9 majors) were eliminated in the good–bad IAT and 12.8% (14 teachers and 11 majors) were eliminated in the lazy–motivated IAT. Similar guidelines and deletion percentages have been used in previous studies (Chambliss et al., 2004; Schwartz et al., 2003; Teachman et al., 2003).

Descriptive statistics were computed for all three questionnaires (AFAS, POSPET, and IAT). Fat bias effects were investigated using one sample *t* tests. The means for the AFAS and POSPET were compared to 3 (*no bias* point on the 5-point Likert scale), and the mean for the IAT was compared to 0 (*lack of differences between matched and reverse IAT forms reveal no bias*). For all questionnaires revealing significant fat bias, independent *t* tests were conducted to investigate genders (male vs. female), experience (teacher vs. major), and grade level (elementary vs. middle/high school teachers). For teachers, Pearson product–moment correlations were conducted to measure associations between levels of fat bias (AFAS, POSPET, and IAT) and demographic variables (age and professional experience). For students, separate one-way ANOVAs were computed on the good–bad and lazy–motivated IAT scores to compare differences among students in different academic years (freshmen, sophomore, junior, senior). All analyses were conducted using SPSS 16 (SPSS Inc., Chicago, IL).

Results

Explicit Attitudes

Teachers expressed a significant pro-fat bias toward students ($t_{42} = -8.99, p < .01$). The effect size was large (Cohen's $d = 1.19$). The average POSPET score ($M = 2.06, SD = .70$) was below the neutral point 3. The scores on the AFAS questionnaire indicated a neutral attitude by teachers ($t_{46} = -1.63, p = .11$) and majors ($t_{148} = .80, p = .43$) toward obese individuals. The average scores for teachers ($M = 2.85, SD = .64$) and majors ($M = 3.05, SD = .82$) were not statistically different from the neutral point 3. Because of the lack of significant results, AFAS was not used for the analyses of demographic characteristics.

Implicit Attitudes

Teachers and majors showed significant anti-fat bias on the good–bad IAT ($t_{37} = 12.31, p < .01$ and $t_{137} = 16.96, p < .01$, respectively) and on the lazy–motivated IAT ($t_{35} = 13.12, p < .01$ and $t_{134} = 20.77, p < .01$, respectively). The number of words correctly classified in each condition is available in Figure 2. On the good–

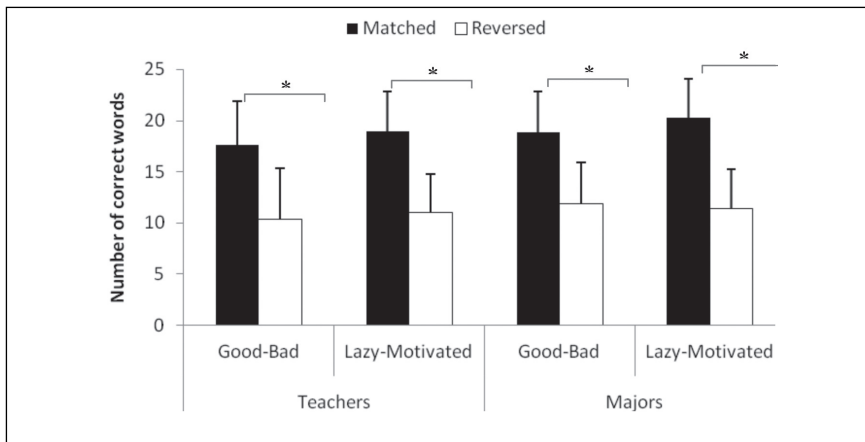


Figure 2. The number of correctly classified words for teachers and majors when *fat people* and *thin people* were paired with *good–bad* or *lazy–motivated* using matched pairs (*thin people* paired with *good* or *motivated*, and *fat people* paired with *bad* or *lazy*) or reversed pairs (*thin people* paired with *bad* or *lazy*, and *fat people* paired with *good* or *motivated*).

bad IAT, the average difference between the matched and reversed IAT forms for teachers 7.32 ($SD = 3.66$) and majors 7.03 ($SD = 4.87$) was above the neutral point 0. The effect size was large in both cases (Cohen's $d = 2.00$ and 1.44 , respectively). Similarly, the average difference between the matched and reversed lazy-motivated IAT forms was also above the neutral point 0 for teachers 7.94 ($SD = 3.63$) and majors 8.87 ($SD = 4.96$). The effect size was large in both cases (Cohen's $d = 1.63$ and 1.78 , respectively). Independent t tests did not find significant differences between teachers and majors for good-bad ($t_{174} = .34, p = .74$) and lazy-motivated IAT categories ($t_{169} = -1.05, p = .21$).

Demographic Characteristics

Gender. Differences in the level of fat bias between male and female teachers were not significant on the POSPET ($t_{43} = 1.51, p = .14$), good-bad IAT ($t_{36} = .36, p = .72$), and lazy-motivated IAT ($t_{34} = .11, p = .92$). Results on the good-bad IAT ($t_{136} = .73, p = .47$) and lazy-motivated IAT ($t_{133} = .17, p = .87$) were also not significant for majors.

Grade level taught. Teachers were asked to check all grades they taught. Teachers were classified into elementary ($N = 23$) and middle/high school ($N = 16$). Middle and high school were combined due to a small sample size. Teachers ($N = 8$) who taught both elementary and middle/high school were not included in the analysis comparing anti-fat bias across grade levels. Grade 6 was not used for classification purposes because some school districts considered it elementary school and others considered it middle school. No difference was found in anti-fat bias between elementary and middle/high school students on the POSPET ($t_{36} = .97, p = .34$), good-bad IAT ($t_{28} = -1.42, p = .17$), and lazy-motivated IAT ($t_{27} = -1.54, p = .14$).

Age. Two teachers were not considered for this analysis because they reported the date of measurement instead of their date of birth. Correlations between teachers' age and scores on POSPET ($r = .07, p = .65$), good-bad IAT ($r = -.10, p = .58$), and lazy-motivated IAT ($r = -.08, p = .68$) were weak and not significant.

Professional experience. The correlation between years of professional experience and levels of fat bias measured by the POSPET ($r = .09, p = .57$), good-bad IAT ($r = -.04, p = .84$), and lazy-motivated IAT ($r = -.05, p = .80$) were weak and not significant.

Academic year. Students were classified into sophomores ($N = 20$), juniors ($N = 49$), and seniors ($N = 77$). Three freshmen were not considered for this analysis because of the small sample size. One-way ANOVAs were computed to investigate differences among academic groups for the good–bad and lazy–motivated implicit bias. The one-way ANOVA for the good–bad IAT violated the homogeneity assumption (Levene statistic_{2,135} = 3.57, $p < .05$). The Kruskal–Wallis test was computed on the good–bad IAT scores. Students in different academic years did not have statistically different levels of fat bias ($X^2 = 1.09$, $df = 2$, $p = .58$), although the mean rank increased from 61.63 for sophomores, to 68.51 for juniors, to 72.12 for seniors. The one-way ANOVA for the lazy–motivated IAT also resulted in statistically nonsignificant differences ($F_{2,132} = .64$, $p = .53$) with a progressive increase in mean score from 8.18 for sophomores, to 8.41 for seniors, to 9.31 for juniors.

Discussion

Discrimination toward obese individuals has been established in areas such as television (Lin, 1998; Greenberg et al., 2003), employment (DeBeaumont, 2009; Han et al., 2009; Pingitore et al., 1994; Wada & Tekin, 2010), and health care (Chambliss et al., 2004; Foster et al., 2003; Hebl & Xu, 2001; Petrich, 2000). Literature on fat bias among physical education teachers and majors is scarce, yet they are at the forefront of obesity prevention and intervention. Greenleaf and Weiller (2005) found that physical education teachers expressed an explicit neutral attitude toward obese individuals. However, they did not measure implicit attitudes. O’Brien et al. (2007) measured implicit and explicit fat prejudice, but did not include physical education teachers in the design. Their results indicated that physical education majors had a strong implicit fat bias.

This study expanded on previous research by measuring explicit and implicit anti-fat bias among physical education teachers and majors and the relationship of fat bias and demographic variables. Our hypotheses were largely supported. As expected, physical education teachers and majors expressed a strong implicit anti-fat bias (IAT), despite a neutral explicit attitude toward obese individuals (AFAS). Inconsistent to our expectations, the results also indicated that physical education teachers have an explicit pro-fat bias toward students (POSPET).

Contradictory results between explicit and implicit attitude measures are not uncommon (Chambliss et al., 2004; O'Brien et al., 2007; Teachman et al., 2003). The explicit pro-fat bias toward students is a positive finding. We believe that it reflects the good intention of physical education teachers to help students who are obese. It also suggests that teachers are not likely to explicitly discriminate against students who are obese by doing things such as commenting on ideal body types. On the other hand, implicit bias by physical education teachers and majors is likely to manifest as subtle negative attitudes toward students who are obese. Taking as example discriminatory behavior derived from implicit attitudes in other contexts (Bessenoff & Sherman, 2000; McConnell & Leibold, 2001; Rudman & Glick, 2001), we speculated that physical education teachers may subconsciously be less friendly toward or interact less frequently with students who are obese. Because of the direct impact on the education of pupils toward a physically active lifestyle, physical education teachers should make a conscious effort to pleasantly interact with students who are obese.

Implicit bias may subconsciously translate to low expectations toward students who are obese. When a student who is obese is pseudo playing a game to avoid physical activity (e.g., standing still pretending to guard a base during an entire game of capture the flag), low expectations may diminish the chances that the teacher will adapt the rules of the game to increase engagement of the student. When a student who is obese has an excuse not to participate in a swimming lesson, low expectations may diminish the chances that the teacher will ask the student to engage in an alternative form of physical activity (e.g., walking 3,000 steps around the gym). Raising expectations may increase the chances to positively direct students who are obese toward a physically active lifestyle.

Several interventions have effectively reduced obesity bias. Evoking empathy is an effective strategy to lower obesity bias. Watching a video about the life story of an obese nurse lowered the fat bias among medical students (Wiese, Wilson, Jones, & Neises, 1992), and reading stories of prejudice toward obese persons lowered the fat bias among those who were also obese (Teachman et al., 2003). Evoking empathy, as part of a larger intervention including the understanding of public health initiatives, was also effective at moderately reducing fat bias among kinesiology majors (Rukavina, Li, & Rowell, 2008). Consequently, physical education

teachers can use empathy-evoking strategies, such as thinking about a person who they admire and who happens to be obese (e.g., friend, politician, reporter), to diminish implicit bias toward students who are obese.

Our final recommendation is to increase awareness among physical education teachers about implicit anti-fat bias. Because physical education teachers and majors did not express anti-fat bias in the explicit questionnaires, they are possibly unaware of their subconscious implicit anti-fat bias (Schwartz et al., 2003). In fact, we believe that increasing the awareness of physical education teachers is an important first step to preventing discriminatory behavior toward students who are obese.

Conclusion

The hypotheses referring to the demographic variables were largely supported. Gender, age, experience, and grade level taught did not significantly affect anti-fat attitudes expressed by teachers or majors. Chambliss et al. (2004) surveyed exercise science majors and concluded that exercise-related professionals may be vulnerable to anti-fat bias because of peculiar characteristics of the profession. Similar to exercise science majors, physical education majors are drawn to the profession because of their interest in fitness and athleticism. They relate to classmates and professional colleagues who tend to have the same fitness interests, and some of the academic courses focus on ideal body weight and health. They love to exercise and be physically active, and they are good at it. They do not understand how others are not equally motivated or successful. These factors may exacerbate fat bias among exercise-related professionals in such a way that fat bias becomes ubiquitous across gender, age, and experience level. In fact, physical education majors have been found to express a stronger fat bias than psychology majors (O'Brien et al., 2007).

We also hypothesized that implicit bias would increase as physical education majors progressed through the academic program. In this study, differences in implicit bias between seniors and juniors were not statistically significant, but there was a trend toward an increased bias among senior students. O'Brien et al. (2007) also concluded that implicitly measured bias increased as physical education majors progressed from the freshmen year to the end of the junior year. This supports the inclusion of obesity awareness and sensitivity training into the PETE curriculum and continuing education programs.

Research on fat bias among physical education teachers is scarce and should be significantly expanded. To date, there is a lack of research investigating the relationship between physical education teachers' implicit fat attitudes and their actions during class toward students who are obese. More studies on the effectiveness of interventions to eliminate fat bias among physical education teachers and majors are needed. Studies investigating fat bias among university professors in PETE programs are also needed. Physical education teachers are at the forefront of preventing and reducing childhood obesity; they need to assist all students in developing lifelong physical activity habits. It is important to ensure that fat prejudice is not a barrier for teachers working with students who are obese.

This study is not without limitations. Two of the limitations were associated with the POSPET questionnaire. First, the POSPET was specifically designed for the study and lacks extensive validity evidence. Second, the term *students who are obese* was used by the POSPET questionnaire instead of the term *fat people*, which was used by the AFAS and IAT questionnaires. The POSPET was designed to measure attitudes during physical education classes, so we decided to use a term that more closely represented how a physical education teacher would professionally describe a student with excess weight. There were also limitations associated with the sample of participants. A larger and more representative sample would have strengthened the study. Although methodological limitations were present, results from this study were largely in line with anti-fat bias findings in other professions (Chambliss et al., 2004; O'Brien et al., 2007; Schwartz et al., 2003).

References

- Bessenoff, G. R., & Sherman, J. W. (2000). Automatic and controlled evaluation toward fat people: Evaluation vs. stereotype activation. *Social Cognition, 18*, 329–353.
- Brochu, P. M., & Morrison, M. A. (2007). Implicit and explicit prejudice toward overweight and average-weight men and women: Testing correspondence and relation to behavioral intentions. *The Journal of Social Psychology, 147*, 681–706.
- Brown, I. (2006). Nurses' attitudes towards adult patients who are obese: Literature review. *Journal of Advanced Nursing, 53*, 221–232.

- Chambliss, H. O., Finley, C. E., & Blair, S. N. (2004). Attitudes toward obese individuals among exercise science students. *Medicine & Science in Sports & Exercise*, *36*, 468–474.
- Daniels, S. R. (2006). The consequences of childhood overweight and obesity. *The Future of Children*, *16*, 47–67.
- DeBeaumont, R. (2009). Occupational differences in the wage penalty for obese women. *The Journal of Socio-Economics*, *38*, 344–349.
- Denker, M., & Andersen, L. B. (2008). Health related aspects of objectively measured daily physical activity in children. *Clinical Physiology and Functional Imaging*, *28*, 133–144.
- Flegal, K. M., Carrol, M. D., Ogden, C. L., & Curtin, C. L. (2010). Prevalence and trends in obesity among US adults, 1999–2008. *Journal of the American Medical Association*, *303*, 235–241.
- Foster, G. D., Wadden, T. A., Makris, A. P., Davidson, D., Sanderson, R. S., Allison, D. B., & Kessler, A. (2003). Primary care physicians' attitudes about obesity and its treatment. *Obesity Treatment*, *11*, 1168–1176.
- Greenberg, B. S., Eastin, M., Hofschire, L., Lachlan, K., & Brownell, K. D. (2003). Portrayals of overweight and obese individuals on commercial television. *American Journal of Public Health*, *93*, 1342–1348.
- Greenleaf, C., & Weiller, K. (2005). Perceptions of youth obesity among physical educators. *Social Psychology of Education*, *8*, 407–423.
- Greenwald, A. G., McGhee, D. E., & Schwartz, L. K. (1998). Measuring individual differences in implicit cognition: The implicit association test. *Journal of Personality and Social Psychology*, *74*, 1464–1480.
- Han, E., Norton, E. C., & Stearns, S. C. (2009). Weight and wages: Fat versus lean pay checks. *Health Economics*, *18*, 535–548.
- Hebl, M. R., & Xu, J. (2001). Weighing the care: Physicians' reactions to the size of a patient. *International Journal of Obesity*, *25*, 1246–1252.
- Lin, C. A. (1998). Uses of sex appeal in prime-time television commercials. *Sex Roles*, *38*, 461–475.

- McConnell, A. R., & Leibold, J. M. (2001). Relations among the implicit association test, discriminatory behavior, and explicit measures of racial attitudes. *Journal of Experimental Social Psychology*, *37*, 435–442.
- Morrison, T. G., & O'Connor, W. E. (1999). Psychometric properties of a scale measuring negative attitudes toward overweight individuals. *The Journal of Social Psychology*, *139*, 436–445.
- O'Brien, K. S., Hunter, J. A., & Banks, A. (2007). Implicit anti-fat bias in physical educators: Physical attributes, ideology and socialization. *International Journal of Obesity*, *31*, 308–314.
- Pangrazi, R. (2007). *Dynamic physical education for elementary school children*. San Francisco, CA: Benjamin Cummings.
- Petrich, B. E. (2000). Medical and nursing students' perceptions of obesity. *Journal of Addictions Nursing*, *12*, 3–16.
- Pingitore, R., Dugoni, B. L., Tindale, R. S., & Spring, B. (1994). Bias against overweight job applicants in a simulated employment interview. *Journal of Applied Psychology*, *79*, 909–917.
- Rudman, L. A., & Glick, P. (2001). Toward agentic women. *Journal of Social Issues*, *57*, 743–762.
- Rukavina, P. B., Li, W., & Rowell, M. B. (2008). A service learning based intervention to change attitudes toward obese individuals in kinesiology pre-professionals. *Social Psychology of Education*, *11*, 95–113.
- Schwartz, M. B., Chambliss, H. O., Brownell, K. D., Blair, S. N., & Billington, C. (2003). Weight bias among health professionals specializing in obesity. *Obesity Research*, *11*, 1033–1039.
- Teachman, B. A., Gapinski, K. D., Brownell, K. D., 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.
- U.S. Department of Health and Human Services. (2010). The Surgeon General's vision for a healthy and fit nation. Rockville, MD: Office of the Surgeon General. Retrieved from <http://www.surgeongeneral.gov/library/obesityvision/obesityvision2010.pdf>
- Wada, R., & Tekin, E. (2010). Body composition and wages. *Economics and Human Biology*, *8*, 242–254.

Wiese, H. J., Wilson, J. F., Jones, R. A., & Neises, M. (1992). Obesity stigma reduction in medical students. *International Journal of Obesity*, *16*, 859–868.