

## **Do physical education teachers and general teachers differ in their implicit anti-fat bias?**

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### **Abstract**

The purpose of this study was to examine implicit attitudes of physical education (PE) and non-PE teachers towards overweight children stratified by gender, age, and body mass index.

Two hundred school teachers (50% PE and 50% non-PE), aged 23-60 (mean=33.5 years) from Hong Kong, China, completed the validated implicit association test to measure attitudes towards overweight children. On the good-bad scale, there were no significant differences between scores for type of teacher. Younger teachers showed more weight discrimination against overweight students compared to their older counterparts. The interaction between type of teacher and gender was significant for the motivated-lazy score. Compared to PE teachers, non-PE teachers demonstrated less discrimination toward the overweight students on motivated-lazy score. Teachers demonstrated implicit weight discrimination toward overweight students. PE teachers are more prone to negative stereotypes related to motivation and laziness. The order of

greatest overweight discrimination against overweight students was (1) male PE teachers, (2) female PE teachers, (3) non-PE female teachers and (4) non-PE male teachers.

**Key words:** body size discrimination; weight stigmatization, overweight children, fat discrimination

## **1 Introduction**

Obesity has been described as “one of the most stigmatizing and least socially acceptable conditions in childhood” (Schwimmer, Burwinkle & Varni, 2003). Evidence now suggests that discrimination against obese individuals may be more socially acceptable than discrimination against other groups (Latner, O’Brien, Durso, Brinkman & MacDonald, 2008). There are associations between anti-fat bias in children and adolescents and poorer body esteem, self-esteem, and maladaptive eating behaviours in girls (Hansson & Rasmussen, 2010; Klaczynski, Goold & Mudry, 2004). Anti-fat attitude effects continue to have an impact on overweight individuals into adulthood, as documented in many social areas (e.g. employment settings) (Brownell & Puhl, 2003; Puhl & Brownell, 2001).

The fact that weight stigma exists within the general population does not come as a surprise when one considers how quickly and pervasively media information technology delivers fat-stigmatizing messages (Brewis, Wutich, Falletta-Cowden & Rodriguez-Soto, 2011; Puhl & Heuer, 2009). However, the existence of weight stigma among healthcare specialists, including physicians, psychologists, nurses and dieticians is disconcerting (Budd, Mariotti, Graff & Falkenstein, 2011).

## **2 Literature Review**

Despite considerable training, healthcare professionals are exposed to the same fat-stigmatizing messages as the general public. Beliefs that obese patients are lazy, stupid and worthless may influence a health practitioner’s behaviour, relating to treatment, in subtle and overt ways (Schwimmer, Burwinkle & Varni, 2003). Budd et al. (2011) reviewed 17 years of literature (1990-2007) on health care provider’s attitudes toward overweight patients, and discovered persistent negative attitudes towards these patients, with improvement over time.

Early studies, measuring the attitudes of health professionals focused on explicit negative attitudes. For example, physicians associated obese patients with poor hygiene, non-compliance, hostility and dishonesty; and nurses reported believing that obese patients experience unresolved anger, are less successful, overindulgent, and lazy in comparison to normal weight patients (Klein, Najman, Kohrman & Munro, 1982; Maroney & Golub, 1992). More recently, Greenleaf & Weiller (Greenleaf & Weiller, 2005) found moderate anti-fat bias in 105 professional physical educators using the Anti-Fat Attitudes Scale (AFAS). However, professional healthcare workers and others with a duty of care to all individuals, including obese people, may not accurately report negative attitudes where this would be deemed inappropriate; they may fall prey to social desirability when completing questionnaires measuring such attitudes, which means that their attitudes are not as positive as they report in the questionnaires (Teachman & Brownell, 2001). It is also possible that professionals are not aware of, or may even deny, holding negative attitudes towards overweight individuals (DeCastro-Ambrosetti & Cho, 2011). Therefore, there is a need to measure implicit attitudes which are automatic and outside of conscious awareness (Greenwald & Banaji, 1995). The assessment of implicit attitudes may enable a more

comprehensive and less biased assessment of stigma than the assessment of explicit attitudes. A 2011 review by Budd and colleagues found that only two out of fifteen studies used the IAT as a measure; however, authors put forward a specific recommendation for the use of the IAT, due to its ability to measure implicit bias, thereby providing information about which types of individuals are less likely to hold biased attitudes.

Implicit association tests (IATs) are measures designed by social psychologists that assess the strength of an individual's automatic association of one concept with another, or of one category (e.g. overweight vs normal weight) with general personality or societal characteristics (e.g. lazy vs motivated, etc.). IATs present a word like obese or overweight with two other choices, often opposite in meaning (e.g. good or bad). The score on an IAT is how quickly the respondent processes the information; the more quickly the association is made, the more it can be assumed that this belief or bias is ingrained into memory. In the IAT, words are manipulated to demonstrate that implicit associations, supported by societal norms (e.g. overweight and lazy), are more quickly processed than those that go against societal norms (e.g. overweight and athletic). These types of implicit or unintended biases occur, often because the media portrays overweight or obese individuals as fat, lazy, unintelligent, and the like (Ata & Thompson, 2010).

Limited research is available which measures the implicit attitudes of those individuals who will have a direct impact on the health of young people in the future, such as exercise science students, PE teachers and professional teachers (Chambliss, Finley & Blair, 2004; Greenwald & Banaji, 1995; O'Brien, Hunter & Banks, 2007). Chambliss et al. (2004) used the IAT with undergraduate (n=136) and postgraduate (n=110) exercise science students. Significant bias was found.

O'Brien et al. (2007) tested 180 New Zealand PE students in their first year (n=122) and third year (n = 58), using the IAT, and compared the results with a group of psychology students (n = 164) who were similarly matched in education, age (mean age = 20yrs) and BMI (mean BMI = 23.18kg/m<sup>2</sup>). PE students had stronger and more negative implicit bias towards obese individuals than psychology students. Furthermore, third-year PE students displayed higher levels of implicit anti-fat bias than first-year students.

It is well documented that exercise has the potential to alleviate many of the health risks associated with obesity (Jakicic, 2009; Wing et al., 2007). Typical barriers that exist to physical activity as reported by normal-weight individuals include bad weather, inaccessible facilities; or personal issues including lack of time, motivation, enjoyment, fear of injury and discomfort (Napolitano & Marcus, 2000). Obese individuals also face these barriers, as well as additional negative experiences, such as embarrassment and unrealistic focus around weight loss (Ball, Crawford & Owen, 2000; Miller & Miller, 2010). Additionally, weight discrimination from exercise, health and teaching professionals is a barrier which may hinder the healthy lifestyle choices and potential behaviour change of overweight and obese individuals further (Chambliss et al., 2004; Dimmock, Hallett & Grove, 2009).

Teachers are expected to be non-prejudiced and hold egalitarian values towards all individuals (Bender, Vail & Scott, 1995). However, it appears that physical education teachers' expectations, attributions, and attitudes towards students may be negatively influenced by students' body weight and gender (Peterson, Puhl & Luedicke, 2012). Interestingly, a predisposition towards stereotyping students according to their weight status went unnoticed by most teachers, many of whom denied holding such stereotypes (DeCastro-Ambrosetti & Cho, 2011). This is crucial, especially considering that teacher's expectations influence the quality and quantity of feedback

and instruction given to students, which subsequently can impact student performance (DeCastro-Ambrosetti & Cho, 2011; Martinek, 1991). Therefore, bias and discrimination among exercise professionals toward overweight and obese students has the potential to negatively impact teaching success (DeCastro-Ambrosetti & Cho, 2011). Ultimately, this implicit bias may contribute further to unhealthy lifestyle behaviours for obese individuals who are at high risk of various chronic hypokinetic diseases.

If PE programs are to be effective, further research is required that examines the implicit attitudes of teaching professionals, who act as positive role models and are responsible for the guidance and development of children's healthy lifestyle behaviours. Research must be directed towards the elimination of size prejudice and weight discrimination in schools, by improving the awareness among teaching professionals of the existence of implicit bias.

In addition to a lack of information about potential negative implicit biases of PE teachers against overweight or obese students, there is a need to examine cultural aspects of implicit bias against overweight and/or obese students in Chinese society. According to the latest figures from the Student Health Service of the Department of Health in Hong Kong (2013) the obesity rate among primary school students in the 2011-12 school year was 20.9% and generally rising in the rest of the Asian world (Hills, Mokhtar, Brownie & Byrne, 2014). Clearly, cultural aspects of obesity and overweight that may differentially affect the implicit biases of teachers in Hong Kong compared to Western societies, where implicit weight biases against overweight and obese individuals have been studied extensively (Katzmarzyk et al., 2013; Peña, Dixon & Taveras, 2012). For example, traditional Chinese culture has been quite obesity-friendly, adults considered plump, children desirable and attractive just decades ago (Chen, Yin, Tang, H& Wang, 2014). Might this traditional cultural view affect the implicit bias among teachers of fat Chinese children? Ultimately, if we can discern these biases, culturally specific to Chinese society, we can more effectively design additional methods in teacher training for dealing with overweight and obese children in the classroom. Knowing and proactively addressing these biases has the potential to significantly enhance the dynamic teaching and learning relationships between teachers and students.

Given the lack of information about the presence of implicit bias among teachers of overweight and obese Chinese students, the objectives of this study are to examine the implicit attitudes of PE and non-PE teachers towards overweight children, and to test the differences between teachers' attitudes, based on their gender, age, and BMI.

### **3 Method**

*Participants.* One hundred PE teachers and 100 non-PE teachers from thirty-one primary and secondary schools in Hong Kong were recruited into the study. Participants aged 23 to 60 (mean age=33.5 years) were invited to participate, via a fact sheet, which was sent through a research assistant. Characteristics of the participants are presented in Table 1. This study was approved by the Senate Committee on the Use of Human and Animal Subjects in Teaching and Research, Hong Kong Baptist University.

*Instrument.* A validated paper and pencil questionnaire developed by Teachman and Brownell (2001) was administered to the participants. The literature suggests that the implicit association test (IAT) is a valid tool with which to measure outward bias and implicit attitudes which could also be used to measure many types of social evaluations including weight bias (Budd et al., 2011; Schwartz, Vartanian, Nosek &

Brownell, 2006). The IAT measures the automatic cognitive associations that individuals make which might be beyond conscious awareness, or which they might be unwilling to share (Greenwald, McGhee & Schwartz, 1998). Participants completed a familiarization round of the IAT where they classified words related to insects and flowers during a 20-second period. In the first familiarization round, socially acceptable constructs were paired. For example, flowers (e.g. daffodil, daisy) were associated with words considered 'good' (e.g. joyful, wonderful) and insects (e.g. roach, mosquito) were associated with 'bad' words (e.g. nasty, terrible). Participants were expected to complete these word associations quickly as the pairing of words was socially normal. In the second familiarization round, flowers were associated with 'bad' words and insects were associated with 'good' words. Typically, when the socially expected norms are reversed, participants take longer to score these items, indicating some cognitive dissonance.

In the next phase of testing, participants were asked to classify words related to overweight and/or obese as fast as they could, during a limited period of 20 seconds under two conditions: socially normal (e.g. fat paired with lazy) and socially abnormal (e.g. fat paired with motivated). In addition, this section of the test was designed to measure two constructs: automatic attitudes (e.g. associations of 'fat' people and 'thin' people with 'good' or 'bad'); and automatic stereotypes, (e.g. 'fat' or 'thin' people with 'motivated' or 'lazy'). The IAT provides a measure of how strongly these two concepts are associated. If the concept 'fat' is associated more with 'good' or 'motivated' as a unit, it should be easier and faster for participants to respond in time. On the contrary, 'fat', 'bad' and 'lazy' should be faster, assuming that participants respond faster when 'fat' and pleasant words are paired rather than when 'thin' and pleasant words are paired, the participant's score would demonstrate their automatic preference for 'fat'.

**Procedure.** An informed consent form was signed by all participants, which explained the nature and procedures of the study and questionnaire. The data collection procedures followed the exact instructions and guidelines of the IAT (Teachman & Brownell, 2001). Since all Hong Kong Chinese teachers who participated in the study understood English, the original IAT questionnaire was used. All participants were asked to complete the familiarization questions first to learn the format of the instrument, with additional explanation from the research assistant. The questionnaire consisted of three parts, the first was a familiarization test, and the second and final parts were related to the participants' attitudes towards overweight students. The questionnaire was conducted in schools, on an individual basis and questionnaires were collected immediately. No questions were raised during the data collection which took 20 minutes for each teacher to complete, including the familiarization test and the actual test. BMI was measured by the PE teachers of the schools and reported to the researcher.

**Statistical Analysis.** Scoring procedures for IAT data: There are many approaches to analysing IAT data. Lemm, Lane, Sattler, Khan and Nosek (2008) have examined the properties of seven scoring procedures and they found that the 'Product: square root of difference' approach resulted in the best performance. "This approach includes both difference score and ratio information. In this case, the square root of the difference between the numbers of items completed between the two blocks is multiplied by the ratio of items completed. The Implicit Association composite score is calculated as  $(X/Y) \times \text{Square Root of } (X - Y)$ , where X is the greater of A or B, and Y is the smaller of A or B. If B is greater than A, the resulting values are multiplied by -1 to retain the

directionality of the IAT effect (Lemm et al., 2008).” Therefore, we have adopted the ‘Product: square root of difference’ approach to analyse the IAT data. In this case, an implicit association composite score of zero means that there is no preference for thin or fat images (i.e. a neutral attitude). On the other hand, a positive implicit association composite score means a favourable preference for thin images while a negative implicit association composite score means a favourable preference for fat images, respectively.

Descriptive statistics were conducted and presented in Table 1. A one-sample t test examined the implicit weight bias of teachers towards overweight students. A multivariate analysis of variance (MANOVA) was used to examine the differences in IAT scores, across type of teacher (PE vs non-PE), gender, age and BMI.

#### 4 Results

Table 1 presents demographic characteristics, means and standard deviations for the IAT, and statistical analysis information for this study.

Table 1

*The implicit score means and standard deviations in parentheses across groups*

Items	Overall (N=200)	Types of Teachers		Gender	
		PE (n=100)	Non-PE (n=100)	Male (n=109)	Female (n=91)
Mean Age (years)	33.5 (8.3)	34.5 (9.0)	32.3 (7.4)	34.3 (8.7)	32.5 (7.7)
Mean Experience(years)	9.4 (7.4)	10.9 (7.8)	8.0 (6.8)	9.8 (8.0)	9.1 (6.7)
Mean BMI(kg/m <sup>2</sup> )	22.2 (3.1)	22.7 (3.1)	21.8 (3.2)	23.4 (3.1)	20.8 (2.6)
Implicit Composite score – Good-Bad (GB) <sup>a</sup>	3.55 (8.36)	2.55 (5.28)	4.56 (10.54)	3.63 (6.89)	3.46 (9.87)
Implicit Composite score – Motivated-Lazy (ML) <sup>a</sup>	0.37 (5.56)	2.22 (5.42)	-1.46 (5.10)	0.19 (5.50)	0.59 (5.66)

<sup>a</sup>A composite score of zero means that there is NO preference for thin or fat images while a positive composite score means a favourable preference for THIN images and a negative composite score means a favourable preference for FAT images respectively.

The means and standard deviations of the ‘Good-Bad’ (GB) and ‘Motivated-Lazy’ (ML) scores for the entire sample of teachers were 3.55 (8.36) and 0.37 (5.56), respectively. A one-sample t test was used to test whether the population implicit association score was equal to zero or not. The t statistic for the GB score was  $t(198) = 5.99$ ,  $P = 0.001$ , 95% CI [2.38, 4.72], indicating that the GB rating was less positive for OW/OB individuals than for their normal weight counterparts; The t statistic for the ML score was  $t(198) = 0.94$ ,  $P = 0.35$ , 95% CI [-.41, 1.15], indicating that the ML score was not different or biased by weight status categories.

Multivariate analysis of variance (MANOVA) was conducted using the GB and ML scores as dependent variables; type of teacher (PE vs non-PE) and gender were used as the between factors, and age and BMI were used as covariates. Type of teacher was significant with  $F(2, 191) = 11.27$ ,  $P = 0.001$ , partial  $\eta^2 = 0.106$ . Further analysis indicated that the ML score was significantly different between type of teacher with  $F(1, 192) = 21.96$ ,  $P = 0.001$ , partial  $\eta^2 = 0.103$ : the ML score for the PE teacher was 2.12 (i.e., a positive composite score, which indicates a favourable preference for thin images), and the score for the non-PE teacher was -1.35 (i.e., a negative composite score which indicates a favourable preference for fat images). This suggests that

compared to their non-PE teacher counterparts, PE teachers may exhibit stronger biases against overweight children, while controlling for other variables. The GB score was not significantly different between teacher groups with  $F(1, 192) = 2.15$ ,  $P = 0.14$ , partial  $\eta^2 = 0.011$ .

Gender was not a significant predictor of teacher bias against overweight children when all teachers were grouped together, with  $F(2, 191) = 0.36$ ,  $P = 0.70$ , partial  $\eta^2 = 0.004$ . On average, the implicit score was similar for both gender groups after controlling for other variables. Interestingly, the interaction between type of teacher and gender was significant, with  $F(2, 191) = 3.57$ ,  $P = 0.030$ , partial  $\eta^2 = 0.036$ . Further analysis showed that gender was a significant predictor for the ML score only,  $F(1, 192) = 6.08$ ,  $P = 0.02$ , partial  $\eta^2 = 0.031$ , but not for the GB score,  $F(1, 192) = 0.49$ ,  $P = 0.48$ , partial  $\eta^2 = 0.003$ . The ML scores for male PE and non-PE teachers were 2.72 and -2.58, respectively, whereas the ML scores for female PE and non-PE teachers were 1.53 and -0.12, respectively, indicating that male PE teachers had more favourable attitudes towards normal weight students, and non-PE teachers had more favourable attitudes towards OB/OW students. The ML scores for female PE and non-PE teachers were 1.53 and -0.12, respectively, indicating that female PE teachers had more favourable attitudes towards normal weight students, and non-PE teachers were neutral towards students from all weight status categories.

Age was a significant covariate with  $F(2, 191) = 3.58$ ,  $P = 0.03$ , partial  $\eta^2 = 0.036$ . Further analysis revealed that age only significantly predicted the GB score,  $F(1, 192) = 6.46$ ,  $P = 0.012$ , partial  $\eta^2 = 0.033$ . Age was negatively correlated with the GB score, indicating that younger teachers showed more biases against overweight students on the GB score after controlling for other variables.

BMI was not a significant covariate with  $F(2, 191) = 0.07$ ,  $P = 0.93$ , partial  $\eta^2 = 0.001$ , indicating that BMI was not related to the implicit bias scores.

## 5 Discussion

Results from this study reveal that teachers (PE & non-PE) may hold negative implicit biases against overweight students. This finding is consistent with previous studies that have measured implicit anti-fat bias using the IAT (O'Brien et al., 2007; Schwartz, Chambliss, Brownell, Blair & Billington, 2003; Teachman & Brownell, 2001; Wang, Brownell & Wadden, 2004). Of the two categories (GB and ML) tested in the current study, results indicate that while weight discrimination was found in the 'good-bad' category, no bias was evident in the 'motivated-lazy' category. This suggests that the Hong Kong Chinese teachers did not hold specific stereotypical beliefs (as measured by the 'motivated-lazy') in the same way as those in other studies (Schwartz et al., 2003 & 2006; Teachman & Brownell, 2001; Wang et al., 2004). However, the implicit anti-fat attitudes (as measured by the 'good-bad') towards students of teachers in this study are comparable to the rest of the literature. This difference might imply a more general, or vague, attitude of Chinese teachers towards overweight students when compared to Western teachers. Further investigation is warranted, due to the fact that the 'good-bad' category is a more general descriptor, as compared to "motivated-lazy", which is specifically related to the domain of effort.

The current study found that PE teachers were more biased against overweight students than non-PE teachers as determined by higher 'motivated-lazy' scores. In the Peterson et al. (2012) study, PE teachers demonstrated significantly more weight discrimination and negative expectations and attitudes toward their overweight students, than their counterparts. In studies by Chambliss et al. (2004) and Peters and Jones (2010), exercise science students from USA, New Zealand and UK universities possessed strong weight discrimination against overweight individuals, in the GB and

ML categories. O'Brien and colleagues (2007) compared the implicit weight discrimination between university level PE major students and psychology major students in three categories: 'good-bad', 'motivated-lazy', 'smart-stupid'. PE students displayed more weight discrimination compared to their counterparts in psychology. Furthermore, senior PE students demonstrated stronger weight discrimination against overweight individuals compared to freshman PE students. O'Brien and colleagues (2007) concluded that this may be due to an over-investment in or over-emphasis on physical attributes by the PE major students. This speculation might also be applicable to the Hong Kong Chinese teachers, as the ML scores symbolize contribution of effort in traditional sport participation, and overweight students have always been judged by PE students and teachers as being lazy and lacking motivation (Lemm et al., 2008; Miyairi & Reel 2011). Existing studies summarized above have singled out an important issue related to training PE teachers. To date, universities may not effectively prepare future PE teachers to deal with overweight children and the issues surrounding weight discrimination. This weight discrimination phenomenon may result in the reinforcement of weight discrimination in schools, and consequently, future PE teachers may significantly contribute to the weight discrimination problem with which students suffer. Based upon these findings, pedagogical and obesity awareness programs should be emphasized and added to PE teacher training curriculums. Then, teacher training programs can help alleviate and prevent the exacerbation of this weight discrimination concern.

The current study revealed no significant gender differences in implicit anti-fat attitudes. This supports similar IAT research findings by numerous other researchers (Gumble and Carels, 2012; Hansson & Rasmussen, 2010; Schwartz et al., 2006; Wang et al., 2004). Peters and Jones (2010) found that gender did not moderate the anti-fat perceptions held by students of sport, exercise and physical education courses, all of whom held similar negative perceptions of overweight children compared with their normal weight peers. Gumble and Carels (2012) suggested that the overweight factor might be more salient than gender, which might consequently overshadow any potential gender effect.

Interestingly, the present study does demonstrate an interaction between type of teacher and gender, in which both male and female PE teachers showed significantly more weight discrimination than non-PE teachers (Figure 1).

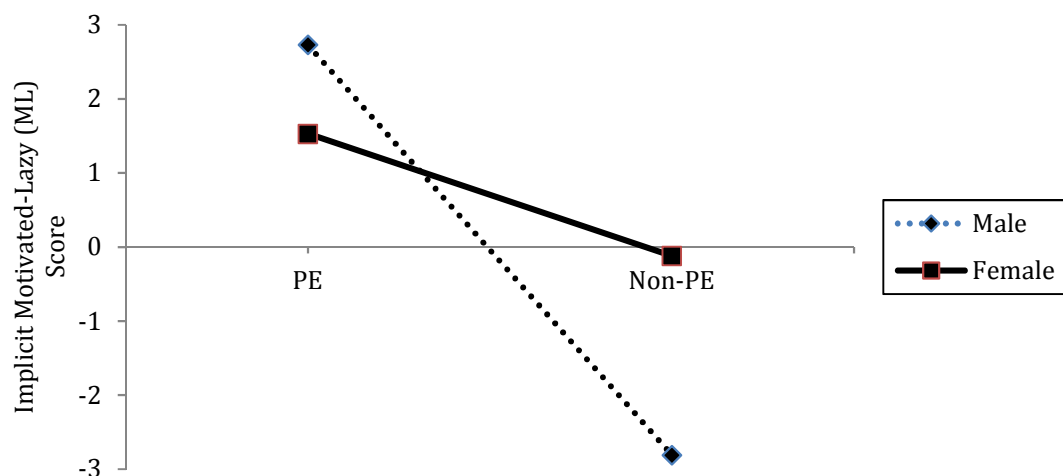


Figure 1. Implicit Motivated-Lazy (ML) score



This significant interaction implies that the impact of gender may be more distinct in the physical education teaching profession. PE teachers may inherit traditional weight discrimination beliefs throughout their teacher training period, and reinforce related physical attributes and physical performance stereotypes of obese or overweight individuals, i.e. lower motivation and lower sport competence (Peterson et al., 2012). As O'Brien et al. (2007) suggested, an over-investment in or over-emphasizing on physical attributes of PE major students may well be the cause of this phenomenon. The current study also found that older teachers held less weight discrimination than younger teachers. More specifically, age was negatively correlated with one category ('good-bad'), suggesting that compared to their older counterparts, younger teachers held stronger weight discrimination against overweight students. Schwartz et al. (2003) suggested that societal pressures, for example, thinness as a social and health ideal in the younger generation, may result in more biased views as a result of socialization. Social stereotypes towards obese people hold that obesity is the fault of the individual, and the group consensus adds weight to these social pressures, which exist regardless of chosen career path or years of study (Chambliss et al., 2004; Guimond, 1997; O'Brien et al., 2007).

In this study, there was no association between BMI and the implicit weight-biased attitudes of teachers, which is in agreement with some previous research (O'Brien et al., 2007; Peters & Jones, 2010). However, other researchers (O'Brien, Hunter, Halberstadt & Anderson, 2007; Schwartz et al., 2003; Teachman & Brownell, 2001) have reported higher levels of weight discrimination in individuals with higher BMI. In contrast, Schwartz and Puhl (Dixon & Andreacci, 2009) found that the magnitude of anti-fat bias was significantly weaker among people with a higher BMI compared to those with a lower BMI. These inconsistent findings suggest that further investigation is required to explore the BMI effect on weight bias among teachers.

## **6 Conclusion**

The present study suggests that a cross-section of teachers, particularly PE teachers, demonstrated significant weight discrimination towards overweight students in Hong Kong Chinese schools. The order of greatest overweight discrimination against overweight students was (1) male PE teachers, (2) female PE teachers, (3) non-PE female teachers and (4) non-PE male teachers. Compared to older teachers, younger teachers had more discrimination on the GB scores. The continuation of research into implicit attitudes and prejudice reduction interventions with teachers is imperative, as this can have an impact on student enjoyment of physical education or other important subject areas.

Miyairi and Reel (2011) suggested the following measures to combat weight discrimination towards overweight students. First, stronger emphasis should be placed on obesity education in the training of PE teachers, in order to target and reduce anti-fat attitudes. Second, educational workshops should be designed to promote acceptance of various body sizes. Third, more focus should be placed on obesity related health issues, rather than allowing ability and beauty to influence positive attitudes. Finally, it may be useful to create situations in schools where teachers develop personal relationships with overweight children.

Although this study has reported several unique findings, it is not without limitations. First, this study was cross-sectional in nature, and these findings are limited to Hong Kong Chinese teachers. Therefore, cultural differences have not been investigated because we examined individuals from the same cultural background (e.g. Hong Kong Chinese). Furthermore, it is important to note that this study did not assess the behaviours of teachers, and therefore, this study does not suggest that discriminatory

behaviours exist towards Hong Kong Chinese children only potentially discriminatory attitudes.

The findings of the present study have alerted existing teachers of the implicit weight bias towards overweight students. The study demonstrated the cultural difference that the weight bias of Chinese teachers was different from their Western counterparts. It established a solid rationale for the weight bias implicit attitudes reduction interventions to nurture future teachers so they may treat overweight children properly in Chinese society. This study also exhibited new cultural specific research findings when contrasted with Western literature. Consequently, the teaching and learning effectiveness and relationships can be enhanced.

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