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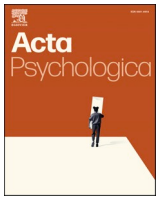

The mediating role of physical activity avoidance in the association between weight stigma and physical activity

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ABSTRACT

Background and aims: Low levels of physical activity (PA) are a global issue that contribute to worse health outcomes in the general population. PA avoidance and weight stigma may play a significant role in lower levels of PA. Therefore, the present study examined the (i) associations between perceived weight stigma, weight-related self-stigma, PA avoidance and PA, and (ii) mediating role of PA avoidance between weight-related self-stigma and PA.

Methods: Using a cross-sectional study design, a total of 1383 university students from Taiwan and Hong Kong (mean age = 25.34 years; 40.20 % men) completed a survey. More specifically, they completed the Perceived Weight Stigma Scale, Weight Bias Internalized Scale, Tendency to Avoid Physical Activity and Sport Scale (TAPAS), and the International Physical Activity Questionnaire. Measurement invariance of the TAPAS was tested to ensure that the combining of data from Hong Kong and Taiwan participants was appropriate for further analysis.

Results: Structural equation modeling showed that weight-related self-stigma was significantly associated with PA avoidance (standardized coefficient [β] = 0.67, $p < 0.01$), and negatively associated with PA ($\beta = -0.14$, $p < 0.01$). In addition, PA avoidance mediated the association between weight-related self-stigma and PA ($\beta = -0.09$, $p < 0.01$).

Conclusions: Higher weight-related self-stigma was associated with lower PA through higher PA avoidance. Strategies such as psychoeducation, or the development of weight-stigma-free exercise settings could be adopted to ameliorate weight-related self-stigma and PA avoidance, resulting in greater rates of physical activity.

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1. Introduction

Regular physical activity (PA) can maintain mental well-being and physical health, as well as improve quality of life (Mahindru et al., 2023; World Health Organization, 2022b). However, insufficient physical activity (PA) is now a global issue (Ding, 2018). The World Health Organization reported that 28 % of adults and 81 % of adolescents were physically inactive in 2022 (World Health Organization, 2022a, 2022b). Individuals with insufficient PA may show higher risks of chronic medical conditions (e.g., hypertension, depression, diabetes, etc.) and/or a higher mortality rates than those who are sufficiently active (World Health Organization, 2022b), causing associated medical costs of approximately $27 billion (US) annually worldwide (World Health Organization, 2022a). Consequently, the World Health Organization has proposed a global project aiming to reach a 10 % reduction in physical inactivity by 2025 and 15 % by 2030 (Ding, 2018). Interventions may target factors attributed to physical inactivity, such as psychosocial factors (e.g., weight stigma) (Pearl et al., 2021).

Weight stigma has been found to be related to greater avoidance of PA and lower levels of PA (Han et al., 2018; Pearl et al., 2021; Puhl & Suh, 2015). PA avoidance refers to an individual's active avoidance from participating in physical activity, exercise or sport (Bevan et al., 2022). Studies have reported that body dissatisfaction and the fear of devaluation by others may deter individuals from engaging in PA in public settings, subsequently developing the tendency to avoid PA (Ajibewa et al., 2024; More et al., 2019; Thiel et al., 2020). The fat stigma mechanism proposed by Brewis (2014) has been used to explain the relationship between weight stigma, PA avoidance, and (consequently) low PA. One of the proposed mechanisms assumes that weight stigma can have a direct impact on individuals' behavior, such as their eating patterns or exercise habits (Brewis, 2014). Individuals who perceive themselves as overweight may feel less motivated to exercise in public settings because of the possibility of being stigmatized by others. In turn, they may avoid physical activity which may consequently increase their risk of weight gain and lead to possible weight stigma (Rubino et al., 2020). The mediating effect of PA avoidance has been reported using this theoretical framework, with reported associations between weight stigma and PA (Han et al., 2018).

Weight stigma is defined as the devaluation or discrimination resulting from one's own weight status (Huang, Latner, Bevan, et al., 2023). It can be further divided into perceived weight stigma, which refers to the weight stigma perceived by individuals from others around them, and weight-related self-stigma, which refers to the weight stigma internalized by individuals themselves (Pearl et al., 2015). Studies have reported that stigmatized individuals may develop PA avoidance, which allowed them to escape from the devaluation by others but consequently reduced their PA engagement (Ajibewa et al., 2024; Thiel et al., 2020). Previous results regarding weight stigma and PA have been mixed (Pearl et al., 2021). Among those studies that compared the effect of both types of weight stigma on PA, most of them supported the negative association between weight-related self-stigma and PA (including PA intensity) (Pearl et al., 2015, 2020, 2021; Puhl et al., 2017). Particularly, a study conducted by Han et al. further found that PA avoidance mediated the associations between different types of weight stigma and low PA levels among participants who received bariatric surgery (Han et al., 2018).

However, considering that weight stigma may affect individuals with varied weight status (Romano et al., 2021), the relationship of how PA avoidance mediates the association between weight stigma and PA has not formally been assessed among individuals across weight spectrums. Recently, a new self-report scale, the Tendency to Avoid Physical Activity and Sport Scale (TAPAS) (Bevan et al., 2022) was developed and validated to assess psychosocial factors of the tendency to avoid PA in several studies (Saffari, Lin, et al., 2023; Yi et al., 2023). This makes the TAPAS an ideal psychometric instrument to study the underlying psychosocial relationships of physical inactivity.

University students are a unique population when it comes to investigating weight stigma. They are generally considered to be energetic and healthy with relatively high PA levels (Belanger et al., 2011). However, despite this perception, studies show that university students have a five times greater risk than the general population of gaining weight (Egli et al., 2011; Kemmler et al., 2016). This may be because of less restrictions (e.g., on food intake) from parents after leaving home and going to university (Frangos et al., 2011; Huang, Latner, O'Brien, et al., 2023). In addition, research findings have shown that university students undergo a considerable decline in PA levels pre- and post-enrolment (Alkhateeb et al., 2019). With these two significant impacts, university students were more likely to experience changing body shapes, which increased the risk of weight stigma. Moreover, university students may be more vulnerable to mental health issues because they are in the transition from "students" to "workforce" (Geirdal et al., 2019). As a consequence, university students are an ideal group to examine the relationship between weight stigma and PA.

In recent times, the prevalence of individuals who are overweight in Asian countries has gradually increased to similar levels as western countries (Chue et al., 2022). However, the perception of 'being overweight' is conflicted between traditional Asian beliefs of being 'plump' (due to wealth) and the contemporary aesthetic of 'thin beauty' in Western societies (Cheng et al., 2018; Lin et al., 2019). The traditional Asian culture in Hong Kong and Taiwan has been gradually Westernized during the colonization by England and Japan. Consequently, the concept of 'thin beauty' has come to the fore and Asian people have become more vulnerable to weight stigma (Cheng et al., 2018) and its potential negative consequences (e.g., less PA). Therefore, the present study proposed a model which examined the associations between perceived weight stigma and weight-related self-stigma, with PA, as well as examining the mediating effect of PA avoidance in these associations among university students from Hong Kong and Taiwan. It was hypothesized that (i) PA avoidance would mediate the association between weight-related self-stigma and PA (H_1); and (ii) PA avoidance would mediate the association between perceived weight stigma and PA (H_2).

2. Methods

2.1. Participants and procedure

The study employed a cross-sectional design and data were collected using convenience and snowball sampling via an online survey. Participants were eligible to take part if they were (i) aged between 20 and 40 years, and studied (ii) as a full-time student (iii) at universities in the targeted regions (i.e., Hong Kong and Taiwan). The Hong Kong students received the online survey (hosted on *Qualtrics*) between June and August 2022. The distribution methods included dissemination on electronic bulletin boards and mass emailing in various Hong Kong-based universities. A total of 787 Hong Kong participants were recruited. The Taiwanese students received the online survey (hosted on *SurveyMonkey*) between September and December 2022. The data were collected with the assistance of faculties from four universities in Taiwan by publicizing and distributing the link via *LINE* groups or through classroom dissemination. A total of 606 Taiwan participants were recruited. The study was conducted in accordance with the Declaration of Helsinki. By clicking "*yes*", participants provided their informed consent prior to completing the survey. By clicking "*no*", the survey ended directly. The study protocol was approved by the Survey and Behavioural Research Committee of Chinese University of Hong Kong (Reference No. SBRE-22-0186), the Human Research Ethics Committee of National Cheng Kung University (Approval No.: NCKU HREC-E-110-486-2), and the Institute of Review Board of National Cheng Kung University Hospital (Approval No.: A-ER-111-445). All participants gave their informed consent before participation. Each participant received a financial incentive of approximately $3.3 US after completing all the survey questions.

2.2. Measures

Demographic variables including age, height, weight and sex were collected. Body mass index (BMI) was calculated using the square of height in meters divided by weight. Those with a BMI 23 kg/m^2 or greater were defined as overweight according to Asian norms (Pan & Yeh, 2008; WHO Expert Consultation, 2004).

The Perceived Weight Stigma Scale (PWSS) (Schafer & Ferraro, 2011) was used to assess the level of participants' perceived weight stigmatization. The PWSS and its Chinese version have demonstrated adequate psychometric properties in previous studies (Ahorsu et al., 2020; Lin et al., 2020). The PWSS has 10 items (Cronbach's alpha [α] = 0.83) with a dichotomous rating (0 = no; 1 = yes) to generate a total score between 0 and 10. A higher score indicates a higher level of perceived weight stigma. A sample item of the scale is "*People act as if you are inferior*".

The Weight Bias Internalization Scale (WBIS) (Durso & Latner, 2008) was used to assess participants' level of weight stigmatization (or weight-related self-stigma). While developing the Chinese version WBIS (Pakpour et al., 2019), the term "weight" was used to replace "overweight" as suggested by the developer, therefore, the sample item in Chinese version WBIS is "*I hate myself because of my weight*". The WBIS and its Chinese version (Durso & Latner, 2008; Lin et al., 2019; Pakpour et al., 2019) have demonstrated good psychometric properties in previous studies. It has 11 items (α = 0.87) rated on five-point Likert-like scale (1 = strongly disagree; 5 = agree) to generate a sum score ranging between 11 and 55. A higher score indicates a higher level of weight-related self-stigma.

The Tendency to Avoid Physical Activity Scale (TAPAS) (Bevan et al., 2022) was used to assess the extent of participants' tendency to avoid PA. The TAPAS and its Chinese version (Bevan et al., 2022; Saffari, Chen, et al., 2023) have demonstrated good psychometric properties in previous studies. In addition, Rasch analysis supported the unidimensional structure of TAPAS with no ceiling/floor effect and differential item functioning (DIF) found among TAPAS items (Fan et al., 2023). It has 10 items (α = 0.94) rated on five-point Likert-like scale (1 = strongly disagree; 5 = strongly agree) to generate a total score ranging between 10 and 50. A higher score indicates a higher level of PA avoidance tendency. A sample item is "*I am afraid other people may notice my physical flaws when I participant in sport*". Considering that the participants were from two different regions with diverse subcultures (Tsai et al., 2019), measurement invariance of TAPAS across subgroups of region (Hong Kong and Taiwan), sex (females and males) and weight status (overweight and non-overweight) was examined. Relevant details are provided in the Supplementary materials (S1 and Table S1).

The International Physical Activity Questionnaire-Short Form (IPAQ-SF) (Liou et al., 2008) was used to assess participants' amount of PA participation in the most recent past week. The Chinese version of IPAQ-SF has demonstrated good psychometric properties in previous studies (Saffari et al., 2022). The IPAQ-SF has seven items assessing the duration of tasks with different physical activity level (i.e., vigorous, moderate, walking, and sitting). A sample item is "*During the last 7 days, how much time did you spend sitting on a week day*". The total metabolic equivalent – minutes (MET-minutes) was calculated using the duration of each task multiplied by the METs of each task (8 METs for vigorous activities, 4 METs for moderate activities, 3.3 METs for walking, and 1 MET for sitting), to represent the individuals' weekly physical activity level.

2.3. Statistical analysis

Participants' characteristics were summarized using descriptive analysis. Pearson's correlation was used to compute the correlation coefficient between the studied variables. The proposed model examining the mediating role of TAPAS in the association between weight stigma and PA was tested using structural equational modeling (SEM). That is, the direct associations between two forms of weight stigma and PA, and the indirect associations via TAPAS, were examined. Age, sex and BMI were controlled as covariates. Given the well-established relationship between perceived weight stigma and weight-related self-stigma, as reported in previous studies (Bidstrup et al., 2022; Cheng et al., 2018; Huang, Latner, Bevan, et al., 2023; Saffari, Lin, et al., 2023), these two variables were correlated in the present model. SEM with the estimator of ML was set to examine if the collected data fit with the proposed model. The mediation effect was examined using the Sobel test. Fit indices of the comparative fit index (CFI) > 0.9, Tucker-Lewis index (TLI) > 0.9, root mean square error of approximation (RMSEA) < 0.08, and standardized root mean square residual (SRMR) < 0.08 were considered good fit of the model (Bentler, 1990; Hu & Bentler, 1999). Moreover, because the present study used SEM, the sample size was decided using rule-of-thumb for SEM research: that is, over 500 for each subsample (i.e., Hong Kong or Taiwan) (Kyriazos, 2018). All statistical analyses were performed using the *lavaan* package in the R software and the SPSS 22.0 (IBM, Corp., NY: Armonk). The significance level was $p < 0.05$.

3. Results

The characteristics of the participants (N = 1383) are shown in Table 1. The participants comprised 787 Hong Kong students and 606 Taiwan students (59.8 % female; 59.8 % undergraduate students) with a mean age of 25.3 years (SD = 6.25). A total of 483 participants were classed as being overweight (i.e., BMI ≥ 23). Table 2 shows the correlations between the studied variables. Most demographic variables (i.e., age, sex, weight status and BMI) significantly correlated with scores on the psychometric instruments (i.e., PWSS, WBIS, TAPAS and IPAQ-SF) with the absolute correlation coefficients (|r|) ranging between 0.058 and 0.773 ($p < 0.05$), except the associations of age with the TAPAS and IPAQ-SF. In addition, most instruments' scores significantly correlated with each other (|r| = 0.076 to 0.628, $p < 0.01$), except for the associations of the IPAQ-SF score with the WBIS and TAPAS scores. The results of measurement invariance are detailed in the Supplementary materials (S1 and Table S1).

Significant and direct effects were found between weight-related self-stigma and PA avoidance (unstandardized coefficient [B] = 6.752, standardized coefficient [β] = 0.671, SE = 2.479, $p = 0.006$), as well as

Table 1
Participants' characteristics (N = 1393).

	Mean (SD) or n (%)
Age (year)	25.34 (6.25)
Sex	
Males	560 (40.20)
Females	833 (59.80)
Education level	
Undergraduate	833 (59.80)
Postgraduate	560 (40.20)
Region	
Hong Kong	787 (56.50)
Taiwan	606 (43.50)
Height (cm)	166.31 (8.61)
Weight (kg)	62.16 (14.15)
BMI (kg/m^2)	22.36 (4.21)
Overweight (BMI ≥ 23)	
Yes	483 (34.67)
No	910 (65.33)
PWSS score (ranging between 0 and 10)	1.18 (2.04)
WBIS score (ranging between 11 and 55)	28.22 (7.94)
TAPAS score (ranging between 5 and 50)	25.79 (9.34)
IPAQ-SF score (METs*min)	2736.14 (2531.01)

BMI = body mass index; PWSS = Perceived Weight Stigma Scale; WBIS = Weight Bias Internalization Scale; TAPAS = Tendency to Avoid Physical Activity and Sport Scale; IPAQ-SF = International Physical Activity Questionnaire – Short Form; MET = metabolic equivalent of task.

Table 2
Pearson's product-moment correlations between studied variables in the proposed model (N = 1393).

	Age	Gender	Weight status	BMI	PWSS	WBIS	TAPAS	IPAQ-SF
Age	–							
Sex	−0.058*	–						
Weight status	0.285**	−0.212**	–					
BMI	0.303**	−0.200**	0.773**	–				
PWSS	0.101**	0.001	0.147**	0.200**	–			
WBIS	0.118**	0.057*	0.347**	0.335**	0.344**	–		
TAPAS	−0.037	0.116**	0.176**	0.197**	0.298**	0.628**	–	
IPAQ-SF	−0.020	−0.125**	0.075**	0.071**	−0.076**	0.020	−0.001	–

Notes. Weight status indicates overweight or non-overweight; BMI = body mass index; PWSS = Perceived Weight Stigma Scale; WBIS = Weight Bias Internalization Scale; TAPAS = Tendency to Avoid Physical Activity and Sport Scale; IPAQ-SF = International Physical Activity Questionnaire - Short Form.
* $p < 0.05$.
** $p < 0.01$.

between PA avoidance and PA (B = −0.472, β = −0.137, SE = 0.139, p = 0.001). Moreover, perceived weight stigma was significantly associated with weight-related self-stigma (r = 0.429, p = 0.007). Additionally, a significant indirect effect was found between weight-related self-stigma and PA via PA avoidance (B = −3.189, β = −0.092, SE = 1.495, p = 0.033). In other words, PA avoidance significantly mediated the association between weight-related self-stigma and PA, but not the association between perceived weight stigma and PA. The SEM model (Fig. 1) showed a good fit with all of the fit indices supported by the proposed model (CFI = 0.950, TLI = 0.944, RMSEA = 0.046 and SRMR = 0.042), except for the significant χ^2 test ($p < 0.001$). A clear path was found between weight-related self-stigma, PA avoidance, and PA (β = 0.671 and − 0.137, $p < 0.01$). That is, higher weight-related self-stigma was associated with lower PA through higher PA avoidance. The results of path coefficients and SEM are shown in Table 3 and Fig. 1.

Table 3
Path coefficients and indirect effects of tendency to avoid physical activity and sport in the association between weight stigma and physical activity engagement.

Path	Unstand. coeff.	Stand. coeff.	SE	p
Direct effects				
Perceived weight stigma → PA avoidance	0.141	0.043	0.086	0.101
Weight-related self-stigma → PA avoidance	6.752	0.671	2.479	0.006**
Perceived weight stigma → PA	0.001	<0.001	0.377	0.998
Weight-related self-stigma → PA	3.290	0.095	1.931	0.088
PA avoidance → PA	−0.472	−0.137	0.139	0.001**
Indirect effects				
Perceived weight stigma → PA avoidance → PA	−0.067	−0.006	0.045	0.138
Weight-related self-stigma → PA avoidance → PA	−3.189	−0.092	1.495	0.033*
Total effects				
Perceived weight stigma and weight-related self-stigma → PA avoidance → PA	−3.729	−0.234	1.598	0.020*

Notes. Unstand. coeff. = unstandardized coefficient; stand. coeff. = standardized coefficient; SE = standard error; PA = physical activity.
* $p < 0.05$.
** $p < 0.01$.

4. Discussion

The present study examined the associations between perceived weight stigma, weight-related self-stigma, and PA avoidance, as well as examining the mediating effect of PA avoidance in the associations between two forms of weight stigma and PA levels among university students from two Asian jurisdictions (i.e., Hong Kong and Taiwan). The results showed that weight-related self-stigma was associated with PA avoidance, which was associated with PA. In addition, PA avoidance indirectly mediated the association between weight-related self-stigma and PA. That is, higher weight-related self-stigma was associated with lower PA through higher PA avoidance. Therefore, H_1 was supported,

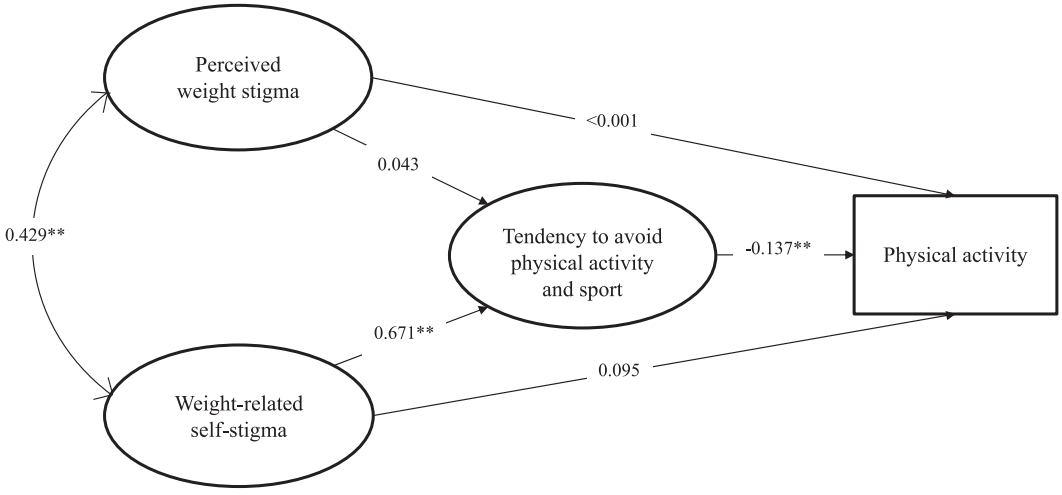

Fig. 1. Standardized coefficients in the proposed model.
CFI = comparative fit index; TLI = Tucker-Lewis index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual. **p < 0.01.

and H_2 was not supported.

The mediation analysis showed that there was a significant positive association between weight-related self-stigma and PA avoidance, suggesting that weight-related self-stigma directly influences PA avoidance. In other word, the present finding showed that individuals who have weight-related self-stigma may avoid engaging in various forms of exercise, especially in public. This is similar to previous studies which also showed positive associations between weight-related self-stigma and PA avoidance (Bevan et al., 2021; Han et al., 2018; Pearl et al., 2015). Moreover, there was a significant negative association between PA avoidance and PA. That is, higher PA avoidance was associated with lower PA, which (unsurprisingly) suggests that individuals who avoid physical activity are less engaged in physical activities.

Indeed, in the present study, PA avoidance was found to mediate the relationship between weight-related self-stigma and PA. Although there was no direct association between weight-related self-stigma and PA, PA avoidance indirectly links weight-related self-stigma and PA. Furthermore, higher weight-related self-stigma was directly associated with higher PA avoidance, which was directly associated with lower PA. These findings align with a previous study conducted among patients who underwent bariatric surgery (Han et al., 2018). However, the previous study also reported additional associations between perceived weight stigma, PA avoidance, and PA level. Moreover, PA avoidance served as a mediator in the relationship between perceived weight stigma and PA level. This may be because individuals with severe obesity are more likely to experience heightened weight stigma compared to those with less severe weight concerns. For example, bariatric surgery itself is often stigmatized because it may be seen as an "easy way" to overcome weight issues (Dimitrov Ulian et al., 2023). Moreover, individuals seeking medical intervention for obesity may face medical stigmatization, further reinforcing feelings of judgment and discrimination (Lewis et al., 2011). Given these factors, those who have undergone bariatric surgery may perceive higher levels of weight stigma than individuals with less severe weight issues, such as the majority of participants in the present study's sample.

In contrast, the present findings suggest that among participants with average BMI, the influence of weight stigma on PA avoidance and PA level may be particularly augmented by weight-related self-stigma rather than perceived weight stigma. This result offers an alternative explanation for the discrepancy between the present findings and those of Han et al. (2018), because perceived weight stigma and weight-related self-stigma were associated in the present model. Given the well-established association between these two constructs, weight-related self-stigma often acts as a mediator in the relationships between perceived weight stigma and various outcomes (Bidstrup et al., 2022; Cheng et al., 2018; Huang, Latner, Bevan, et al., 2023; Saffari et al., 2022). However, the present findings suggested that weight-related self-stigma may play a more dominant role than perceived weight stigma in this context. Accordingly, future studies may consider testing these two constructs and using longitudinal or experimental study designs to delineate the underlying relationships.

The fat stigma mechanism proposed by Brewis (2014) suggests that weight stigma may directly change individuals' behaviors. Such behavioral change reported in previous studies has included healthcare avoidance (Mensinger et al., 2018; Prunty et al., 2023), maladaptive eating (Ahorsu et al., 2020; Himmelstein et al., 2018), and low PA levels (Ajibewa et al., 2024; Han et al., 2018; Pearl et al., 2015; Pearl et al., 2020; Puhl et al., 2017). However, such behavioral changes may be associated with solely perceived weight stigma (including experienced weight stigma) (Ajibewa et al., 2024; Himmelstein et al., 2018; Prunty et al., 2023), solely weight-related self- stigma (Ahorsu et al., 2020; Pearl et al., 2015, 2020; Puhl et al., 2017), or both forms of weight stigma (i.e., perceived weight stigma and weight-related self-stigma) (Han et al., 2018; Mensinger et al., 2018). Considering the aforementioned inconsistent influences of the two forms of weight stigma on behavioral changes, future studies may examine both types of weight stigma when investigating the underlying mechanisms regarding behavioral change associated with weight stigma.

The present study has several limitations. First, the cross-sectional study design cannot determine causality between the studied variables. Second, the use of self-report measures may present bias such as social-desirability bias (e.g., participants may report less stigmatization considering the social norm) or recall bias (e.g., participants may not have an accurate representation of the time spent on different types of PA). Third, the use of IPAQ-SF may jeopardize the correlation between weight stigma and different PA intensity. More specifically, stigmatized individuals may choose activities that are less exposing to weight/physical appearance, such as cycling instead of swimming. However, the collapsing calculation of IPAQ-SF may cause a low correlation between weight stigma and vigorous PA. Fourth, demographics of height and weight were subjectively reported. Considering that being overweight was one of the key demographic variables, objective measures are needed to accurately assess BMI in future studies. Fifth, the influence of pandemic (i.e., coronavirus disease 2019) on PA levels cannot be excluded (Lopez-Valenciano et al., 2020).

Despite these limitations, the present study has several strengths. First, the TAPAS used in the present study is a reliable and valid psychometric instrument for assessing the tendency to avoid PA. Second, the IPAQ-SF used to assess the PA level was far more detailed than simple questions used in previous studies that typically ask 'yes/no' questions in relation to PA participation. Third, examining a university student population across different weight statuses may enhance the generalizability of the present findings. Fourth, unlike most studies conducted in Western countries, the present study focused on an Eastern population, addressing an important gap in the literature. Lastly, the present study incorporated both forms of weight stigma (i.e., perceived weight stigma and weight-related self-stigma), providing a more comprehensive understanding of how weight stigma affects PA participation. Considering the high reported association between perceived weight stigma and weight-related self-stigma (Lin et al., 2019), interventions should comprehensively target both forms of weight stigma. Accordingly, strategies such as psychoeducation, motivational interviewing or support groups (Nutter et al., 2019) can be provided to individuals who feel stigmatized to reduce their weight-related self-stigma. Information or public health communications on the harm of weight stigma can be promoted to the public in an attempt to decrease perceived weight stigma (Nutter et al., 2019). In addition, in response to the present finding, actions should be taken to reduce PA avoidance in order to increase PA. Approaches to facilitate PA enjoyment or create stigma-free conditions in exercise and sports settings (Han et al., 2018) may benefit all individuals by minimizing PA avoidance.

5. Conclusion

The present study examined the associations between perceived weight stigma, weight-related self-stigma, PA avoidance, and PA levels, as well as examining the mediating effect of PA avoidance in the associations between two types of weight stigma and PA levels among university students from Hong Kong and Taiwan. The results showed that higher weight-related self-stigma was associated with lower PA via higher PA avoidance. Strategies such as psychoeducation or weight stigma-free environments could be adopted to reduce weight stigma and PA avoidance, leading to a subsequent reduction in physical inactivity.

CRediT authorship contribution statement

Po-Ching Huang: Writing – original draft, Conceptualization. **Hung-Ching Wu:** Writing – original draft, Visualization, Software, Methodology, Formal analysis, Conceptualization. **Ji-Kang Chen:** Writing – review & editing, Validation, Supervision, Resources, Methodology, Investigation, Funding acquisition, Data curation, Conceptualization. **Xavier C.C. Fung:** Writing – review & editing, Validation,

Conceptualization. **Nadia Bevan:** Writing – review & editing, Validation, Conceptualization. **Daniel Kwasi Ahorsu:** Writing – review & editing, Validation, Conceptualization. **Mark D. Griffiths:** Writing – review & editing, Validation, Conceptualization. **Jung-Sheng Chen:** Writing – review & editing, Validation, Conceptualization. **Kuo-Hsin Lee:** Writing – review & editing, Validation, Supervision, Resources, Investigation, Funding acquisition, Conceptualization. **Amir H. Pakpour:** Writing – review & editing, Validation, Conceptualization. **Chung-Ying Lin:** Writing – review & editing, Writing – original draft, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Data curation, Conceptualization.

Ethics approval

The study protocol was approved by the Survey and Behavioural Research Committee of Chinese University of Hong Kong (Reference No. SBRE-22-0186), the Human Research Ethics Committee of National Cheng Kung University (Approval No.: NCKU HREC-E-110-486-2), and the Institute of Review Board of National Cheng Kung University Hospital (Approval No.: A-ER-111-445). All participants gave their informed consent before participation.

Declaration of Generative AI and AI-assisted technologies in the writing process

The authors did not use any AI tools to assist in this manuscript at any stage.

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Declaration of competing interest

All authors declare no conflict of interests.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.actpsy.2025.105107.

Data availability

The data that support the findings of the present study are available from the corresponding author upon reasonable request.

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