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Running head: Body Appreciation Scale

Factor structure and psychometric properties of the Body Appreciation Scale among adults in
Hong Kong

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Abstract

Previous research has suggested that the factor structure of Body Appreciation Scale (BAS), a widely-used measure of positive body image, may not be cross-culturally equivalent. Here, we used confirmatory factor analysis to evaluate the conceptual equivalence of a Chinese (Cantonese) translation of the BAS among women ($n = 1,319$) and men ($n = 1,084$) in Hong Kong. Results showed that neither the one-dimensional nor proposed two-dimensional factor structures had adequate fit. Instead, a modified two-dimensional structure, which retained 9 of the 13 BAS items in two factors, had the best fit. However, only one these factors, reflective of General Body Appreciation, had adequate internal consistency. This factor also had good patterns of construct validity, as indicated through significant correlations with participant body mass index, self-esteem, and (among women) actual-ideal weight discrepancy. The present results suggest that there may be cultural differences in the concept and experience of body appreciation.

[Abstract word count: 149]

Keywords: body appreciation, positive body image, cultural equivalence, factor structure, Hong Kong

Factor structure and psychometric properties of the Body Appreciation Scale among adults in Hong Kong

Body image scholars are increasingly paying attention to the concept and experience of positive body image, overturning the traditional focus on pathology and distress (Tylka, 2011). Indeed, this emphasis on adaptive or healthy aspects of body image is now viewed as being “essential to the field” (Smolak & Cash, 2011, p. 472), which in turn requires reliable and valid scales that can measure the concept. One of the most widely-used measures of positive body image is the Body Appreciation Scale (BAS; Avalos, Tylka, & Wood-Barcalow, 2005), a 13-item measure that taps into four qualities of positive body image, namely holding positive opinions of the body, acceptance of the body despite its imperfections, respect for the body, and protection of the body through the rejection of unrealistic ideals. Viewed in this way, body appreciation is not simply the experience of body satisfaction, but rather encompasses a protective processing style in relation to one’s corporeal experiences and the adoption of flexible ideals of beauty (Holmqvist & Frisén, 2012; Wood-Barcalow, Tylka, & Augustus-Horvath, 2010).

Part of the reason for the widespread adoption of the BAS is the evidence in support of its validity in a number of cultural groups. Thus, the scale’s one-dimensional factor structure has been supported using exploratory and confirmatory factor analyses with samples from the US (Avalos et al., 2005; Cotter, Kelly, Mitchell, & Mazzeo, in press), Austria (Swami, Stieger, Haubner, & Voracek, 2008), Spain (Jáuregui-Lobera & Bolaños-Ríos, 2011), and Turkey (Swami, Özgen, Gökçen, & Petrides, in press). In addition, Tylka (2013) reported that scores on the scale showed measurement invariance among US women and men, although men had significantly higher body appreciation than did women. A number of studies have also provided evidence for the convergent validity of the BAS, primarily through significant associations with other indices of body image. More specifically, positive

correlations have been reported with body satisfaction, body esteem, and appearance evaluation, while negative associations have been found with body dissatisfaction, social physique anxiety, body shape concerns, body image avoidance, and skin tone dissatisfaction (Avalos et al., 2005; Tiggemann & McCourt, 2013; Swami, Stieger, et al., 2012; Swami, Tran, et al., 2013; Swami, Henry, Peacock, Roberts-Dunn, & Porter, 2013; Swami, Salem, Furnham, & Tovée, 2008).

BAS scores are also positively correlated with scores on measures of psychological well-being, including self-esteem, optimism, life satisfaction, self-compassion, and subjective happiness (Avalos et al., 2005; Dalley & Vidal, 2013; Swami, Airs, Chouhan, Padilla Leon, & Towell, 2009; Swami, Tran, Stieger, Voracek, & The YouBeauty.com Team, in press; Wasylkiw, MacKinnon, & MacLellan, 2012), and negatively associated with measures of psychological distress, including maladaptive perfectionism, thin-ideal internalisation, attachment anxiety, and the Big Five trait of Neuroticism (Avalos et al., 2005; Iannantuono & Tylka, 2012; Swami, 2009; Swami, Stieger, et al., 2012; Swami, Tran, et al., 2013; Tylka & Kroon van Diest, 2013). Supporting patterns of validity for the BAS have also been reported among select populations, including dancers (Langdon & Petracca, 2010; Swami & Harris, 2012; Swami & Tovée, 2009) and fashion models (Swami & Szmigielska, 2013). Finally, BAS scores are also significantly and positively associated with emotional intelligence (Swami, Begum, & Petrides, 2010), sexual functioning and behaviours (Satinsky, Reece, Dennis, Sanders, & Bardzell, 2012; Winter & Satinsky, 2014), and health behaviours (Andrew, Tiggemann, & Clark, in press), and negatively with femininity ideology (Swami & Abbasnejad, 2010).

Although this work points to the BAS as a valid measure of positive body image, one limiting issue concerns its factorial validity among some non-Western groups, where the scale's one-dimensional structure has been disputed. Thus, in a sample of Malaysian women,

Swami and Chamorro-Premuzic (2008) reported that the BAS reduced to two dimensions, with a dominant factor labelled 'General Body Appreciation' (eight items) and a secondary factor labelled 'Body Image Investment' (three items). Two items did not load onto either factor and were subsequently dropped from analyses, a strategy that has been followed in other studies with Malaysian women (Swami, 2010; Swami, Kannan, & Furnham, 2012). A subsequent study among Portuguese-speaking Brazilian women and men also arrived at a 2-factor solution, but in which the two previously non-loading items loaded onto the dominant factor (Swami, Campana, Fereirra, Barrett, Harris, & Tavares, 2011). Exploratory factor analyses of the BAS among South Korean women and men (Swami, Hwang, & Jung, 2012), Indonesian women and men (Swami & Jaafar, 2012), and Polish women (Taylor, Szpakowska, & Swami, 2013) have supported the latter 2-factor solution. Among Zimbabwean women, on the other hand, support was found for the 10-item General Body Appreciation factor, while the Body Image Investment factor failed to converge (Swami, Mada, & Tovée, 2012).

Broadly speaking, these studies suggest that three items on the BAS may be distinguishable from the construct of body appreciation among some non-Western populations. Swami and Jaafar (2012) have concluded that this is unlikely to have been caused by linguistic idiosyncrasies in the non-Western populations that have been sampled to date (e.g., the way in which ego-centred terms are interpreted in some languages). Nor does it seem likely that the bi-dimensionality is caused by ignorable method effects, given that both positively and negatively worded items appear in the Body Image Investment factor. Rather, it appears that the constructs that contribute to body appreciation vary across cultures (Swami & Chamorro-Premuzic, 2008). That is, those constructs associated with the General Body Appreciation factor – primarily body acceptance and respect – seem to be common to the concept of body appreciation across cultures; on the other hand, items related to adaptive

investment in the body do not appear to be cross-culturally stable. This perspective is supported by the relative independence of the factors among non-Western samples, with studies reporting small-to-moderate inter-factor correlations where the secondary factor had adequate internal consistency (Swami & Jaafar, 2012; Taylor et al., 2012).

The issue of the dimensionality of the BAS has important implications for researchers studying body appreciation generally and for cross-cultural research on body appreciation specifically. At the most basic level, it is important that scholars examine the factorial structure of the BAS when using translated versions of the scale. Notably, Romanian (Dumitrescu, Zetu, Teslaru, Dogaru, & Dogaru, 2008), Russian (Durneva & Meshkova, 2013), Iranian (Pakpour, Zeidi, Ziaeiha, & Burri, 2014), and Thai (Pisitsungkagarn, Taephant, & Attasaranya, in press) translations of the BAS have been prepared and, in each of these cases, the developers have treated derived scores as one-dimensional. The preceding review problematises such an analytic strategy, as it cannot be assumed that body appreciation will share the same conceptual structure across different cultures. A more substantive implication concerns the practical use of BAS scores: insofar as the BAS assesses two related though distinct concepts related to body appreciation among some populations, this limits opportunities for cross-cultural comparisons of BAS scores and points to possible cross-cultural differences in the antecedents and/or outcomes of body appreciation.

The Present Study

As a contribution to ongoing discussions, we used confirmatory factor analysis (CFA) to evaluate the conceptual equivalence of the BAS in a large sample of adults in Hong Kong. This approach allows us to apply previously-defined models to observed data in order to examine the similarity across cultures of the pattern linking items to dimensions, of the loading of items to dimensions, and of the relationships between measured concepts (Meredith & Teresi, 2006). More specifically, we examined the fit of the one-dimensional

structure proposed in the parent study (Avalos et al., 2005), the two-dimensional alternative model with all items included (Swami, Campana, et al., 2011; Swami, Hwang, et al., 2012; Swami & Jaafar, 2012; Taylor et al., 2013), and the two-dimensional model with two items deleted (Swami & Chamorro-Premuzic, 2008). To the extent that the one-dimensional structure of the BAS is not supported in the present study, it would be inadvisable to assume that the instrument is cross-culturally equivalent (Swami & Chamorro-Premuzic, 2008); in this scenario, statistical comparisons of body appreciation from different cultural groups may not be warranted, which in turn would require alternative methods and further analyses to identify the core domains of body appreciation that are relevant across cultures.

As a recently developed non-Western setting with a standard of living and infrastructure similar to Western Europe or North America, Hong Kong is a useful site in which to examine issues related to body appreciation for a number of reasons. First, sedentary activities (Bauman et al., 2011; Xie, Stewart, Lam, Viswanath, & Chan, 2014) coupled with declining physical fitness levels (for a review, see Fu, Guo, & Zang, 2012) and the increased availability of processed foods (Asia Pacific Cohort Studies Collaboration, 2004) have contributed to the high prevalence of obesity in Hong Kong, rates that now converge towards that of Western countries (Griffiths, 2010; So et al., 2008). This, in turn, has contributed to the increased prevalence of negative body image among Hong Kong adults (Cheung et al., 2011), adolescents (Lai, Mak, Pang, Fong, Ho, & Guldán, 2013), and children (Knowles, Ling, Thomas, Adab, & McManus, in press; Li et al., 2007), with studies suggesting rates that are comparable to, if not higher than, those in the West (Hui & Brown, 2013). This is notable because negative body image is known to be a risk factor for depressive symptoms and psychological distress among respondents in Hong Kong (Fung, Stewart, Ho, Wong, & Lam, 2010).

However, there are also differences with the West: the fact that economic development from pre- to post-industrial living conditions in Hong Kong was achieved over a relatively short period of time may have resulted in different attitudes toward, and outcomes of, adiposity compared to the West (Wang, Leung, & Schooling, in press). For example, some scholars have postulated that body weight may be less important to negative body image and symptoms of disordered eating among Chinese populations (Mellor et al., 2013), where conversely perceived social pressure may be heightened as compared to the West (e.g., Jackson & Chen, 2007). In addition, despite significant improvements in the status of women (Lee & Collins, 2008), familial, educational, and societal structures continue to promulgate restrictive prescriptions about the role of women and their individuality (Fung & Ma, 2000; Women's Commission, 2003). These issues mean that it is increasingly important to understand the nature of body image in this population. The availability of the BAS for use in Hong Kong would represent a significant advance, given that previous studies on body image with this population have largely, though not exclusively (Mak, Pang, Lai, & Ho, 2013), focused on negative body image (e.g., Swami, Frederick, et al., 2010). Moreover, given that Hong Kong is the most Westernised and urbanised city of China, it is possible that body image issues prevalent in this context can forewarn what is likely to occur in many parts of China as the country undergoes rapid socioeconomic development.

In summary, the present study examined the factor structure of a Chinese (Cantonese) translation of the BAS among adults in Hong Kong, comparing the fit of models selected from the extant literature. We expected to find a two-dimensional factor structure for the BAS in this sample, as has been reported among other non-Western populations, including geographically proximate sites (Swami, Campana, et al., 2011; Swami, Hwang, et al., 2012; Swami & Jaafar, 2012). In addition to an investigation of factorial validity, we conducted a preliminary examination of the construct validity of the newly-translated scale by examining

associations between derived body appreciation scores, body mass index (BMI), actual-ideal weight discrepancy among women, and self-esteem. Significant correlations between these variables and body appreciation, as expected to find, would provide evidence of construct validity. Finally, we examined sex differences on body appreciation, with the expectation that men would have significantly higher scores than women. This latter prediction is consistent with previous findings among Hong Kong samples, such as reports that men have significantly higher body esteem than women (Mak et al., 2013), and is a reflection of a culture in which women experience greater social pressure than men to conform to ideals of appearance (Chen & Jackson, 2012; Knowles et al., in press).

Method

Participants

The participants of this study were 1,319 female and 1,084 male students at two universities Hong Kong. Participants ranged in age from 17 to 66 years ($M = 23.52$, $SD = 10.26$). We checked whether participants reported implausible BMIs, operationalised as $< 7\text{kg/m}^2$ or $> 60\text{kg/m}^2$ (Young, Gunzenhauser, Malone, & McTiernan, 2001), but all respondent BMIs (based on self-reported height and weight) ranged between 12.96 and 53.72 kg/m^2 ($M = 20.75$, $SD = 3.07$). The majority of participants self-reported as being atheists (62.8%) and single (85.5%).

Materials

Body appreciation. Participants completed the Body Appreciation Scale (Avalos et al., 2005), a 13-item measure of several related components of positive body image (see Appendix). All items were rated on a 5-point scale (1 = *Never*, 5 = *Always*). One item on the scale is sex-specific and required presentation of different items to women and men. The factor structure and internal consistency of the BAS is reported below.

Actual-ideal weight discrepancy. Women were asked to complete the Photographic Figure Rating Scale (PFRS; Swami et al., 2008b); no male version of this scale currently exists and so men were asked to skip this section. The PFRS is a figural rating scale that depicts 10 front-view, photographic images of women ranging in body size from emaciated to obese. All images were presented in greyscale, with faces obscured, and in standard clothing to minimise culture-related target effects. Participants were asked to rate the figure that most closely matched their own body and the figure that they would most like to possess. Ratings were made on a 10-point scale (1 = *Figure with the smallest body size*, 10 = *Figure with the largest body size*). A measure of actual-ideal weight discrepancy was computed as the difference between unsigned (absolute) current and ideal ratings, so that scores could only take positive values¹. Previous studies have shown that scores derived from the PFRS have good test-retest reliability up to 5 weeks and good patterns of validity, including a negative association with body appreciation (Swami, Salem, et al., 2008; Swami, Stieger, et al., 2012; Swami, Tran, et al., 2013; Swami, Taylor, & Carvalho, 2011).

Self-esteem. Participants completed Rosenberg's Self-Esteem Scale (RSES; Rosenberg, 1965; Chinese translation: Kwan, Bond, & Singelis, 1997), a widely-used 10-item measure of an individual's overall sense of worthiness as a person. All items were rated on a 4-point scale (1 = *Strongly disagree*, 4 = *Strongly agree*). Although there is some debate as to the factor structure of the RSES across cultures (Supple, Su, Plunkett, Peterson, & Bush, 2013), best practice recommends the removal of one troublesome item. Without the offending item, the one-dimensional factor structure of the RSES has received support in cross-cultural studies (Schmitt & Allik, 2005), including among Chinese samples (Tian, 2006). The Chinese version of the RSES has been shown to have adequate internal consistency and good psychometric properties (Tian, 2006). In the present study, Cronbach's α for this scale was .80.

Body mass index. Using participants' self-reported height and weight, we computed BMI as kg/m^2 . Previous work with Chinese samples has reported strong correlations between self-reported and measured BMI, with greater accuracy among urban populations (e.g., Zhou, Dibley, Cheng, Ouyang, & Yan, 2010).

Demographics. Participants provided their demographic data consisting of sex, age, religion, and marital status.

Procedure

Ethics approval for this study was obtained from the relevant university ethics committee. With the exception of the RSES, the questionnaire instruments were translated into Cantonese using the standard back-translation technique (Breslin, 1970). Specifically, the first author initially translated the instruments into Cantonese from their English originals; these were then translated back into English by an independent translator unaffiliated with the study. Small differences that emerged during the translation process were resolved between translators, resulting in the final versions of the scales used in the present research. Study participants were invited to take part in a study on health and well-being in classroom settings between September 2013 and April 2014. Participation was entirely voluntary and participants were not remunerated. All participants who agreed to take part were provided with a questionnaire packet consisting of an information sheet describing the research, an informed consent form, and the measures above presented in a randomised order for each participant. The questionnaires were administered by research assistants and all participants completed the questionnaires individually. In addition, the questionnaire was anonymous and individuals were not identifiable from data returned. The questionnaire took approximately 15-20 minutes to complete and participants were verbally debriefed once all questionnaires had been returned.

Statistical Analyses

Missing data (< 2% of the total dataset) were replaced using the mean replacement method. CFAs were conducted using the Analysis of Moment Structures Program (AMOS v.21; Arbuckle, 2012) to examine the factorial structure of the BAS. CFA is the preferred method (e.g., as opposed to exploratory factor analysis) when there is a sufficient body of theory, empirical research, or both, that postulates a relationship pattern *a priori* (Schumacker & Lomax, 1996). A single-factor model where all items loaded onto a single latent variable was assessed to examine the factorial validity of the model proposed by Avalos et al. (2005; see Figure 1). Further, a two-dimensional, 13-item model consisting of General Body Appreciation and Body Image Investment factors was assessed, as this model has been proposed in a number of non-Western contexts (Swami, Campana, et al., 2011; Swami, Hwang, et al., 2012; Swami & Jaafar, 2012; Taylor et al., 2013; see Figure 2). We also examined an alternative two-dimensional model in which two items were deleted from the General Body Appreciation factor, as proposed by Swami and Chamorro-Premuzic (2008; see Figure 2).

Standard goodness-of-fit indices were selected *a priori* to assess the measurement models (e.g., Brown & Cudeck, 1993; Hu & Bentler, 1999). The Steiger-Lind root mean square error of approximation (RMSEA) and its 90% confidence interval provide a correction for model complexity (values less than .08 reflect reasonably good-fitting models). The standardised root mean square residual (SRMR) assesses the mean absolute correlation residual. The smaller the SRMR, the better the model fit (< .08 indicates adequate fit). The comparative fit index (CFI) measures the proportionate improvement in fit by comparing a target model with a more restricted, nested baseline model. Generally, the CFI is recommended to be > .90 for adequate fit. Even so, these recommended cut-off values should be considered subjective guidelines (Heene, Hilbert, Draxler, Zeigler, & Bühner, 2011; Marsh et al., 2011). When comparing models, the Akaike information criterion (AIC)

provides a better measure to compare factor structures, with the lowest AIC value being preferred (Hair, Anderson, Tatham, & Black, 1998). Consequently, we emphasise this statistic when comparing the one- and two-dimensional models. We also examined standardised parameter estimates. Factor loadings for CFA were interpreted using Comrey and Lee's (1992) recommendations (i.e., $> .71$ = excellent, $> .63$ = very good, $> .55$ = good, $> .45$ = fair, and $> .32$ = poor). As a measure of internal consistency, we computed Cronbach's α , with values of .70 and greater considered acceptable (Kline, 1999). To test for configural and structural invariance of selected models across sex, we performed multiple-group analysis with the best-fitting model (Millsap & Meredith, 2007). Sex differences were investigated using an independent samples *t*-test and indices of validity were established by assessing bivariate correlations between derived factors and measures of BMI, actual-ideal weight discrepancy (women only), and self-esteem.

Results

First, we examined the factorial validity of the one-dimensional model proposed by Avalos et al. (2005). This model did not fit these data well: $\chi^2(63, N = 2393) = 1661.92$, CFI = .88, GFI = .90, RMSEA = .10 (low = .10, high = .11), SRMR = .08, AIC = 1717.92. In addition to this poor fit, and in parallel with a previous investigation (Swami & Chamorro-Premuzic, 2008), several items (#1, 7, 8, 9, 12; see Figure 1 and Appendix for item content) had poor loadings. Next, we tested a two-dimensional model in which all items of the BAS were retained. This model also did not fit the data well: $\chi^2(62, N = 2393) = 1171.39$, CFI = .92, GFI = .93, RMSEA = .09 (low = .08, high = .09), SRMR = .07, AIC = 1229.39 (see Figure 2). Third, after Swami and Chamorro-Premuzic (2008), we examined a two-dimensional model of the following the deletion of items #7 and 11. This factorial structure had improved fit: $\chi^2(41, N = 2393) = 753.50$, CFI = .94, GFI = .94, RMSEA = .08 (low = .08,

high = .09), SRMR = .06, AIC = 803.50. As can be seen in Figure 3, however, two items (#1 and 12) had poor fit in this model, requiring us to reject our initial hypothesis.

Considering the poor fit of the two items, we examined the fit of an alternative 2-factor model without these items (see Figure 4). This model had the best fit of the models under examination: $\chi^2(25, N = 2393) = 360.09$, CFI = .97, GFI = .97, RMSEA = .07 (low = .07, high = .08), SRMR = .04, AIC = 400.09. These results indicate that a two-dimensional model, following the removal of four items (#1, 7, 11, and 12; see Appendix for item content), had superior fit to a one-dimensional model. To test for invariance of the models across sex, we performed multiple-group analysis with the best-fitting model. As the unconstrained model fits each sample individually (see Table 1), we compared the invariance of factor loadings, invariance of intercepts, and invariance of error terms between sexes. Differences were not significant at each level of invariance, indicating that the structure of the model was invariant across sex.

Composite factor scores were computed by taking the mean of items associated with General Body Appreciation and Body Image Investment, respectively. The two factors were significantly and moderately correlated among women, $r = .43, p < .001$, and weakly among men, $r = .25, p < .001$. Internal consistency coefficients were very good for the General Body Appreciation factor (women $\alpha = .92$, men $\alpha = .90$), but fell below the acceptable cut-off for the Body Image Investment factor (women $\alpha = .64$, men $\alpha = .61$). Given the low coefficients for the latter, as well as the fact that two items are very unlikely to constitute a stable factor (Comrey & Lee, 1992), this factor was omitted from all further analyses.

On average, men ($M = 3.32, SD = 0.91$) had higher General Body Appreciation scores compared with women ($M = 3.20, SD = 0.67$). An independent samples t -test showed that the difference between women and men was statistically significant, $t(2391) = 3.53, p < .001$. However, based on Cohen's (1988) criteria, the magnitude of the difference in the means

(mean difference = 0.11, 95% *CI*: 0.05 to 0.18) was small ($d = 0.14$). Among women, General Body Appreciation was significantly and negatively correlated with BMI, $r = -.32$, $p < .001$, and weight discrepancy, $r = -.41$, $p < .001$, and positively correlated with self-esteem, $r = .40$, $p < .001$. Among men, General Body Appreciation was significantly and positively correlated with self-esteem, $r = .36$, $p < .001$, but was not significantly correlated with BMI, $r = -.02$, $p = .468$. Among men, however, there may be a curvilinear relationship between body satisfaction and BMI (e.g., Frederick, Peplau, & Lever, 2006), which can be estimated using the term BMI². Indeed, we found a significant, albeit weak, correlation between General Body Appreciation and BMI² in our male sample, $r = -.12$, $p < .001$.

Discussion

The present study sought to examine the factorial validity of a Chinese version of the BAS among a sample in Hong Kong. Our results showed that, in our sample, the BAS consists of two factors, only one of which appears to tap the construct of body appreciation as delineated in the parent study (Avalos et al., 2005). Our results are notable because, in broad outline, they are consistent with similar findings among other non-Western samples (Swami & Chamorro-Premuzic, 2008; Swami, Campana, et al., 2011; Swami, Hwang, et al., 2012; Swami, Mada, et al., 2012; Swami & Jaafar, 2012; Taylor et al., 2013). Importantly, however, the best-fitting model in our study was discrepant from those proposed in previous research. Specifically, our final model retained only 9 of the 13 items of the BAS and, consistent with some previous studies (e.g., Swami, Mada, et al., 2012), the secondary factor fell below an adequate internal consistency cut-off.

The present findings contribute to ongoing discussions about the concept and experience of body appreciation across cultures. Specifically, our results suggest that the concept of body appreciation does not share the same conceptual and factorial structure across different cultures. In the view of Swami and Jaafar (2012), bodily acceptance and

respect may be aspects of body appreciation that are similar across cultures, whereas those related to autonomy over, and investment in, the body may not. Although our results do not contest that broad conclusion, it does appear that the concept of body appreciation among our Hong Kong sample is further constricted, as reflected in the poor loadings of four items. It is possible that this result is the outcome of culture-specific factors, such as the combination of post-industrial living conditions and traditional familial structures, the complex mix of traditional and individualistic values, and the cultural flux of attitudes toward embodiment and the body (Lee, 1999). Such culture-specific experiences may lead to divergences in embodiment and the way in which individuals relate to their bodies, which in turn result in the differences in the concept of body appreciation.

Another possibility is that some items of the BAS show differential item functioning; that is, there may be differences in the expected response for an item from individuals who belong to different cultural groups. To take one example from our results – where item 1 (“I respect my body”) had poor loadings in all tested models – it is possible that ‘respect’ carries unexpectedly different connotations among Chinese-speaking samples, particularly in relation to the body, or that it has a different relationship to body appreciation in this specific sample. These are issues that are difficult to unpick without additional data; specifically, qualitative research may prove useful in understanding the reasons behind the lack of equivalence of the BAS across cultures. In addition, while the extant research points to possible core domains of body appreciation that are consistent across cultures, a combination of qualitative and further quantitative research is necessary to establish the extent to which those domains are stable and valid.

Bearing in mind the above issues, our results suggest that a truncated measure of General Body Appreciation has adequate psychometric properties in our sample. The 7-item General Body Appreciation factor had good internal consistency coefficients and showed

good patterns of construct validity, insofar as it was significantly correlated with self-esteem, BMI, and weight discrepancy among women, and self-esteem and BMI² among men. In addition, the best-fitting model in the present work was invariant across women and men, which suggests that the core domains of body appreciation are equivalent across sexes in Hong Kong. Moreover, consistent with our hypothesis, we found that men in Hong Kong had significantly higher General Body Appreciation than women. Although the effect size of this difference was small, it is consistent with previous reports (e.g., Swami & Jaafar, 2012). In short, the measure of General Body Appreciation that we uncovered in the present study has good psychometric properties and is acceptable for use in Hong Kong.

A strength of the present work is the large sample size; in fact, we believe the present sample is the largest that has been recruited to examine the factor structure of the BAS to date. Conversely, however, the reliance on a student sample limits the generalisability of our findings. In a similar vein, our translation of the BAS into Cantonese may limit its use to Hong Kong, where it is the *de facto* official language, and other Cantonese-speaking populations. Indeed, it has been suggested that the major dialects of Chinese, of which Cantonese is one, are mutually unintelligible, which in turn requires inter-dialect translation (e.g., Zhang, 1998). As such, examination of the factor structure of the BAS in other Chinese dialects would be a useful direction for future research. Doing so may help to determine the extent to which the factor structure we have uncovered here is due to conceptual differences in body appreciation and/or differential item functioning as a result of semantic issues.

Another limitation of the present work is the fact that we have only conducted a preliminary examination of the construct validity of the BAS in Hong Kong. Further research could extend our work by examining associations between General Body Appreciation and other indices of body image. As we noted above, qualitative research on positive body image, as has been conducted with Western samples (e.g., Holmqvist & Frisén, 2012; Wood-Barcalow

et al., 2010), would also be a useful direction for future research. Doing so would not only help to determine core constructs of body appreciation that are cross-culturally stable, but may also uncover facets of positive body image that are unique to particular cultural samples.

In addition, in the time it took to conduct this research, a new version of the BAS was developed and validated (BAS-2; Tylka & Wood-Barcalow, 2015). The BAS-2 includes five new items and retains five of the original measure's items, only three of which (#2, 5, 6; see Appendix for items) adequately loaded on to the General Body Appreciation factor in the present work. Moreover, the two items that made up the Body Image Investment factor here have not been retained in the BAS-2. Taken together, these developments raise important questions for the measurement of body appreciation: although the BAS-2 overcomes some limitations associated with the original measure (eliminating the need for sex-specific versions, the rewriting or replacement of items with low factor loadings, and a better reflection of the positive body image construct), an important next step will be to examine its factorial validity in different cultural contexts. Should the BAS-2's one-dimensional factor structure be replicated among samples from different cultural backgrounds, it will help to stimulate cross-cultural comparisons that are not fully possible with the BAS.

In conclusion, the present study arrived at a two-dimensional factor structure of the BAS in a sample of adults in Hong Kong. We recommend that scholars wishing to measure body appreciation among Cantonese-speaking samples use the truncated 7-item General Body Appreciation factor, while being cognisant that this may offer a limited index of positive body image. We also caution against assuming that the BAS is one-dimensional, as a number of scholars appear to have done (Dumitrescu et al., 2008; Durneva & Meshkova, 2013; Pakpour et al., 2014; Pisitsungkagarn et al., in press), and urge more careful consideration of the scale's factorial validity prior to its inclusion in statistical analyses. In short, the factor structure of the BAS does not appear to be cross-culturally equivalent and

further research is needed to understand what constitutes body appreciation in culturally distinct groups.

Footnotes

¹ Examination of the signed scores indicated that 15.9% of women did not want to be either thinner or larger, 3.3% wanted to be larger, and 80.8% wanted to be thinner.

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Table 1

Best-Fitting Two-Factor Model Across Participant Sex

	χ^2_M	df _M	RMSEA	SRMR	CFI	GFI	AIC
			(90% CI)				
Men (<i>n</i> = 1074)	191.77	25	.08	.04	.96	.96	331.77
			(.07, .09)				
Women (<i>n</i> = 1319)	206.33	25	.07	.04	.97	.96	246.33
			(.07, .08)				

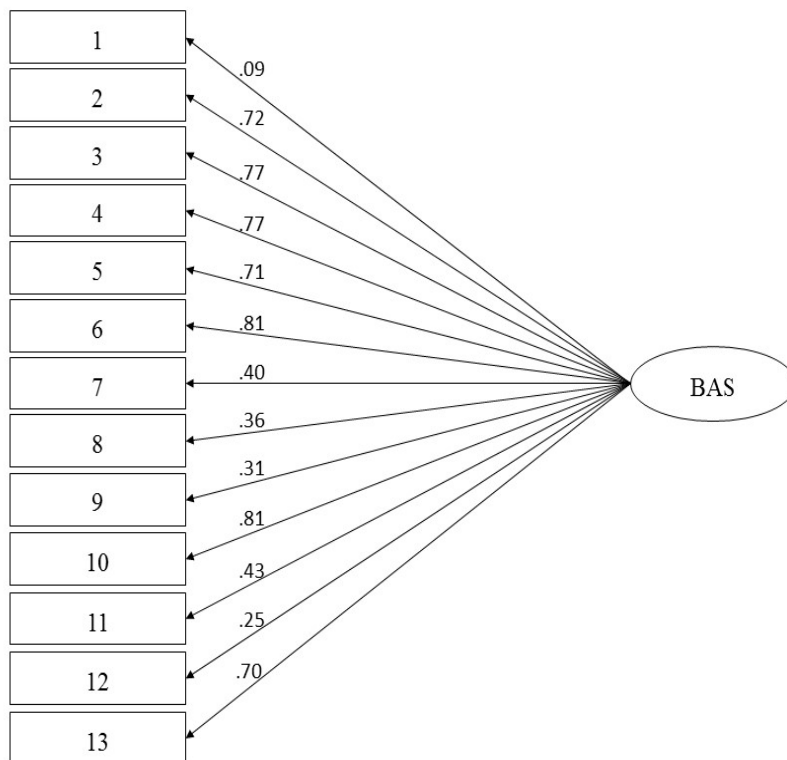


Figure 1. Confirmatory factor analysis for the one-dimensional model of the Body Appreciation Scale (Avalos et al., 2005).

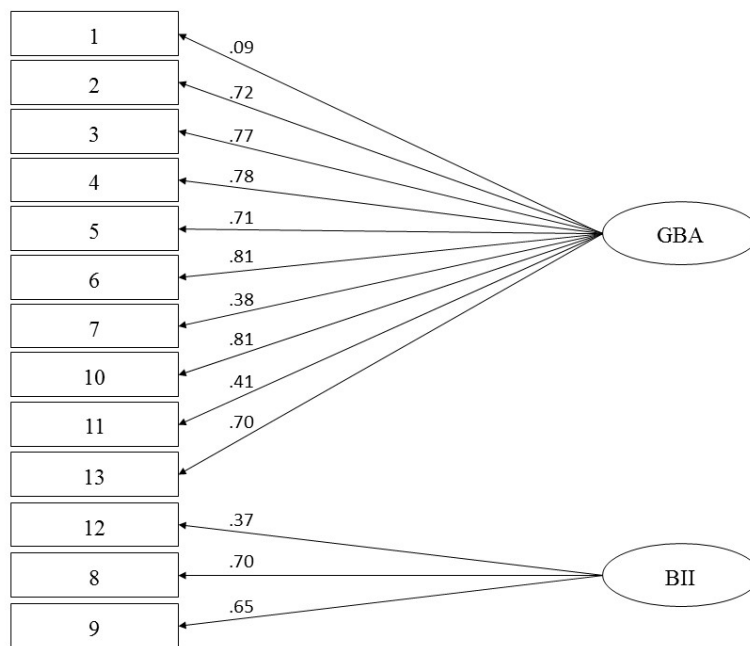


Figure 2. Confirmatory factor analysis for the two-dimensional model with all items included (Swami et al., 2011a, 2012c; Swami & Jaafar, 2012; Taylor et al., 2013). Note: GBA = General Body Appreciation; BII = Body Image Investment.

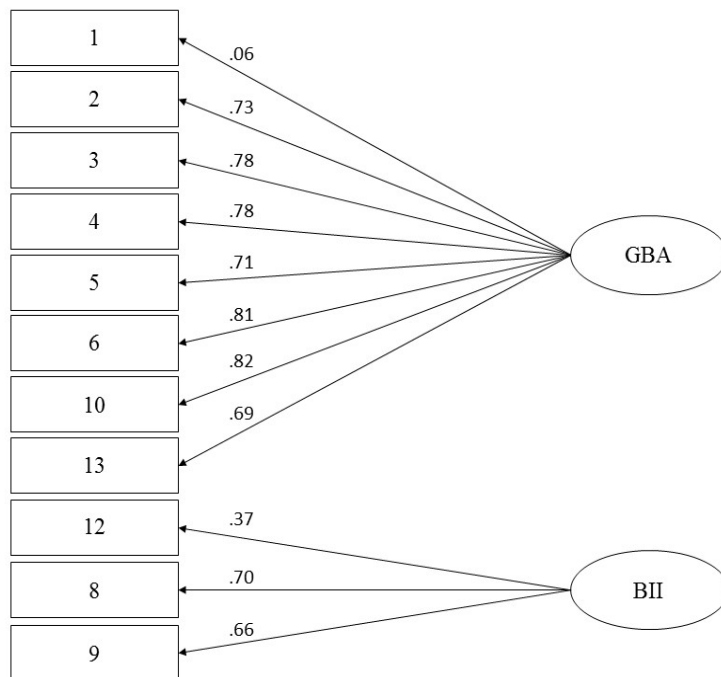


Figure 3. Confirmatory factor analysis for the two-dimensional model with two items deleted (Swami & Chamorro-Premuzic, 2008). Note: GBA = General Body Appreciation; BII = Body Image Investment.

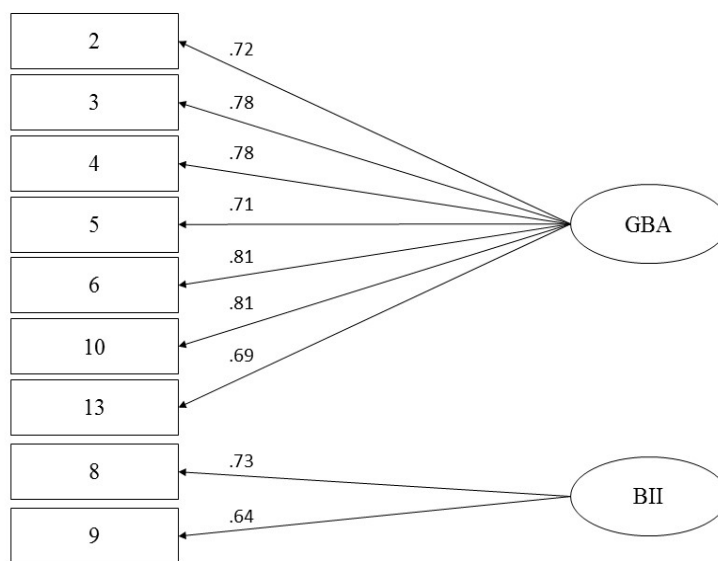


Figure 4. The two-factor structure of Body Appreciation Scale with four items deleted. Note:

GBA = General Body Appreciation; BII = Body Image Investment.

*Appendix*The Body Appreciation Scale (BAS) items

- 1 I respect my body.
 - 2 I feel good about my body.
 - 3 On the whole, I am satisfied with my body.
 - 4 Despite its flaws, I accept my body for what it is.
 - 5 I feel that my body has at least some good qualities.
 - 6 I take a positive attitude towards my body.
 - 7 I am attentive to my body's needs.
 - 8 My self worth is independent of my body shape or weight.
 - 9 I do not focus a lot energy being concerned with my body shape or weight.
 - 10 My feelings toward my body are positive, for the most part.
 - 11 I engage in healthy behaviours to take care of my body.
 - 12 I do not allow unrealistically thin images of women presented in the media to affect my attitudes toward my body / I do not allow unrealistically muscular images of men presented in the media to affect my attitudes toward my body.
 - 13 Despite its imperfections, I still like my body.
-