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Factor Structure and Psychometric Properties of the Body Appreciation Scale-2 in University Students in Hong Kong

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Abstract

Previous studies have suggested that there may not be cross-cultural equivalence in the factor structure of body appreciation. Here, we examine the conceptual equivalence of a Chinese (Cantonese) translation of the Body Appreciation Scale-2 (BAS-2; Tylka & Wood-Barcalow, 2015b), a newly-developed measure of body appreciation. Participants were 457 women and 417 men from a university in Hong Kong. The results of exploratory factor analyses showed that, like its English version, the Chinese BAS-2 had a one-dimensional structure. Body appreciation scores had good internal consistency and were also significantly associated with respondent body mass index, self-esteem, life satisfaction, and (in women) actual-ideal weight discrepancy. Men had significantly higher scores than women, while comparisons with data from Tylka and Wood-Barcalow (2015b) suggest that cross-cultural differences are small-to-moderate at best. The present findings suggest that the BAS-2 may prove to be a useful tool for the assessment of body appreciation across cultures.

Keywords: Body appreciation, Positive body image, Cultural equivalence, Factor structure, Hong Kong

Scholars are shifting from a focus on body image disturbances to a comprehensive account of the body image concept that includes positive body image (Tylka & Wood-Barcalow, 2015a). In particular, the concept of positive body image was informed by the development of the Body Appreciation Scale (BAS; Avalos, Tylka, & Wood-Barcalow, 2005). In its original form, the BAS measured four components of positive body image: favourable opinions of one's body, body acceptance, bodily respect, and a protective cognitive style that rejects unrealistic ideals. The BAS is one of the most widely-used measures of positive body image, with strong evidence of construct validity and internal consistency (Webb, Wood-Barcalow, & Tylka, 2015). In addition, the BAS has been used to understand the outcomes of positive body image, including psychological well-being and sexual functioning (Tylka & Wood-Barcalow, 2015b).

However, one limiting issue with the BAS concerns its cross-cultural equivalence. Whereas its one-dimensional structure has been upheld in adults in North America, Austria, and Turkey (Swami, Özgen, Gökçen, & Petrides, 2015; Swami, Stieger, Haubner, & Voracek, 2008; Tylka, 2013), the same is not true in all surveyed populations. In samples from Malaysia, Indonesia, Brazil, South Korea, Poland, Zimbabwe, and Hong Kong, several items of the BAS failed to load onto a primary factor that measures body appreciation (Ng, Barron, & Swami, 2015; Swami et al., 2011; Swami & Chamorro-Premuzic, 2008; Swami, Hwang, & Jung, 2012; Swami & Jaafar, 2011; Swami, Mada, & Tovée, 2012; Taylor, Szpakowska, & Swami, 2013). This lack of factorial equivalence limits our ability to compare BAS scores across cultures.

Recently, Tylka and Wood-Barcalow (2015b) revised the BAS in line with developments in the conceptual understanding of body appreciation (but without redefining the body appreciation construct itself). They deleted one sex-specific item and several items that consistently had item-factor loadings < .50. This revised measure, the BAS-2, consists of

10 items, five of which were retained from the parent scale and five of which are newly-devised. Across three studies with adults from the United States, Tylka and Wood-Barcalow (2015b) confirmed the BAS-2's one-dimensional factor structure, which was invariant across participant sex. They also provided evidence for the scale's test-retest reliability after 20 days (rs = .90) and construct validity including convergent, incremental, and discriminant validity.

As with its predecessor, it is important to establish the extent to which the BAS-2 can be considered cross-culturally invariant. As such, our aim in the present study was to examine the factor structure of the BAS-2 in a university sample in Hong Kong. Previous work has found that the BAS has a two-dimensional factor structure in university students from Hong Kong (Ng et al., 2015). Thus, Hong Kong provides a useful reference site in which to examine the factor structure of the BAS-2, aside from being an important site in which to examine body image issues more broadly (see Ng et al., 2015, for a discussion). In addition, we also conducted a preliminary examination of the newly-translated scale's construct validity by examining associations between body appreciation and body mass index (BMI) in women and BMI^2 in men, with the expectation of negative associations in both cases. We also examined associations between body appreciation and actual-ideal weight discrepancy in women, and self-esteem and life satisfaction in women and men. We hypothesised that body appreciation would be negatively correlated with weight discrepancy, and positively correlated with self-esteem and life satisfaction.

Method

Participants

Participants were 457 women and 417 men from a university in Hong Kong, who ranged in age from 16 to 54 years ($M = 19.97$, $SD = 4.58$) and in self-reported BMI from 14.87 to 32.05 kg/m^2 ($M = 20.35$, $SD = 2.47$).

Measures

Body appreciation. Participants completed the 10-item BAS-2 (Tylka & Wood-Barcalow, 2015b; see Table 1). All items were rated on a 5-point scale (1 = *Never*, 5 = *Always*).

Actual-ideal weight discrepancy. Women completed the Photographic Figure Rating Scale (PFRS; Swami, Salem, Furnham, & Tovée, 2008; Chinese translation: Ng et al., 2015), a figural rating scale that depicts 10 photographic images of women ranging from emaciated to obese. Participants were asked to select the figure that most closely matched their own body and the figure that they would most like to possess on a 10-point scale, ranging from 1 (*Figure with the smallest body size*) to 10 (*Figure with largest body size*). A measure of actual-ideal weight discrepancy was computed as the difference between absolute current and ideal ratings, so that higher scores reflect greater weight discrepancy. Previous work has shown that the PFRS has good patterns of test-retest reliability and construct validity (Swami, Stieger, et al., 2012). Men did not complete this portion of the questionnaire because no male version of the PFRS is available.

Self-esteem. We used the 10-item Rosenberg's Self-Esteem Scale (RSES; Rosenberg, 1965; Chinese translation: Kwan, Bond, & Singelis, 1997) to measure participants' overall sense of self-worth. All items were rated on a 4-point scale, ranging from 1 (*Strongly disagree*) to 4 (*Strongly agree*). Tian (2006) recommended removal of one item of the Chinese RSES, which improves internal consistency and construct validity estimates. In the present study, Cronbach's α for the resultant 9-item measure was .86 in women and .88 in men.

Life satisfaction. Participants completed the 5-item Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985; Chinese version: Choy & Moneta, 2003), which gauges respondents' overall assessment of the quality of their lives. All items were rated on a 5-point scale, ranging from 1 (*Strong disagree*) to 5 (*Strongly agree*). The Chinese

version of this scale has evidence of good construct validity (Choy & Moneta, 2003). In the present study, Cronbach's α for this scale was .84 in women and .85 in men.

Procedure

Once ethics approval was obtained, we translated the five new items of the BAS-2 into Cantonese using the standard back-translation technique. Recruitment of participants took place between November 2014 and April 2015 in classroom settings. Potential participants were invited to take part in a study on health and well-being. Those who agreed to participate provided informed consent and completed the questionnaire individually in a classroom setting. The order of presentation of the scales above was pre-randomised for each participant. All questionnaire materials were anonymous and participants were not remunerated. Once completed questionnaires had been returned, all participants were provided with a debriefing sheet that contained information about the study and the contact details of the second author.

Statistical Analyses

To examine the factor structure of the BAS-2, we computed principal-axis exploratory factor analysis (EFA) for women and men separately using quartimax rotation (because of the expectation of a single, general factor). EFA is the appropriate method of data reduction when the aim is to explore the possible underlying structure of a variable in the absence of a preconceived structure. Given the cross-cultural discrepancies in the underlying structure of the BAS, we did not assume Tylka and Wood-Barcalow's (2015b) one-dimensional structure for the BAS-2. Where EFA indicated the existence of more than one factor with an eigenvalue (λ) above 1.0, we determined the final number of factors to be extracted based on an examination of the scree-plot and the results of parallel analysis (Hayton, Allen, & Scarpello, 2004). Parallel analysis works by creating a random dataset with the same number of cases and variables as the actual dataset. When the λ from the random data are larger than

the λ from the actual data, then that factor is retained and all other factors are omitted. Factor loadings were interpreted following Tabachnick and Fidell's (2013) recommendation of $\leq .32$ as poor, .45 as fair, .55 as good, .63 as very good, and $\geq .71$ as excellent.

An independent-samples *t*-test was used to compare scores between women and men in our sample. We also conducted one-sample *t*-tests to compare scores between our participants and the community sample means reported in Tylka and Wood-Barcalow's (2015b) Study 3, which used the same wording of the BAS-2 as in the present study. Finally, bivariate correlations were used to establish convergent validity in terms of significant associations between body appreciation, BMI, self-esteem, life satisfaction, and (for women only) weight discrepancy. Because the relationship between body image and BMI may be curvilinear in men, we also the examined body appreciation's correlation with BMI^2. We also report on associations between body appreciation and respondent age.

Results

Female Sample

Barlett's test of sphericity, $\chi^2(45) = 2237.36$, $p < .001$, indicated that the correlation matrix was factorable, whereas the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy, KMO = .92, indicated that the BAS-2 items had adequate common variance for EFA. The results of the EFA revealed two factors with $\lambda > 1.0$ (4.88 and 1.50). However, inspection of the scree-plot suggested one primary factor and a steep cut-off to the secondary factor. Moreover, all items loaded at least fairly onto the dominant factor (item-factor loadings $\geq .45$; see Table 1). The results of our parallel analysis showed that the first λ for the random data was smaller than the real data counterpart, whereas the second λ was for the random data was larger than the second λ for the real data. These findings suggest that a single factor should be extracted, explaining 48.8% of the total item variance.

Male Sample

Barlett's test of sphericity, $\chi^2(45) = 2241.78$, $p < .001$, and the KMO measure of sampling adequacy, KMO = .93, exceeded minimum standards that should be passed before EFA can be conducted. The results of the EFA pointed to the existence of a single factor with $\lambda = 5.67$ and explaining 56.9% of the total item variance. All item-factor loadings in the component matrix were very good ($\geq$ .63; see Table 1).

Between-Group Comparisons

Internal consistency coefficients of the BAS-2 items were very good for women ($\alpha = .90$) and men ($\alpha = .91$). On average, men ($M = 3.59$, $SD = 0.63$) had higher body appreciation mean scores than women ($M = 3.48$, $SD = 0.57$). Levene's test suggested there was not equality of variance in the scores of women and men, $F = 4.11$, $p = .043$. An independent-samples t-test showed that the difference between women and men was statistically significant, $t(836.68) = 2.79$, $p = .005$. However, the magnitude of the difference in the means (mean difference = 0.11, 95% $CI = 0.03$-0.19) was small ($d = 0.19$).

Women in the present study had higher body appreciation than the women in the community sample in Tylka and Wood-Barcalow (2015b, Study 3; $\mu = 3.22$). A one-way t-test showed the difference between samples was significant, $t(456) = 9.81$, $p < .001$. The magnitude of the differences in the means (mean difference = 0.26, 95% $CI = 0.21$-0.31) was small-to-moderate ($d = 0.33$). Similarly, men in the present study had higher body appreciation than the men in Study 3 from Tylka and Wood-Barcalow (2015b; $\mu = 3.46$). A one-way t-test showed that the difference between men's scores was significant, $t(414) = 4.35$, $p < .001$. The magnitude of this difference (mean difference = 0.13, 95% $CI = 0.07$-0.20) was small ($d = 0.17$).

Convergent Validity

In women, body appreciation was significantly and positively associated with self-esteem ($r = .38$, $p < .001$), life satisfaction ($r = .45$, $p < .001$), and age ($r = .14$, $p = .03$), and

negatively correlated with weight discrepancy ($r = -.34$, $p < .001$) and BMI ($r = -.25$, $p < .001$). In men, body appreciation was significantly and positively correlated with self-esteem ($r = .44$, $p < .001$), life satisfaction ($r = .48$, $p < .001$), and age ($r = .17$, $p < .001$), but not with BMI ($r = -.03$, $p = .484$). On the other hand, there was a significant correlation, in men, between body appreciation and BMI^2 ($r = -.15$, $p = .003$).[2]

Discussion

Our results showed that the Chinese BAS-2 consists of a single factor in both women and men. This factor retained all 10 items from the English version of the BAS-2 and total scores had good internal consistency. These results are consistent with the findings of Tylka and Wood-Barcalow (2015b), who demonstrated that the BAS-2 has a one-dimensional factor structure in adults from the United States. Moreover, our findings contrast with earlier work in a similar sample from Hong Kong, in which it was shown that the original version of the BAS had a two-factor structure, consistent with findings from other non-Western sites (Ng et al., 2015).

The practical importance of our finding of a one-dimensional factor structure for the BAS-2 should not be underestimated. An important precondition for cross-cultural comparisons is that instruments should be cross-culturally equivalent. One way of establishing cross-cultural equivalence is to demonstrate similarity in the factorial validity of instruments across samples. Our findings fulfil this goal, at least in university students from Hong Kong. This allowed us to conduct a preliminary cross-cultural comparison of body appreciation scores with the community sample in Tylka and Wood-Barcalow (2015b), with our findings suggesting that our respondents have significantly higher body appreciation than North American adults. However, the magnitude of the differences were small-to-moderate at best[1] and, in this sense, would seem to corroborate earlier evidence that populations from high socioeconomic settings are more similar than different in their body image (Swami et

al., 2010). Examining body appreciation scores in populations of low socioeconomic status would be one way of extending the present findings (see Swami, Kannan, & Furnham, 2012).

Our findings also showed that the Chinese version of the BAS-2 had good convergent validity, insofar as we found significant correlations between body appreciation, self-esteem, life satisfaction, and (in women) actual-ideal weight discrepancy. In addition, body appreciation scores in the present study were significantly associated with BMI in women and BMI^2 in men. Finally, we found that men in the present study had significantly higher body appreciation scores compared with women. The magnitude of this difference is consistent both with previous work in a similar sample (Ng et al., 2015) and the sex differences reported by Tylka and Wood-Barcalow across two college samples and one (of two) community sample (2015b, ds = 0.26-0.58).

Future work could expand on our findings by replicating our work with community populations and with speakers of other Chinese dialects. In fact, an important next step for scholars working in body appreciation is to examine the factorial validity of the BAS-2 in other cultural and linguistic groups, as was done with the BAS. This will not only provide for a clearer picture of the concept of body appreciation, but will also facilitate cross-cultural comparisons where factorial equivalence is established. In addition, future work should also examine associations between body appreciation and further indices of construct validity, including a measure of weight or muscularity discrepancy in men. These issues aside, if the one-dimensional structure of the BAS-2 can be replicated in other cultural groups, it may offer scholars an important tool for assessing differences and similarities in body appreciation across cultures.

Footnotes

[1] We also compared scores from the present study with the student sample from Tylka and Wood-Barcalow (2015b; women μ = 3.47, men μ = 3.97), who completed a slightly different

version of the BAS-2 (the different version related to the modification of Item 8; original:

"My behavior reveals my positive attitude toward my body; for example, I walk holding my

head high and smiling", and revised: "My behavior reveals my positive attitude toward my

body; for example, I hold my head high and smile"). In this instance, there were no

significant cross-cultural differences in the body appreciation scores of women, $t(456) = 0.41$,

$p = .684$, $d = 0.01$. On the other hand, Tylka and Wood-Barcalow's (2015b) male college

students had significantly higher body appreciation than the men in the present study, $t(414)$

$= 12.12$, $p < .001$, $d = 0.52$.

[2] We also computed partial correlations between body appreciation and all remaining

constructs, while controlling for respondent age, but this did not substantially alter the

correlations.

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Table 1

Body Appreciation Scale-2 (BAS-2) Standardised Item-Factor Loadings for Women and Men

BAS-2 items	Women[a]	Men[b]
1. I respect my body.	.48	.65
2. I feel good about my body.	.83	.80
3. I feel that my body has at least some good qualities.	.80	.75
4. I take a positive attitude towards my body.	.85	.86
5. I am attentive to my body's needs.	.45	.63
6. I feel love for my body.	.76	.82
7. I appreciate the different and unique characteristics of my body.	.80	.81
8. My behaviour reveals my positive attitude toward my body; for example, I hold my head high and smile.	.52	.72
9. I am comfortable in my body.	.78	.67
10. I feel like I am beautiful even if I am different from media images of attractive people (e.g., models, actresses/actors).	.72	.80

Note. [a] Rotated component matrix; [b] Component matrix.