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Rural-Urban Differences in Body Appreciation and Associations with Life Satisfaction
in Adults from Sabah, Malaysia

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Abstract

Studies of body appreciation have typically focused on measurement of the construct in urban populations and there remains very little research on body appreciation in rural communities. To fill this gap, the present study examined rural-urban differences in body appreciation in an adult Kadazan-Dusun sample from the state of Sabah in Malaysia. Participants from rural ($n = 215$) and urban ($n = 219$) locales in the West Coast administrative district of Sabah were asked to complete Malay versions of the Body Appreciation Scale-2 (BAS-2) and the Satisfaction With Life Scale, and to provide their demographic details. Multi-group confirmatory factor analysis evidenced both partial metric invariance (by allowing loadings for three items to vary) and partial scalar invariance (by freeing the intercept for one item) on the BAS-2. Between-group analyses indicated that rural participants had significantly greater body appreciation than urban participants overall. Additionally, urban men had significantly greater body appreciation than urban women, but there was no gender difference in the rural subsample. Finally, correlational analyses indicated that body appreciation was significantly associated with life satisfaction in both the rural and urban subsamples. The present results highlight the importance of further considering the phenomenology of body appreciation in rural communities.

Keywords: Body appreciation; Rural; Urbanicity; Measurement invariance; Life satisfaction; Positive body image

1. Introduction

Although research on body image has traditionally focused on negative aspects of the construct (Grogan, 2016), research and research-informed practice centred on positive body image have grown dramatically over the past decade (Andersen & Swami, 2021; for reviews, see Tylka, 2018, 2019). The most central facet of positive body image (Swami, Furnham et al., 2020) is the construct of *body appreciation*, which Tylka and Wood-Barcalow (2015a, p. 53) defined as “accepting, holding favorable opinions toward, and respecting the body, while also rejecting media-promoted appearance ideals as the only form of human beauty”. A focus on body appreciation in research is vital, not least because of its robust association with a range of positive outcomes. For instance, recent reviews and meta-analyses have concluded that body appreciation is positively associated with health-promoting behaviours (e.g., preventive health behaviours, seeking medical attention; Nolen & Panisch, 2022), inversely associated with indices of eating and body image disturbance and psychopathology, and positively associated with adaptive psychological well-being (Linardon et al., 2022).

Despite the wealth of accumulated knowledge on the construct of body appreciation, it is notable that much of the extant research has focused on urbanised populations (Swami, 2018). This is particularly important in light of evidence showing that *urbanicity* (i.e., living in urban areas at a given time; Vlahov & Galea, 2002) is a risk factor for poorer psychological well-being (Pedersen & Mortensen, 2001a, 2001b), including psychotic experiences, depressive symptoms, and stress-related disorders (for reviews, see Abrahamyan Empson et al., 2020; Lecic-Tosevski, 2019). In explanation, some scholars have suggested that the detrimental effects of urbanicity on well-being stem from numerous factors that constitute “urban stress” (Abbott, 2012). Although urban stress is sometimes difficult to define (Abrahamyan Empson et al., 2020), it is typically thought to include a conjunction of elements, ranging from exposure to psycho-toxic stimuli (e.g., light, traffic, noise, and

pollution), to social fragmentation and disorganisation, to early life traumatic experiences (Gruebner et al., 2017).

It is also possible that urbanicity has a similar detrimental impact on body image outcomes. In their seminal work, for instance, Lee and Lee (2000) suggested that increasing urbanicity brings greater pressure to engage with rigid beauty ideals and participate in beauty practices that result in body disparagement. In this view, macro-level factors – such as beauty systems operating via the fashion and beauty industries, as well as consumerist lifestyles – are thought to operate more forcefully in urbanised settings (Swami, 2015, 2021). Such factors tie an individual's self-worth to their physical appearance and willingness to engage with personal body projects (Featherstone et al., 1991; Featherstone, 2010), such that the body comes to be viewed not as a biological entity but rather as a sociocultural object or commodity that can or must be worked on and improved. As highlighted by sociocultural models of body image (Thompson et al., 1999), those same factors also propagate prescriptive and unrealistic beauty ideals, which in turn results in individuals feeling detached from their bodies (Ramati-Ziber et al., 2020; Swami, Coles et al., 2010) and heightens the likelihood of experiencing a host of detrimental outcomes, including negative body image and symptoms of disordered eating (Hay & Mitchison, 2021; Rodgers et al., 2019; Tomiyama et al., 2018). In contrast, such macro-level factors may exert less pressure in rural sites (Brewis et al., 2011; Swami, 2015, 2021), thus allowing for healthier body image outcomes.

There is some evidence to support these perspectives on the association between urbanicity and body image, although much of the research is focused on aspects of negative body image. For instance, a wealth of evidence has shown that increasing urbanicity is associated with greater idealisation of thin and muscular ideals (for reviews, see Swami, 2015, 2021). Additionally, urban living (as compared to rural living) is also associated with greater body dissatisfaction in women (Pioreschi et al., 2017; Swami, Frederick et al., 2010;

Swami, Tran et al., 2020), although significant rural-urban differences in body dissatisfaction are less marked in high-income countries (Jones et al., 2007; Mooney et al., 2009; Sánchez-Cabrero et al., 2020). However, increasing access to Westernised media programming and the erosion of traditional values (e.g., conservatism, the centring of family values) in rural areas in low- and middle-income countries may have also led to an increase in body dissatisfaction in these sites (e.g., Thornborrow et al., 2020). Thus, one recent systematic review of 27 studies that included rural populations indicated that body dissatisfaction occurred in between 50 and 85% of respondents (García-Mendoza, 2021).

In contrast, studies examining the impact of urbanicity on indices of positive body image remain scarce and their findings equivocal. In one early study, Swami and colleagues (2012) assessed body appreciation (operationalised using the Body Appreciation Scale) in samples of rural and urban women from the state of Sabah in Malaysia. Their analyses indicated that rural women had significantly greater body appreciation than urban women ($\eta_p^2 = .10$). In contrast, Baceviciene et al. (2021) reported that urban respondents had significantly greater body appreciation (assessed using the Body Appreciation Scale-2; BAS-2) than rural respondents in Lithuania ($d = 0.17$). More recently, in a sample of older adults from China, Zhang and colleagues (2022) reported that men from rural areas had significantly greater body appreciation (assessed using the BAS-2) than men from urban areas ($r = .18$), although the same association in women did not reach significance ($r = .09$). The same authors also reported that urbanicity was not significantly associated with either body image flexibility or body dissatisfaction in both women or men.

1.1. The Present Study

Given these equivocal findings and the general dearth of studies including rural samples, much more can be done to better understand the impact of urbanicity on positive body image generally and body appreciation specifically. Therefore, the primary objective of

the present study was to examine differences in body appreciation between rural and urban adults in Sabah, Malaysia. Unlike some previous studies (e.g., Baceviciene et al., 2021; Zhang et al., 2022), where consideration of rural-urban differences in body appreciation was a corollary aim, we followed Swami and colleagues (2012) in explicitly setting out to examine rural-urban differences. However, beyond contributing to a better understanding of the relationship between urbanicity and body appreciation generally, the present study builds on the early work of Swami and colleagues (2012) in a number of ways.

First, we were able to use a validated, Bahasa Malaysia (Malay) translation of the BAS-2 (Tylka & Wood-Barcalow, 2015b), which offers a more comprehensive and contemporaneous operationalisation of the body appreciation construct compared to the BAS (for a discussion, see Swami, 2020). Second, previous studies have all not assessed measurement invariance of the body appreciation construct across rural and urban participants (i.e., the extent to which an instrument measures the same latent construct across groups), which could have led to measurement biases and, in turn, artefactual or inaccurate results (Chen, 2008; Guenole & Brown, 2014). Establishing measurement invariance is a prerequisite of any meaningful comparison of scores across groups (Boer et al., 2018; Chen, 2007; Swami & Barron, 2019), and its establishment here would allow us to be more confident that rural-urban differences in body appreciation do in fact exist. As a preliminary hypothesis, and given that the BAS-2 has been shown to achieve at least partial scalar invariance across a range of social identity groups (e.g., Paquette et al., 2022), including in Malaysia (Swami et al., 2019; Tan et al., 2021), we expected to be able to support measurement invariance of the BAS-2 across rural and urban samples.

Third, given that a decade has passed since the publication of Swami and colleagues (2012), it would be useful to assess the extent to which putative rural-urban differences in body appreciation (still) exist in the study site. Although Sabah – one of two Malaysian states

on the island of Borneo – remains one of the least developed states in Malaysia (GDP per capita of RM16,480 compared with the Malaysian average of RM48,549; Department of Statistics Malaysia, 2021), as it was a decade ago, the state has also experienced rapid urbanisation, economic development, and social transformation. As examples, the Pan Borneo Highway has dramatically increased connectivity between urban and rural areas in Sabah (Abram et al., 2022) and Internet access has likewise grown to include most rural areas (Bagang et al., 2022). Nevertheless, marked regional differences persist, particularly between the urban centre of Kota Kinabalu (the state capital) and rural areas, where traditional lifestyles remain common (Ationg et al., 2020). Finally, in recruiting both women and men, we were able to concurrently examine possible gender differences in body appreciation, as well as possible interactions between urbanicity and gender. Our expectation, based on the literature review above and on existing evidence (He et al., 2020), was that rural participants and men would have significantly greater body appreciation than urban participants and women, respectively.

A secondary objective was to assess associations between body appreciation and psychological well-being (operationalised as life satisfaction) in rural and urban participants. Although the association between body appreciation and psychological well-being is robust (Linardon et al., 2022), little is known about the strength of this association among rural respondents (Kim, 2022). Thus, although body appreciation has been previously linked with life satisfaction in Malaysian adults ($r_s \sim .40$ to $.50$; Swami et al., 2019, 2021), extant research is limited to participants from urban sites. As such, it would be instructive to assess the extent to which the relationship remains stable in rural participants, particularly as this may point to an interventionist strategy for promoting more positive psychological well-being in both rural and urban adults in Malaysia. Based on the available evidence base (Linardon et al., 2022), we expected that body appreciation would be significantly and positively

associated with life satisfaction across both urban and rural participants, although we also allowed for the possibility that the strength of the relationships would be relatively stronger in rural participants.

2. Method

2.1. Participants

2.1.1. Power calculation. A power calculation conducted using G*Power 3 (Faul et al., 2007) indicated that the minimum sample size required to detect a small effect size with $\alpha = .05\%$ and 95% power was 88 per subsample. Each of our subsample sizes (i.e., site by gender) exceeded this minimum requirement.

2.1.2. Rural participants. Rural participants were recruited from the districts of Ranau and Kota Belud, located in the West Coast Administrative Division of Sabah, where rural tourism and agriculture are the major industries (Chan & Jiran, 2021). Specifically, following Swami and colleagues (2012), we recruited participants from sites located at least 50km from the nearest towns in each of the districts. The subsample consisted of 108 women and 107 men, all of whom were of Kadazan-Dusun ancestry (the largest indigenous ethnic group in Sabah). Participants ranged in age from 18 to 63 years ($M = 32.87$, $SD = 10.78$) and in self-reported body mass index (BMI) from 14.69 to 45.45 kg/m² ($n = 209$; $M = 23.23$, $SD = 4.73$). In terms of marital status, 33.0% were single, 23.7% were single but in a committed relationship, 41.9% were married, and 1.4% were of another status. In terms of education, 9.3% had completed primary education as their highest qualification. 67.4% had completed secondary education, 16.7% were in full-time education, and 6.5% had an undergraduate degree. The majority of respondents (50.7%) indicated that they felt their financial security to be the same as others of their own age in Sabah, 42.3% felt less secure, and 7.0% felt more secure.

2.1.3. Urban participants. Urban participants were recruited from Kota Kinabalu, the state capital and largest city in Sabah, as well as the state's primary commercial and industrial centre. The subsample consisted of 107 women and 112 men, all of whom were of Kadazan-Dusun ancestry. This subsample ranged in age from 20 to 67 years ($M = 31.59$, $SD = 10.60$) and in self-reported BMI from 15.61 to 41.40 kg/m² ($n = 212$; $M = 24.44$, $SD = 4.97$). In terms of marital status, 44.3% of respondents were single, 20.1% were single but committed relationship, 34.7% were married, and 0.9% were of another status. In terms of education, 35.2% had completed secondary education, 9.6% were in full-time education, 46.6% had an undergraduate degree, and 8.7% had a postgraduate degree. Compared to others of the same age in Sabah, the majority of respondents (63.9%) indicated that they felt they had the same financial security, 15.5% felt less secure, and 20.5% felt more secure.

2.2. Materials

2.2.1. Body appreciation. To measure body appreciation, we used the Body Appreciation Scale-2 (BAS-2; Tylka & Wood-Barcalow, 2015; Bahasa Malaysia translation: Swami et al., 2019). The 10-item BAS-2 measures acceptance for one's body, respect and care for one's body, and protection of one's body from unrealistic beauty standards. All items were rated on a 5-point scale, ranging from 1 (*never*) to 5 (*always*), and an overall score was computed as the mean of all items. Scores on the Bahasa Malaysia version of the BAS-2 have been shown to have a unidimensional factor structure, evidences measurement invariance across women and men, and has adequate internal consistency, construct validity, and incremental validity (Swami et al., 2019), though we sought to examine measurement invariance between urban and rural participants in the present study. In the present study, McDonald's ω for BAS-2 scores was .86 (95% CI = .84, .89) in rural participants and .93 (95% CI = .91, .94) in urban participants.

2.2.2. Life satisfaction. We measured life satisfaction using the Satisfaction with Life Scale (SLS; Diener et al., 1985; Bahasa Malaysia translation: Swami & Chamorro-Premuzic, 2009), a 5-item scale that taps individuals' assessments of the quality of their lives on the basis of their own unique criteria. All items were rated on a 5-point scale (1 = *strongly disagree*, 5 = *strongly agree*), and an overall score was computed as the mean of all items. Higher scores on this scale reflect greater life satisfaction. Scores on the Bahasa Malaysia version of the SLS have been shown to have adequate internal consistency and construct validity (Swami & Chamorro-Premuzic, 2009). In the present work, McDonald's ω for SLS scores was .81 (95% CI = .76, .84) in rural participants and .84 (95% CI = .81, .87) in urban participants.

2.2.3. Financial security. Following previous work (Swami et al., 2012; Swami, Tran et al., 2020), we measured financial security as a proxy of socioeconomic status. Participants were asked to self-report how financially secure they felt relative to others of their own age in their country of residence (1 = *Less secure*, 2 = *Same*, 3 = *More secure*).

2.2.4. Demographics. Participants were asked to provide their demographic details consisting of age, gender identity, highest educational qualification, and marital status. We also requested height and weight data in order to compute self-reported BMI as kg/m^2 . Fourteen height and weight data-points were missing completely at random and were retained as missing values.

2.3. Procedures

Ethics approval was obtained from the relevant research ethic panel at the first author's institution. All data collection took place in December 2021 and August 2022. In both research sites, potential participants were directly approached in various public spaces (e.g., markets, recreational areas, festivals) by trained research assistants and invited to complete a brief paper-and-pencil survey if they met inclusion criteria, including being of

Kadazan-Dusun descent (in order to recruit an ethnically homogeneous sample), being of adult age, and being able to complete a survey in Bahasa Malaysia (or Malay; the national language of Malaysia). If participants agreed to take part, they were asked to provide written informed consent before being given a survey package that included further information about the study and the survey instruments presented in a pre-randomised order (either the BAS-2 or SLS first, with the financial security and demographic items appearing last). Participants completed the survey individually in a quiet space before returning completed forms to researchers via a drop-box to ensure confidentiality and anonymity. All participants took part voluntarily and without remuneration. Upon return of completed surveys, participants were provided with written debriefing information.

2.4. Statistical Analyses

There were 15 missing BAS-2 or SLS data-points. Because of the minimal amount of missing data and because these were missing completely at random, $\chi^2(138) = 93.20, p = .999$, all missing data were replaced using the mean replacement method (Parent, 2013). We first examined between-group (i.e., rural vs. urban) differences in basic demographic variables using independent-samples *t*-tests and chi-squared tests. To examine the invariance of BAS-2 scores across rural and urban participants, we conducted multi-group confirmatory factor analysis (CFA; Chen, 2007). Model fit was assessed using commonly used indices (Finch, 2020; Hu & Bentler, 1999), namely the normed model chi-square (χ^2/df ; values < 3.0 considered indicative of good fit and up to 6.0 considered acceptable fit), the Steiger-Lind root mean square error of approximation (RMSEA) and its 90% CI (values close to .06 considered to be indicative of good fit and up to .08 indicative of adequate fit), the standardised root mean square residual (SRMR; values < .09 indicative of good fit), and the Tucker-Lewis index (TLI; values close to or > .95 indicative of good fit), and the comparative fit index (CFI; values close to or > .95 indicative of adequate fit).

Measurement invariance was assessed at the configural, metric, and scalar levels (Vandenberg & Lance, 2000). In accordance with recommendations (e.g., Byrne, 2016; Vandenberg & Lance, 2000), we first tested the fit of an initial measurement model with both the rural and urban groups combined. Next, we estimated a configural multigroup measurement model, which served as a baseline model to which all other models were compared to in invariance testing. Configural invariance implies that the latent BAS-2 variable and the pattern of loadings of the latent variable on indicators are similar across groups (i.e., the unconstrained latent model should fit the data well in both groups). Metric invariance implies that the magnitude of the loadings is similar across groups; this is tested by comparing two nested models consisting of a baseline model and an invariance model. Lastly, scalar invariance implies that both the item loadings and item intercepts are similar across groups and is examined using the same nested-model comparison strategy as with metric invariance (Chen, 2007). Following the recommendations of Cheung and Rensvold (2002) and Chen (2007), we accepted $\Delta CFI \leq .010$ and $\Delta RMSEA \leq .015$ or $\Delta SRMR \leq .010$ (.030 for configural invariance) as evidence of invariance.

Assuming evidence of scalar invariance were obtained, we aimed to examine the study's first hypothesis using a univariate analysis of variance (ANOVA), with BAS-2 scores entered as the dependent variable and both site (rural vs. urban) and gender (women vs. men) entered as independent variables. We also aimed repeated this analysis with any demographic variable found to differ across groups entered as covariates in an analysis of covariance (ANCOVA). Effect sizes were interpreted based on Cohen's (1988) recommendations, such that a η_p^2 of .01 was considered a small effect, .06 a medium effect, and .14 a large effect, while a d of 0.20 was considered a small effect, 0.50 a medium effect, and 0.80 a large effect. Finally, we assessed associations between body appreciation and life satisfaction using

bivariate correlations separately in the rural and urban groups. Fisher's z was used to test whether the strength of the correlation differed between groups.

3. Results

3.1. Preliminary Analyses

There was no significant differences between urban and rural participants in terms of age, $t(432) = 1.24, p = .214, d = 0.12$, but urban participants had significant higher BMIs than their rural counterparts, $t(419) = 2.56, p = .011, d = 0.25$. Chi-squared tests showed no significant between-group differences in the distribution of women and men, $\chi^2(1) = 0.08, p = .775$ and marital status, $\chi^2(3) = 5.88, p = .117$. Confirming the rural-urban gradient, urban participants were more likely than rural participants to be highly educated, $\chi^2(4) = 130.51, p < .001$, and to feel more financially secure than others of the same age, $\chi^2(2) = 44.82, p < .001$.

3.2. Measurement Invariance

The data were neither univariate (Shapiro-Wilks $p < .001$) nor multivariate normal (Mardia's skewness = 944.42, $p < .001$; Mardia's kurtosis = 23.42, $p < .001$), so parameter estimates were obtained using the robust maximum likelihood method and fit indices were interpreted with the Satorra-Bentler correction applied (Satorra & Bentler, 2001). We first used CFA to assess the unidimensional model in the total (rural and urban) sample. Here, model fit indices were indicative of a less than ideal model fit, with normed chi square, RMSEA, CFI, and TLI outside of ideal ranges: $SB\chi^2(35) = 173.60, p < .001$, $SB\chi^2_{normed} = 4.96$, robust RMSEA = .110 (90% CI = .094, .127), SRMR = .049, robust CFI = .919, robust TLI = .896. Therefore, model fit indices were consulted and we found that freeing error covariances between Items #6 and 7 (MI = 56.75) resulted in a significantly improved model fit, $\chi(1) = 55.79, p < .001$, with fit indices as follows: $SB\chi^2(34) = 132.24, p < .001$,

$SB\chi^2_{\text{normed}} = 3.89$, robust RMSEA = .084 (90% CI = .077, .111), SRMR = .044, robust CFI = .943, robust TLI = .925.

Next, we examined the fit of the unidimensional model in the rural sample. Again, model fit indices were suggestive of a less-than-ideal model fit, particularly for RMSEA, CFI, and TLI: $SB\chi^2(35) = 104.06$, $p < .001$, $SB\chi^2_{\text{normed}} = 2.97$, robust RMSEA = .112 (90% CI = .087, .137), SRMR = .066, robust CFI = .872, robust TLI = .835. Therefore, model fit indices were consulted. Freeing Items #6 and 7 (MI = 44.94) resulted in a significantly improved model fit, $\chi(1) = 46.02$, $p < .001$, although TLI remained slightly deflated: $SB\chi^2(34) = 71.46$, $p < .001$, $SB\chi^2_{\text{normed}} = 2.10$, robust RMSEA = .083 (90% CI = .056, .110), SRMR = .055, robust CFI = .932, robust TLI = .909.

We next examined the fit of the unidimensional model in the urban sample. Here, model fit indices were suggestive of an acceptable model fit, although RMSEA and TLI were slightly outside of ideal cut-offs: $SB\chi^2(35) = 92.44$, $p < .001$, $SB\chi^2_{\text{normed}} = 2.64$, robust RMSEA = .098 (90% CI = .074, .123), SRMR = .045, robust CFI = .945, robust TLI = .929. Freeing Items #3 and 4 (MI = 21.90) resulted in significantly improved model fit $\chi(1) = 21.72$, $p < .001$, with fit indices as follows: $SB\chi^2(34) = 75.35$, $p < .001$, $SB\chi^2_{\text{normed}} = 2.22$, robust RMSEA = .085 (90% CI = .059, .111), SRMR = .042, robust CFI = .960, robust TLI = .947.

Next, we examined measurement invariance using multi-group CFA. As can be seen from Table 2, invariance was achieved at the configural but not the metric level. That is, the factor loadings were not of the same magnitude across the two groups, meaning a unit difference in the latent construct is not comparable across subpopulations. We further explored the item loadings across the two groups and found that item loadings were of a generally of a higher magnitude for the urban sample compared to the rural sample. We were able to achieve partial metric invariance by allowing the loadings for Items #2, 3, and 10 to

vary, and we were able to achieve partial scalar invariance by additionally freeing the intercept for Item #9. Because partial scalar invariance is typically considered a minimum threshold for comparison of mean scores (Chen, 2007; Putnick & Bornstein, 2016), we proceeded to between-group analyses.

3.3. Between-Group Differences in Body Appreciation

Descriptive statistics are reported in Table 2. A univariate ANOVA indicated that there was a significant interaction between the research site and participant gender, $F(1, 430) = 4.71, p = .031, \eta_p^2 = .01$. Tests of simple effects indicated that rural men had significantly greater body appreciation than urban men, $t(217) = 3.01, p = .003, d = 0.41$. Likewise, rural women had significantly greater body appreciation than urban women, $t(213) = 5.37, p < .001, d = 0.73$. Additionally, there was no significant gender difference in body appreciation in the rural site, $t(213) = 0.06, p = .951, d < 0.01$, whereas urban men had significantly greater body appreciation than urban women, $t(217) = 2.71, p = .007, d = 0.37$. The results of the ANOVA also indicated that there was a significant main effect of gender, $F(1, 430) = 5.03, p = .025, \eta_p^2 = .01$ (men had significantly greater body appreciation than women), and that there was a significant main effect of research site, $F(1, 430) = 36.65, p < .001, \eta_p^2 = .08$ (rural participants had significantly greater body appreciation than urban participants). Including participant BMI, financial security, and education as covariates in an ANCOVA did not substantively alter this pattern of results, and none of the covariates reached significance (all F s < 0.70 , all p s $> .402$, all $\eta_p^2 < .01$).

3.4. Associations with Life Satisfaction

Body appreciation was significantly and positively associated with life satisfaction in both rural participants, $r(215) = .45, p < .001$, and their urban counterparts, $r(219) = .34, p < .001$. The strength of the associations did not differ significantly across groups, $z = 1.47, p = .142$.

4. Discussion

Studies examining rural-urban differences in body appreciation have returned equivocal results, with two studies suggesting that rural respondents have greater body appreciation (Swami et al., 2012; Zhang et al., 2022) and one study suggesting that urban participants have greater body appreciation (Baceviciene et al., 2021). However, none of these studies have considered the extent to which the construct of body appreciation evidences measurement invariance across rural and urban respondents. This is important because measurement invariance is a prerequisite of any meaningful comparison of scores across groups (Boer et al., 2018; Chen, 2007; Swami & Barron, 2019). Here, for the first time, we assessed measurement invariance of BAS-2 scores across rural and urban respondents. Our results indicated that, while configural invariance was supported, neither full metric invariance nor full scalar invariance were established. However, by allowing loadings for three items to vary and by freeing the intercept for one item, we were able to achieve partial metric and partial scalar invariance, respectively. These findings require some discussion before we consider between-group differences in body appreciation.

First, the results of testing for configural invariance indicated that the BAS-2 measures a single latent factor in both rural and urban groups (i.e., the items comprised in the BAS-2 exhibits the same configuration of salient factor loadings across both groups). However, when the matrix of loadings was constrained to be equal across groups, we found a lack of metric invariance due to relatively deflated loadings on three items (Items #2, 3, and 10) in the rural sample. It is difficult to know exactly why loadings on these three items differentially contributed to the latent body appreciation construct across groups, but it may be that these items tap lower-order meanings that are less relevant to the rural sample. For instance, it is possible that Item #10 [“I feel that I am beautiful even if I am different from media images of attractive people (e.g., models, actresses/actors)"] may be less salient to rural

participants if they have lower media exposure than urban participants (cf. Swami et al., 2010) or are less concerned about social comparisons with media ideals (Swami & Tovée, 2005a, 2005b). Nevertheless, unequal factor loadings likely have a negligible effect on mean differences (Steinmetz, 2013) and allowing the loadings for these items to vary allowed us to achieve partial metric invariance.

Additionally, we were also unable to support full scalar invariance, with the intercept for Item #9 (“I am comfortable in my body”) differing between rural and urban participants. This finding suggests that rural participants feel less comfortable in their bodies than do urban participants, but that increased scores on this item are not necessarily related to increased body appreciation in the rural sample. One possibility here is that the meaning of being “comfortable” in one’s body – or affective responses to and experiences of the body within particular spaces – may differ between rural and urban participants. For instance, some sociological work with rural populations has suggested that understandings of embodied comfort (i.e., the subjective way in which the body is inhabited and experienced in relation to feelings of comfort) are highly situated within particular spaces (Farrugia et al., 2016). If this is the case – and future ethnographic or anthropological work might be useful to better understand this issue – then it might help to explain why Item #9 proved problematic in terms of scalar invariance. Nevertheless, it is also important to note that failure to achieve full scalar evidence may be a common occurrence *vis-à-vis* the BAS-2, at least in Malaysia (Swami et al., 2019; Todd & Swami, 2020).

Partial scalar invariance is typically considered to be a minimum precondition for comparison of scores across groups (Boer et al., 2018; Chen, 2007; Swami & Barron, 2019), but may also lead to more serious misinterpretation of true mean differences compared with metric non-invariance (Putnick & Borstein, 2016; Steinmetz, 2013). As such, the following discussion of between-group differences should be considered cautiously. Specifically, our

results broadly indicated that rural participants had significantly greater body appreciation than their urban counterparts, which is consistent with previous work in the same geographic context (Swami et al., 2012). Indeed, the difference in BAS-2 scores across rural and urban sites was medium-to-large, suggesting that the difference is robust, even after accounting for possible bias introduced by the lack of scalar non-invariance. However, there was also a degree of nuance here: while urban men had significantly greater body appreciation than urban women, which is consistent with the findings of a recent meta-analysis (He et al., 2020), the gender difference among rural participants did not reach significance.

In considering the overall difference between rural and urban participants, two non-mutually exclusive explanations are possible. First, borrowing from the theory of urban stress (Abbott, 2012), it might be suggested that greater urbanicity has a detrimental effect on body appreciation in urban respondents. As has been suggested when explaining rural-urban differences in negative body image, it is possible that various structural and cultural factors – such as greater pressure to view the body as a sociocultural object or commodity open to investment, pressure to engage in body work, and greater exposure to unhealthy appearance ideals and standards (Brewis et al., 2011; Ramati-Ziber et al., 2020; Swami, 2015, 2021) – all serve to dampen or restrict possibilities for constructing healthy body appreciation in urban sites. Additionally, given that urbanicity has been associated with social disorganisation and fragmentation (e.g., looser ties between individuals and families; Cornwell & Behler, 2015), urban respondents may also perceive and experience lower body acceptance by others, a key determinant of body appreciation (Andrew et al., 2016).

An alternative proposition is focused less on the negative effects of urban living and instead centres the positive impact of rural life. For instance, sociological work has highlighted how experiences of sensory freedom (e.g., open spaces, quietness, the ability to move freely and to experience greater personal space) and the slower, relaxed pace of rural

life can contribute to a greater sense of embodiment (i.e., feelings of being within and at one with the body; Farrugia et al., 2016), which in turn may contribute to greater body appreciation. This perspective would also fit with evidence indicating that access and exposure to natural environments – which are in greater abundance in rural locales – is associated with greater body appreciation (e.g., Swami et al., 2018, 2022). Additionally, although rural life is often characterised by highly traditional gender and sexual identities, rurality may also afford individuals greater space to define one's physical self in terms of functionality rather than appearance, to destabilise conventional appearance ideals, and to dis-engage from body work itself (Little & Leyshon, 2003). Finally, rural communities are more often perceived by their inhabitants to be close-knit and caring (Glendinning et al., 2003), which in turn may promote factors that lead to greater body appreciation, such as lower self-objectification and higher body acceptance by others.

These explanations may also help to explain the lack of gendered difference in body appreciation in our rural subsample. For example, there is some evidence from ethnographic studies and demographic surveys showing that rural Malaysian women are often economically active (e.g., in agriculture; Hirschman, 2016). While such evidence should not be taken to suggest that patriarchal constraints are completely absent in rural Malaysia, it does suggest that gendered power relations may be more fluid. Indeed, women in rural Sabah may often take on important breadwinning roles not just for their families, but also for their communities (Adnan et al., 2016) – roles that are both predicated upon, and may help build, body appreciation. Moreover, and to the extent that rurality provides opportunities to define one's physical self in terms of functional capabilities and to de-couple appreciation of one's body from its aesthetic value, this may help to explain both the lack of gendered difference in body appreciation in our rural subsample, as well as rural women's significantly greater body appreciation compared to urban women.

Beyond the rural-urban continuum, our results are also important in another sense: our secondary analyses indicated that the association between body appreciation and life satisfaction was significant in both the rural and urban subsamples. Indeed, the strength of the association did not differ across subgroups, suggesting that the relationship is relatively robust irrespective of locale. In broad outline, this finding is consistent with previous work showing that body appreciation is robustly associated with a wide range of indices of psychological well-being (Linardon et al., 2022), including with life satisfaction in Malaysian adults from urban sites (Swami et al., 2019, 2021). This finding, although preliminary and limited to a single facet of psychological well-being, is particularly important given that it is the first time the association between body appreciation and life satisfaction has been documented in a rural community. It may also be important in highlighting the potential universality of downstream benefits of body appreciation, such that promoting body appreciation in both rural and urban communities should be expected to lead to greater psychological well-being.

4.1. Limitations

Strengths of the present study include sampling from across a rural-urban gradient in a single geographic locale (i.e., the state of Sabah, Malaysia), use of validated measures of body appreciation and life satisfaction, and consideration of measurement invariance. Nevertheless, our findings should be considered in light of a number of limitations. First, the opportunistic method of sampling – a necessity, particularly in the rural context of Sabah – means that we cannot be certain to what extent our findings are representative of the wider Kadazan-Dusun community. Additionally, because we focused sampling on a single ethnic group, we also cannot be certain that our results would replicate in other ethnic groups in Sabah, although previous work has suggested no significant ethnic differences in body appreciation in this context (Swami et al., 2012; but see Kui-Ling et al., 2021). Likewise, our

recruitment was limited to the West Coast Division of Sabah, which may mask differences with other administrative divisions in the state. In short, given these design and recruitment issues, we cannot be entirely certain that our findings will generalise more broadly, whether regionally or internationally.

Second, in order to facilitate recruitment and survey completion, we intentionally kept the survey brief. This, in turn, meant that we were limited in the sorts of research questions we were able to ask and answer, as well as in the explanation we are able to posit for our findings. For instance, it may have been useful to assess a wider range of constructs that may help explain the present findings, such as exposure to both local and Western media (including social media), perceived gendered equality and relations, appearance investment, and eating styles and nutritional knowledge (Bin Jeinie et al., 2021). Of course, doing would also mean a commensurate increase in survey length, which may make participant recruitment more difficult, particularly in rural settings. An alternative approach would be to utilise qualitative research methods, which may help provide a more in-depth understanding of the nature, phenomenology, and meaning of body appreciation in rural locales. Indeed, qualitative work may also help scholars to better understand the specific meaning of body appreciation within rural contexts.

4.2. Conclusion

Although scholarly understanding of positive body image generally and body appreciation specifically has grown at pace over the past decade, much more can still be done to better understand the meaning of body appreciation in hitherto neglected communities. Indeed, it remains the case that much of the available research on body appreciation is centred on urban communities to the exclusion of rural respondents. Our results suggest, firstly, that the meaning of body appreciation may not be entirely invariant across urban and rural communities, which itself is worthy of further investigation. Nevertheless, based on

evidence of partial scalar invariance of BAS-2 scores, we also found that rural participants had significantly greater body appreciation than urban participants. The latter finding, if it can be replicated in other regional and national contexts, may be particularly useful for scholars and practitioners, as it may provide clues for promoting healthier body image across communities. Doing so would also help practitioners develop new interventions or tailor existing interventions (e.g., Lewis-Smith et al., 2022) that could conceivably promote healthier body image in rural communities.

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Table 1

Measurement across Rural and Urban Groups.

Model	SB χ^2	df	Robust CFI	Robust RMSEA	SRMR	Model Comparison	Δ SB χ^2	Δ df	Δ Robust CFI	Δ Robust RMSEA	Δ SRMR
Baseline	173.60	35	.919	.110	.049						
Configural	196.83	70	.919	.105	.051	Baseline vs Configural	23.23	35	<.001	.005	.002
Metric	243.52	79	.898	.111	.090	Configural vs metric	46.69	9	.021	.006	.039
Partial Metric A Item #2	235.28	78	.902	.110	.085	Configural Vs Partial Metric A	38.45	8	.017	.005	.034
Partial Metric B Items #2 & 10	226.38	77	.906	.108	.078	Configural Vs Partial Metric B	29.55	7	.013	.003	.027
Partial Metric C Items #2, 3 & 10	218.62	76	.910	.106	.073	Configural Vs Partial Metric C	21.79	6	.009	.001	.022
Partial Scalar A	254.18	85	.898	.107	.079	Partial Metric c Vs Partial Scalar A	18.9	9	.012	.001	.006
Partial Scalar B Item # 9	248.06	84	.901	.107	.078	Partial Metric c Vs Partial Scalar B	29.44	8	.009	.001	.005

Note. CFI = Comparative fit index, RMSEA = Steiger-Lind root mean square error of approximation, SRMR = standardised root mean square residual, SB = Satorra-Bentler; Partial Metric A allowed loading for Item #2 to vary; Partial Metric B allowed loadings for Items #2 and 10 to vary; Partial Metric C allowed loadings for Items #2, 3, and 10 to vary; Partial Scalar B freed the intercept for Item #9.

Table 2

Descriptive Statistics for Body Appreciation and Life Satisfaction in Rural and Urban Participants

Site		Body appreciation		Life satisfaction	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Rural	Total	4.23	0.52	3.92	0.64
	Women	4.24	0.52	3.91	0.66
	Men	4.24	0.51	3.93	0.62
Urban	Total	3.87	0.74	3.55	0.73
	Women	3.74	0.82	3.60	0.78
	Men	4.01	0.64	3.50	0.68