The Body and Appearance Self-Conscious Emotions Scale (BASES): A Comprehensive Examination of its Factorial Validity, with Recommendations for Researchers

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Abstract

The 16-item Body and Appearance Self-Conscious Emotions Scale (BASES) is widely used to assess the discrete emotions of guilt, shame, authentic pride, and hubristic pride. However, recent work has questioned the factorial validity of the BASES (i.e., the extent to which it truly assesses a discrete set of self-conscious emotions). In the present study, we re-assessed the factorial validity of the BASES using confirmatory factor analysis (CFA) and exploratory structural equation modelling (ESEM). An online sample of adults from the United Kingdom ($N = 637$) were asked to complete the BASES. Our analyses indicated that the original 4-factor CFA model had adequate fit but resulted in very high latent correlations between similarly valenced facets (Guilt/Shame and Authentic/Hubristic Pride, respectively). An alternative 2-factor CFA model (combining Guilt-Shame and Authentic-Hubristic Pride) had a less-than-ideal fit. Conversely, 4-factor and 2-factor ESEM solutions both resulted in a superior fit to the data than their CFA counterparts, and in reduced estimates of factor correlations. Both of these ESEM solutions were also fully invariant across gender. These results have important theoretical and practical implications for our understanding of body and appearance-related self-conscious emotions and how this construct is currently measured.

Keywords: Self-conscious emotions; BASES; Factorial validity; Exploratory structural equation modelling; Confirmatory factor analysis

1. Introduction

As part of the focus of research on self-consciousness and affect, body image scholars have emphasised the importance of considering appearance-related self-conscious emotions, such as shame, guilt, and pride (Sabiston et al., 2010, 2019). Specifically, body and appearance-related shame is a painful emotion that is elicited when events that are incongruent with one's identity are attributed to global, stable, and uncontrollable aspects of the self (e.g., failure to attain internalised ideals of appearance). Conversely, body and appearance-related guilt is elicited when attributions are made to specific, unstable, or controllable aspects of the self (e.g., consumption of fatty foods; Castonguay et al., 2012). Both shame and guilt are thought to play important roles in motivating thoughts, feelings, and actions related to one's body and appearance and may, in some situations, lead to maladaptive outcomes (e.g., social physique anxiety Castonguay et al., 2014). Meanwhile, body and appearance-related pride is defined as either authentic (e.g., when an individual undertakes specific behaviours or achieves goals that are consistent with internalised social standards, such as exercising regularly) or hubristic (e.g., involving more global and less controllable aspects of the self, such as being a physically attractive person; Castonguay et al., 2013). While authentic pride has been conceptualised as leading to positive outcomes (e.g., improved self-esteem), hubristic pride has proposed as serving both adaptive and maladaptive functions (e.g., increased and decreased self-esteem; Castonguay et al., 2014).

To measure these body and appearance-related emotions, Castonguay and colleagues (2014) created the 16-item Body and Appearance Self-Conscious Emotions Scale (BASES). From an initial pool of 24 items measuring body and appearance-related shame, guilt, authentic pride, and hubristic pride, these authors first eliminated eight items with low item variance and high inter-item correlations, resulting in a final set of 16 items. Next, using confirmatory factor analysis (CFA), they reported that a hypothesised 4-factor model of scores obtained on the BASES resulted in an adequate level of fit to the data in a sample of Canadian adults. Subsequent work has also supported this 4-factor structure in samples of Polish (Razmus et al., 2019) and Iranian (Zemestrani et al., 2021) adults (for alternative findings, see: Spanish: Alcaraz-Ibáñez & Sicila, 2018; Brazilian Portuguese: Chiminazzo et al., 2021; Malay: Swami, Maïano et al., 2021). As a result, this 4-factor CFA structure is now widely used in research as *the* established structure for BASES scores (Sabiston et al., 2020).

However, the range, distinctions, and structure of self-conscious emotions remains widely debated beyond the body image literature (e.g., Dickens & Robins, 2022; Holbrook et al., 2014a, 2014b), with some of these arguments also now being heard within body image research (Swami, Maïano et al., 2021). The crux of these debates is the issue of *factorial validity*, which refers to the extent to which the underlying putative structure of a scale is recoverable in a set of test scores (Piedmont, 2014). When factorial validity is established, it means that scores on each measurement item (i.e., an item on a scale, or observed variables) shares strong associations with the one construct that it is supposed to define (i.e., the latent factor), while sharing no associations (i.e., cross-loadings), or having negligible associations, with the other constructs assessed within the instrument (Gefen & Straub, 2005). Factorial validity is a vital component in determining the extent to which an instrument truly measures what it purports to measure (Byrne, 2001). In terms of the BASES specifically, it has been suggested that the reliance on CFA in the initial development of the instrument, as well as in subsequent validation studies, may have artefactually influenced the determination of factorial validity (Swami, Maïano et al., 2021).

1.1. The Limitations of Confirmatory Factor Analyses

In CFA, items are only allowed to load on to their respective hypothesised latent factor, while cross-loadings across latent factors are forced to be zero (Marsh et al., 2009, 2014; Morin et al., 2016). Although it is possible in CFA to incorporate a subset of cross-loadings based on a strong supporting theoretical or empirical rationale (e.g., allowing an item measuring insomnia to cross-load on factors measuring anxiety and depression), these inclusions typically remain minimal, need to be justified *a priori*, and are only used to control for strong and substantively meaningful cross-associations. This is not the case for the BASES, for which it is generally assumed that items designed to measure one construct will only be significantly associated with the latent factor reflecting that construct (e.g., authentic pride) without additional associations between these items and non-target factors (e.g., hubristic pride). However, the assumption of zero cross-loadings is highly improbable and especially problematic when measuring conceptually-related constructs (Marsh et al., 2014; Morin et al., 2016), such as the BASES subscales. Indeed, statistical and psychometric research has always acknowledged that items designed to assess conceptually-related factors will tend to share at least some construct-relevant associations with the additional factors included in the model, making CFA an unrealistically restrictive approach to tests of factorial validity (Asparouhov & Muthén, 2009; Marsh et al., 2013, 2014; Morin et al., 2013, 2020).

More precisely, when cross-loadings are assumed (or forced) to be zero, researchers are essentially ignoring the fact that items often overlap and associate with other conceptually related constructs, which in turn leads to biased estimates of factor correlations and of associations between these factors and other variables (Asparouhov & Muthén, 2009; Marsh et al., 2011, 2014; Zhang et al., 2022). This phenomenon is due to the fact that unmodelled cross-loadings, via error propagation, end up inflating the size of the factor correlations, in turn increasing the risk of multicollinearity in predictive analyses (e.g., Morin et al., 2020). In fact, statistical research has shown that failure to model even negligible cross-loadings as small as .10 could lead to biased parameter estimates, whereas allowing for the free estimation of unnecessary cross-loadings still results in unbiased parameter estimates (Asparouhov et al., 2015). This, in turn, can lead to additional model misspecifications (e.g., poor goodness-of-fit indices; Marsh et al., 2020), forcing researchers to rely on suboptimal *post hoc* procedures to correct the situation (e.g., examining modification indices to locate potential areas of misspecification, adding correlated uniquenesses, etc.; Schumacker & Lomax, 2004). However, even well-fitting CFA models may hide these misspecifications given their ability to absorb unmodelled cross-loadings through an inflation of factor correlations, without letting them impact model fit (e.g., Morin et al., 2016, 2020). Thus, even if the fit of the *a priori* 4-factor structure of the BASES has been confirmed in previous research (e.g., Castonguay et al., 2014), this is no guarantee that this structure provides a non-artefactual conceptualisation of the latent constructs measured by this instrument.

In fact, where studies have assessed the factorial validity of the BASES using methods other than CFA, discrepant results have been reported. For instance, relying on exploratory factor analysis (EFA) to allow for the free estimation of all cross-loadings, Alcaraz-Ibáñez and Sicila (2018) reported that, although the 4-factor model of BASES scores had adequate fit, one item (Item #7) hypothesised to load on the Guilt subscale in fact loaded on the Shame subscale (see also Chiminazzo et al., 2021). Likewise, based on the results of EFA, Swami, Maïano et al. (2021) suggested that the BASES may in fact consist of two, rather than four, broad dimensions of shame-guilt and hubristic-authentic pride, respectively, rather than four orthogonal latent constructs. This suggestion is consistent with the repeated observation that the BASES factors sharing the same valence (i.e., shame and guilt *versus* authentic and hubristic pride) are consistently strongly correlated with one another (~ |.60|-|.80|; Alcaraz-Ibáñez & Sicilia, 2018; Castonguay et al., 2014; Chiminazzo et al., 2021), possibly as a result of unmodelled cross-loadings.

1.2. Exploratory Structural Equation Modelling as an Improved Test of Dimensionality

One relatively recent alternative to CFA, which may be useful when considering issues of factorial validity, is exploratory structural equation modelling (ESEM; Marsh et al., 2013, 2014; Morin et al., 2013, 2020). ESEM was specifically designed to integrate the best elements of both EFA and CFA, including the relaxation of the zero cross-loadings requirement of CFA (a feature typically limited to EFA), while also allowing researchers to obtain goodness-of-fit statistics, residual correlations, standard error estimates, tests of measurement invariance, and tests of associations between latent constructs (i.e., features typically limited to CFA). As a result, ESEM provides a promising approach to address the aforementioned limitations of CFA for the assessment of factorial validity (Morin et al., 2020). Moreover, target rotation procedures make it possible to rely on an *a priori* (i.e., confirmatory) specification of the main indicators of each factor while allowing for the free estimation of cross-loadings "targeted" to be as close to zero as possible (Morin et al., 2020).

To date, we are aware of only one study that has assessed the factorial validity of the BASES using ESEM. In their study validating a Bahasa Malaysia (Malay) translation of the BASES, Swami, Maïano et al. (2021) provided support for a 2-dimensional structure (shame-guilt and hubristic-authentic pride) of scores obtained on this instrument. At present, however, it remains uncertain whether this 2-dimensional model is specific to the Malaysian context or whether it is generalisable beyond this specific national context. The latter possibility would suggest problems in in the way the BASES has been previously conceptualised based on CFA, which in turn would call into question the results obtained in previous studies relying on a 4-factor representation of the BASES. Swami, Maïano et al. (2021) thus called for further research to better understand the factorial validity of BASES scores.

1.3. The Present Study

In light of the discussions above, and responding to calls from researchers to make fuller use of ESEM in body image research (Swami, Todd et al., 2021), we sought to examine the dimensionality of the BASES in a more analytically rigorous and comprehensive manner, following recommendations outlined in Morin et al. (2020) and Alamer and Marsh (2022). In this process, a researcher evaluates the fit of standard CFA and ESEM models. If the analysis reveals adequate and similar fit indices and parameters (e.g., factor loadings and correlations) for both the CFA and ESEM models, there may be less advantage to pursuing an ESEM model because the ESEM model is less parsimonious than the CFA model (Alamer & Marsh, 2022; Litalien et al., 2015). Otherwise, the observation of an increased level of fit and reduced factor correlations in ESEM relative to CFA, accompanied by similarly well-defined factors, can be taken as evidence supporting the value of ESEM (Morin et al., 2020).

In the present study, we tested the fit of the 4-factor (Castonguay et al., 2014) and 2-factor (Swami, Maïano et al., 2021) BASES models using both CFA (see Figure 1a and 1b) and ESEM (see Figure 1c and 1d). Drawing on similar work focusing on other multidimensional body image-related constructs (e.g., Maïano et al., 2021, 2022; Swami et al., 2022), we predicted that the 2-factor ESEM and 4-factor ESEM models of BASES scores would prove superior compared to their CFA counterparts. Additionally, we also tested the invariance of the optimal model(s) across women and men. Based on previous work showing that the 4-factor model (with Item #7 omitted; Alcaraz-Ibáñez & Sicilia, 2018; Chiminazzo et al., 2021) and the 2-factor model (Swami, Maïano et al., 2021) were invariant across gender, we expected similar results here.

2. Method

2.1. Participants

Participants were 343 women and 294 men (no participant described their gender identity in another way) from the United Kingdom aged between 18 and 74 years (M = 34.59, SD = 11.08) and with a self-reported body mass index (BMI) ranging between 13.25 and 46.28 kg/m^2 (M = 23.93, SD = 5.06). Most participants self-reported their ethnicity as British White (86.3%), while 6.8% were Asian or British Asian, 2.4% were Black or British Black or African Caribbean, and 4.5% self-identified as member of another ethnic group. In terms of education, 6.8% had completed secondary schooling, 30.3% had obtained Advanced-Level (A-Level) qualifications, 40.0% had an undergraduate degree, 11.5% had a postgraduate degree, and 11.5% had some other qualification.

2.2. Measures

2.2.1. Body and appearance self-conscious emotions. Participants completed the 16-item BASES (Castonguay et al., 2014) in English. In theory, the BASES measures four body and appearance self-conscious emotions, namely Guilt (4 items), Shame (4 items), Authentic Pride (4 items), and Hubristic Pride (4 items). All items were rated on a 5-point scale ranging from 1 (*never*) to 5 (*always*). BASES items are reported in Appendix 1.

2.2.2. Demographics. Participants provided information about their gender identity (*woman*, *man*, *identify my gender in another way*), age, highest educational qualification, and ethnicity. They also self-reported their height and weight, which we used to compute BMI as kg/m^2 for sample description purposes.

2.3. Procedures

Ethics approval was obtained from the first author's institution. All data were collected via the Prolific website (a crowdsourcing platform that allows scientists to recruit participants; Palan & Schitter, 2018) on March 26-27, 2022. The project was advertised as a study on "attitudes toward the body" with an estimated completion time (5 min). The panel of potential respondents on Prolific were pre-screened to ensure that only residents and citizens of the United Kingdom (to ensure a culturally homogeneous sample), those of adult age, and those fluent in English were able to complete the survey. Prolific ID codes and IP addresses were checked to ensure that no participant completed the survey more than once. After providing informed consent, participants were asked to complete the BASES followed by the demographic items, which were presented in Qualtrics™. The survey was anonymous and participants were paid £0.75 upon completion. All participants received debriefing information at the end of the survey.

2.4. Analytic Strategy

All analyses were conducted using Mplus 8.7's (Muthén & Muthén, 2021) robust maximum likelihood estimator, which is robust against violations of normality standard errors and produces model-data fit indices that are robust against violations of normality and the use of categorical variables when there are at least five response categories (Bandalos, 2014; Rhemtulla et al., 2012). There were no missing responses in the dataset (participants were prompted to respond to all items). The original 4-factor model (Castonguay et al., 2014) and Swami, Maïano et al. (2021)'s 2-factor model of the BASES were estimated using CFA and ESEM. In the 4-factor (Authentic Pride, Hubristic Pride, Shame, and Guilt) and 2-factor (Authentic-Hubristic Pride and Shame-Guilt) CFA models, BASES ratings were respectively explained by four and two correlated latent factors, without cross-loadings or correlated uniquenesses. In the ESEM solutions, all cross-loadings were freely estimated using a confirmatory oblique target rotation procedure, allowing us to rely on an *a priori* specification of the main indicators of each factor and "targeting" all cross-loadings to be as close to zero as possible (Asparouhov & Muthén, 2009; Browne, 2001).

Composite reliability of BASES latent factors was estimated using McDonald's (1970) omega (ω). Model fit was assessed using the following fit indices: the root mean square error of approximation (RMSEA) and its 90% CI (values ≤ .08 indicate acceptable fit; ≤.06 indicates good fit), the Tucker-Lewis index (TLI; values ≥ .90 indicate acceptable fit and > .95 indicate good fit), and the comparative fit index (CFI; values ≥ .90 indicate acceptable fit and > .95 indicate good fit) (Hu & Bentler, 1999; Marsh et al., 2005; Swami & Barron, 2019). However, goodness-of-fit assessment is insufficient to guide model selection when contrasting CFA and ESEM given the ability of CFA to absorb unmodelled cross-loadings via a simple inflation of factor correlations (Morin et al., 2016, 2020). For this reason, Morin et al. (2016, 2020) recommend a careful examination of parameter estimates (i.e., loadings, cross-loadings, latent correlations, composite reliability) obtained from the various models. In this comparison, the observation of reduced factor correlations in ESEM coupled with generally well-defined factors can be taken as additional evidence in favor of the ESEM solution over a similarly fitting CFA solution (Morin et al., 2016, 2020).

The model providing the most optimal representation of the data based was then retained for tests of measurement invariance across gender. These tests were conducted in the following sequence (Millsap, 2011): (i) configural invariance; (ii) weak invariance (loadings); (iii) strong invariance (intercepts); (iv) strict invariance (uniqueness); (v) invariance of the latent variances/covariances; and (vi) invariance of latent mean factors. Model comparisons (i.e., with each model contrasted to the previous one) relied on changes (Δ) in CFI, TLI, and RMSEA. Invariance was supported when ΔCFI and ΔTLI were ≤ .01, and ΔRMSEA was ≤.015 (Chen, 2007; Cheung & Rensvold, 2002).

3. Results

3.1. Dimensionality

Goodness-of-fit indices for all measurement models are presented in Table 1. The 4-factor CFA solution had an acceptable level of fit to the data (CFI and TLI > .90, RMSEA ≤ .08), whereas some fit indices for the 2-factor CFA solution failed to reach acceptability (TLI = .899; RMSEA = .081). The 4-factor ESEM model had a good fit to the data (CFI and TLI > .95, RMSEA < .06), whereas the 2-factor ESEM model had an acceptable fit (CFI and TLI > .90, RMSEA < .08). Both ESEM models resulted in a substantial improvement in fit relative to their CFA counterparts (4-factor solution: ΔCFI = +.046, ΔTLI = +.039, ΔRMSEA = -.020; 2-factor solution: ΔCFI = +.028, ΔTLI = +.022, ΔRMSEA = -.011). Although these results lend preliminary support to both of the ESEM solutions, we followed Morin et al.'s (2016, 2020) suggestions, turning our attention to the parameter estimates from these solutions.

Parameter estimates for the 4- and 2-factor CFA models are reported in Tables S1 and S2 of the Supplementary Materials, while those for the 4- and 2-factor ESEM solutions are reported in Tables 2 and 3. In the 4-factor CFA solution, factor loadings were all reasonably high (Shame: M_λ = .726; Hubristic Pride: M_λ = .843; Authentic Pride: M_λ = .818; Guilt: M_λ = .726) and accompanied by adequate coefficients of composite reliability (ω = .82 to .91, M_ω = .86). However, the latent correlations between the Guilt and Shame (*r* = .997) and between Hubristic Pride and Authentic Pride (*r* = .941) subscales were high enough to call into question their distinguishability (see Table S1).

In the 4-factor ESEM solution, factor loadings were generally acceptable (Shame: M_λ = .479; Hubristic Pride: M_λ = .639; Authentic Pride: M_λ = .520; Guilt: M_λ = .590) and accompanied by reasonably small cross-loadings, with the exception of Items #5, 7, and 16. Item #5 from the Shame factor was more strongly associated with the Guilt factor, Item #7 from the Guilt factor was more highly associated with the Shame factor, while Item #16 presented a similar pattern of associations with the Shame and Guilt factors. Additionally, when cross-loadings were observed, they were essentially between Hubristic Pride and Authentic Pride or between Shame and Guilt, thus further alluding to the conceptual similarity of these pairs of factors. The composite reliability coefficients of the four factors were adequate (ω = .75 to .85; M_{ω} = .79). In contrast to the 4-factor CFA solution, the correlations between the Guilt and Shame latent factors (r = .460) and between the Hubristic Pride and Authentic Pride latent factors (r = .465) were substantially reduced in ESEM, thus supporting their distinguishability (see Table 2).

In the 2-factor CFA solution (which had less-than-ideal fit indices), factor loadings were all reasonably high (Shame-Guilt: M_{λ} = .725; Hubristic-Authentic Pride: M_{λ} = .816) and associated with adequate coefficients of composite reliability (ω = .90 and .94, respectively). In addition, the latent factor correlation between Hubristic-Authentic Pride and Shame-Guilt was non-significant (see Table S2). Similarly, in the better fitting 2-factor ESEM solution, factor loadings were all reasonably high (Shame-Guilt: M_{λ} = .723; Hubristic-Authentic Pride: M_{λ} = .816) with very small cross-loadings. The composite reliability coefficients of the two factors were adequate (ω = .91 and .94, respectively) and the latent factor correlation between Hubristic-Authentic Pride and Shame-Guilt was modest and significant (see Table 3).

Therefore, based on all of these results, the 4- and 2-factor ESEM solutions were retained and used for tests of measurement invariance across gender. Indeed, although the 4-factor ESEM model resulted in a higher level of fit to the data, and in properly defined and well-differentiated factors, some of the cross-loadings observed in this solution still suggest some level of conceptual overlap between the similarly valenced factors. In contrast, although the fit of the 2-factor ESEM model was slightly lower, this more parsimonious model resulted in clearly defined and well-differentiated factors. As a result, both solutions seemed to provide viable alternatives, depending on whether researchers seek, or not, to differentiate Shame from Guilt, and Hubristic Pride from Authentic Pride[1].

3.2. Measurement Invariance

Goodness-of-fit statistics associated with the 4- and 2-factor ESEM solutions estimated separately among subsamples of male and female participants are reported in Table 1 (Models 2-1, 2-2, 3-1, 3-2). These results revealed acceptable fit indices for all models (CFI and TLI > .90 or > .95; RMSEA ≤ .08). The goodness-of-fit statistics associated with the tests of measurement invariance conducted for 4- and 2-factor ESEM solutions (Models 2-3 to 2-8 and 3-3 to 3-8 in Table 1) also supported the complete measurement invariance (i.e., loadings, intercepts, uniquenesses, variances/covariances, and means) of both solutions.

4. Discussion

In the present study, we sought to re-evaluate the factorial validity of the BASES in an English-speaking sample. Our results indicated that the original 4-factor CFA model had adequate fit but resulted in very high latent correlations between similarly valenced facets. An alternative 2-factor CFA model (combining Guilt-Shame and Authentic-Hubristic Pride) had a less-than-ideal fit, while both the 4-factor and 2-factor ESEM solutions resulted in a superior fit to the data than their CFA counterparts. Our results provide several important insights into the factorial validity of the BASES, which in turn raise both theoretical implications for the construct of body and appearance-based self-conscious emotions and practical considerations for scholars wishing to use the BASES in empirical analyses. Here, we first summarise our main findings before returning to these theoretical and practical implications.

4.1. CFA Solutions

Our results revealed that the original 4-factor CFA representation of BASES scores (Castonguay et al., 2014) had an adequate fit to the data, and resulted in well-defined factors with satisfactory composite reliability. While this might be taken as evidence that the originally hypothesised model can be retained, we caution against such a conclusion. Indeed, in our dataset, the correlations between the Guilt and Shame factors (r = .997), as well as between the two pride factors (r = .941), were high enough to question their distinguishability. Although higher than the correlations reported in previous studies, these findings are consistent with reports that scores on these subscales are strongly correlated with one another (~ |.60|-|.80|; Alcaraz-Ibáñez & Sicilia, 2018; Castonguay et al., 2014; Chiminazzo et al., 2021). Although this is likely to be partially due to the fact that cross-loadings are not estimated in CFAs, these high correlations fail a basic test of conceptual and empirical nomological distinctiveness (Newman et al., 2011), suggesting a lack of conceptual distinctiveness between these pairs of CFA factors. To account for these correlations, as well as for Swami, Maïano et al.'s (2021) results, we also estimated a simpler 2-factor CFA solution, which had to be ruled out as a result of unacceptable model fit.

In sum, none of the CFA-based models tested in the present study was able to provide clear evidence for the factorial validity of BASES scores, resulting in empirical or conceptual deficiencies that raise concerns about their continued usage. These issues are likely a reflection of the fact that CFA forces cross-loadings across latent constructs to be zero, which is very unlikely to be tenable in relation to the BASES (Swami, Maïano et al., 2021). That is, CFA-based modelling of the BASES essentially ignores the fact that BASES items are overlapping and share associations with the other conceptually related constructs measured in this instrument. Supporting this assertion, the CFA models tested in this study resulted in substantively poorer fit indices than their ESEM counterparts.

4.2. ESEM Solutions

The 4-factor and 2-factor ESEM solutions both resulted in an adequate level of fit to the data in this study, with the former providing slightly better fit than the latter. Importantly, the latent correlations obtained in these ESEM solutions were substantially lower than their CFA counterparts, thus providing further support for the importance of accounting for cross-loadings when modelling conceptually-related facets of body and appearance-related self-conscious emotions. However, cross-loadings were a noteworthy issue in the 4-factor ESEM solution. Thus, Item #7 ("In general, I have felt guilt that I look the way I do") was more strongly associated with Shame than with the hypothesised Guilt factor, matching previous EFA results obtained among Spanish adults (Alcaraz-Ibáñez & Sicila, 2018). This suggests that this item may be conceptually closer to experiences of body and appearance-related shame rather than guilt. Conversely, Item #5 ("In general, I have felt inadequate when I think about my appearance") was more strongly associated with Guilt than with the hypothesised Shame factor, whereas Item #16 ("In general, I have felt ashamed that I am a person who is unattractive") had a similar pattern of associations with both the Shame and Guilt factors. Moreover, multiple noteworthy cross-loadings were also observed among the two pride subscales, although these cross-loadings were not large enough to suggest that items should be re-allocated to a different subscale.

These findings broadly suggest that cross-loadings are more common than has previously been assumed, particularly between the similarly-valenced subscales of the BASES (i.e., Shame and Guilt; Hubristic Pride and Authentic Pride). However, although statistically significant cross-loadings were also present in the 2-factor ESEM solution, these cross-loadings were much smaller than in the 4-factor solution and did not challenge the definition of any of the factors. This suggests that it may be more useful, at least in some research contexts, to consider the BASES as tapping two broad domains of self-conscious emotions, namely Shame-Guilt and Authentic-Hubristic Pride. Importantly, our results supported the generalisability (i.e., measurement invariance) of these ESEM in women and men, suggesting that both solutions can be reliably used in tests of gender differences.

4.3. Implications

4.3.1. Theoretical implications. Our findings raise several important issues in relation to the construct of body and appearance-related self-conscious emotions. From a theoretical perspective, Castonguay and colleagues (2012, 2014) suggested that body and appearance-related experiences tend to trigger one of several discrete and universally recognisable self-conscious emotions. For instance, the consumption of fatty foods is thought to elicit body and appearance-related guilt rather than shame. While we agree that there may be distinguishable body and appearance-related self-conscious emotions, our results suggest that it is possible for body and appearance-related experiences to trigger a multitude of self-conscious emotions simultaneously. To use our earlier example, it is possible – and in fact quite likely – for the consumption of fatty foods to trigger both body and appearance-related guilt *and* shame.

Indeed, recent work has suggested that, when participants are asked to recall negative self-conscious emotional experiences, they report multiple self-conscious emotions simultaneously (Mu & Berenbaum, 2019). This might help explain why several items of the BASES cross-load across supposedly discrete factors, but also why a 2-factor ESEM representation of BASES scores achieved an adequate level of fit to the data.

Alternatively, it may be possible for body and appearance-related experiences to truly elicit discrete self-conscious emotions, but the BASES may be unable to adequately capture this discreteness. That is, based on our results, it is possible to question the construct validity of the facets measured by the BASES. To take one example, some items of the Hubristic Pride subscale pejoratively suggest that taking pride in one's appearance is excessive, socially undesirable, and perhaps even unwarranted (e.g., "In general, I have felt proud of my superior appearance"). However, it is possible that individuals who strongly endorse items on the Hubristic Pride subscale are merely accepting of their appearance and unconcerned about displaying pride in this regard – consistent with conceptualisations of positive body image (e.g., Tylka, 2018) and body positivity (Lebouef, 2019). It is thus possible that (some) items of the Hubristic Pride subscale may be interpreted by (some) participants as indicative of an acceptable and authentic manner of taking pride in one's appearance and body. This is an aspect that may be worthy of further research, such as through the use of qualitative methods that explore how items on an instrument are understood (for an applied example, see Brailovskaia et al., 2022).

A similar critique can also be applied to the Guilt and Shame items. For instance, current thinking suggests that shame is a cognitive affective construct, comprising negative judgements of the self as inherently flawed or inadequate (Blythin et al., 2020; Chou et al., 2018; Gilbert & Proctor, 2006). However, the items of the BASES Shame subscale do not – or not fully – centre the experience of appearance and body-related shame on an individual's perceptions of themselves, nor do they distinguish between this and individuals' representation of how they are negatively judged by others (i.e., "external shame"; Gilbert, 1997, 1998). Conversely, guilt is currently conceptualised as concerns with, and negative evaluation of, one's behaviour (Tangney et al., 2007). However, not all BASES Guilt items make reference to behavioural accounts. Indeed, several items of the Guilt subscale conflate experiences of guilt and regret, although these are currently conceptualised as distinct self-conscious emotions that arise from different sources (i.e., intrapersonal and interpersonal harm; for a discussion, see Berndsen et al., 2004). These issues may explain why items on both of these subscales cross-load and why a 2-factor model achieves adequate fit.

4.3.2. Practical implications. The present results and theoretical implications raise some practical issues that require consideration. Most pressingly, how should scholars use the BASES? Our results suggest that scholars have two options going forward. The first option is to rely on a 2-factor ESEM solution model, which will result in a blunt assessment of body and appearance-related self-conscious emotions. This solution is, arguably, the one most consistent with our results and with their theoretical implications, which call into question the true ability to properly differentiate (at least when using the BASES) between Guilt and Shame, as well as between Hubristic and Authentic Pride. The second option is to rely on a 4-factor ESEM solution, while acknowledging that this model entails a less-than-ideal account of body and appearance-related self-conscious emotions. Importantly, when using latent factor scores from this ESEM solution, the factors themselves remain properly defined using all of the conceptually-relevant information available at the item level (i.e., accounting for all of the cross-loadings; Asparouhov et al., 2015). It is mainly when one seeks to move out of the latent variable framework (e.g., calculating scale scores) that one starts to move away from a clear conceptual definition of the factors. Ultimately, the decision to use observed versus latent scores will depend on the research objectives (e.g., to assess predictive validity, to compare differences across groups, to assess effects on other latent variables, etc.), but in either case it remains important to match the level of the hypothesis with the level of analysis (Ullman & Bentler, 2003). In any case, from a practical point-of-view, our results suggest that aggregated scale scores should be avoided, and that research should rather rely on latent ESEM factors, or on factor scores saved from such an ESEM solution.

It is also true that the simpler structure of the 2-factor ESEM solution provides a more naturally intuitive manner of measuring these constructs. Alternatively, proponents of the 4-factor model may suggest that this conceptualisation is more theoretically plausible and practically useful. It is, however, important to highlight the need to separate measurement clarity from theoretical clarity, as the latter does not automatically lead to the former. Generally, based on our results, our current tentative recommendation would have to be in favour of the 2-factor ESEM solution, unless one specifically seeks to differentiate among similarly valanced emotions. A useful interim suggestion at this stage, therefore, may be for scholars to re-assess the factorial validity of the BASES in their own datasets any time the instrument is used and/or to reconsider issues of factorial validity in existing datasets. At this point, we also suggest that it may be unwise to use BASES subscales in isolation, given that it is unclear what specific subscales are measuring conceptually and which items contribute to each subscale. In the longer term, it may be necessary to revise the BASES items to more fully and thoroughly assess the underlying hypothesised latent constructs. Alternatively, there may be some value in developing a scenario-based measure of body and appearance-related self-conscious emotions (for reviews, see Tangney, 1996; Tangney & Dearing, 2002), where respondents are asked to imagine themselves in a set of everyday situations and rate the likelihood of their reacting to those situations in situation-specific manners (e.g., Gilchrist et al., 2019). This would allow respondents to react phenomenologically to each scenario with different self-conscious emotions in a situation-specific manner rather than in the abstract. This method would also allow scholars to better understand how different situations elicit either discrete or multiple body and appearance-related self-conscious emotions.

4.4. Limitations and Conclusion

Our results should be considered in light of several limiting issues. First, we relied on an online sample of adults from the United Kingdom, which may limit generalisability of our findings. In this sense, it would be useful to reconsider the validity of the 2- and 4-factor ESEM models in the national contexts where the BASES has been previously validated (e.g., Alcaraz-Ibáñez & Sicila, 2018; Chiminazzo et al., 2021; Razmus et al., 2019; Swami, Maïano et al., 2021), as well as in additional cultural contexts. Additionally, given our focus on factorial validity, we did not assess other components of validity, such as convergent, predictive, and discriminant validity. Importantly, however, we were able to show that both the 2- and 4-factor ESEM models were invariant across samples of women and men up to the latent means, which is consistent with previous results (Swami, Maïano et al., 2021). Relatedly, however, given that our sample predominantly identified as British White, it may be useful in future work to examine the invariance of these models across ethnic groups, as well as other social identities (e.g., sexual orientation).

These limitations notwithstanding and, while acknowledging that research on body and appearance-related self-conscious emotions has expanded rapidly, we suggest that it may be useful to pause and carefully consider both how such self-conscious emotions should be conceptualised and what the BASES is actually measuring. Further, we suggest that the issues raised here may also affect other similar instruments, such as the Body-Related Self-Conscious Emotions Fitness instrument (BSE-FIT; Castonguay et al., 2016). In all such cases, we suggest that it remains an open question whether body and appearance-related self-conscious emotions can really be decomposed into a discrete set of four emotions, and whether existing instruments are able to adequately assess those emotions. We do not present these criticisms to stem the flow of research on body and appearance-related self-conscious emotions, quite the opposite! Indeed, we remain highly enthusiastic about much of the work conducted in this area. However, we also believe that enthusiasm should go hand-in-hand with methodological and theoretical rigor. In this regard, our results highlight a need to more comprehensively think about body and appearance-related self-conscious emotions, as well as the instruments that are being used to measure this construct.

Footnotes

[1] Psychometrically, it is methodologically possible to test an alternative bifactor structure of the BASES encompassing a series of global (i.e., one global factor reflecting global body and appearance-related emotions, versus two global factors reflecting shame-guilt and authentic-hubristic pride) and specific constructs (i.e., the four or two *a priori* subscales) defined from the same items. However, this conceptualisation may make little theoretical sense. That is, as far as we are aware, there has never been any attempt to conceptualise body and appearance self-conscious emotions as consisting of specific and global factors. In the absence of such a theoretical rationale, bifactor models should be avoided (Morin et al., 2020). Nevertheless, for the sake of completeness (and with the intention of supporting future re-development of the BASES), we also estimated alternative bifactor-CFA and bifactor-ESEM representations of the data, considering models including one global factor and two or four specific factors, and models including two global factors and four specific factors. Consistent with the superiority of the ESEM solutions retained in this study, solutions including one global factor resulted in an improperly defined global factor (capturing only positive or negative emotions rather than both), while those including two global factors resulted in "empty" (weakly defined) specific factors, thus further supporting the retained 2-factor ESEM solution.

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Table 1.

Goodness-of-Fit Statistics of Confirmatory Factor Analyses (CFA) and Exploratory Structural Equation Modeling (ESEM) for the BASES

Models	Nº	Description	Rχ²	df	CFI	TLI	RMSEA	RMSEA 90% CI LB	RMSEA 90% CI UB	CM	ΔRχ²	*df*	*p*	ΔCFI	ΔTLI	ΔRMSEA
Measurement	1-1	CFA - 4 factors	448.919*	98	.930	.915	.075	.068	.082	-	-	-	-	-	-	-
	1-2	CFA - 2 factors	536.999*	103	.914	.899	.081	.075	.088	-	-	-	-	-	-	-
	1-3	ESEM - 4 factors	181.438*	62	.976	.954	.055	.046	.064	-	-	-	-	-	-	-
	1-4	ESEM - 2 factors	383.230*	89	.942	.921	.072	.065	.080	-	-	-	-	-	-	-
ESEM-4 factors	2-1	Men	102.437*	62	.982	.966	.047	.030	.063	-	-	-	-	-	-	-
MI: Gender	2-2	Women	102.509*	62	.986	.973	.044	.028	.058	-	-	-	-	-	-	-
	2-3	Configural invariance	205.897*	124	.984	.970	.046	.034	.056	-	-	-	-	-	-	-
	2-4	Weak invariance	309.176*	172	.974	.963	.050	.041	.059	2-3	102.17	48	<.001	-.010	-.007	+.004
	2-5	Strong invariance	335.098*	184	.971	.962	.051	.042	.059	2-4	32.51	12	.001	-.003	-.001	+.001
	2-6	Strict invariance	334.185*	200	.974	.969	.046	.037	.054	2-5	7.57	16	.96	+.003	+.007	-.005
	2-7	Variance-covariance invariance	362.572*	210	.971	.967	.048	.039	.056	2-6	26.24	10	.003	-.003	-.002	+.002
	2-8	Latent mean invariance	379.648*	214	.968	.964	.049	.041	.057	2-7	313.99	4	<.001	-.003	-.003	+.001
ESEM-2 factors	3-1	Men	215.075*	89	.945	.926	.069	.058	.081	-	-	-	-	-	-	-
MI: Gender	3-2	Women	297.198*	89	.929	.904	.083	.072	.093	-	-	-	-	-	-	-
	3-3	Configural invariance	512.585*	178	.936	.913	.077	.069	.085	-	-	-	-	-	-	-
	3-4	Weak invariance	548.105*	206	.934	.923	.072	.065	.080	3-3	26.12	28	.566	-.002	+.010	-.005
	3-5	Strong invariance	576.131*	220	.932	.925	.071	.064	.078	3-4	25.81	14	.027	-.002	+.002	-.001
	3-6	Strict invariance	585.471*	236	.933	.932	.068	.061	.075	3-5	15.61	16	.480	+.001	+.007	-.003
	3-7	Variance-covariance invariance	588.104*	239	.933	.933	.068	.061	.075	3-6	1.62	3	.655	.000	+.001	.000
	3-8	Latent mean invariance	591.011*	241	.933	.933	.068	.061	.074	3-7	2.28	2	.320	.000	.000	.000

Notes. BASES = Body and Appearance Self-Conscious Emotions Scale; ESEM = exploratory structural equation model; Rχ² = robust maximum likelihood chi-square; df = degrees of freedom; CFI = comparative fit index; TLI = Tucker-Lewis index; RMSEA = root mean square error of approximation; MI = measurement invariance; 90% CI = 90% confidence interval of the RMSEA; LB = lower bound; UB = upper bound; Δ = change from the previous model; ΔRχ² = robust chi-square difference tests (calculated from loglikelihoods for greater precision). * $p \leq .01$

Table 2.

Standardised Parameters Estimates from the Four-Factor Exploratory Structural Equation Modeling Representation of the BASES

Items	Shame (λ)	Hubristic Pride (λ)	Authentic Pride (λ)	Guilt (λ)	δ
1	.504	.105	-.189	.286	.423
5	-.318	.400	-.313	.641	.323
8	.630	.262	-.254	.282	.140
16	.462	-.052	.029	.498	.355
2	.004	.617	.266	-.012	.401
6	-.010	.709	.278	-.041	.255
9	.102	.661	.377	-.100	.244
15	.006	.569	.436	-.030	.267
3	-.206	.378	.466	.184	.349
10	-.069	.366	.536	.131	.340
12	-.113	.356	.511	.168	.360
14	-.012	.379	.566	.087	.309
4	-.078	.099	.055	.681	.510
7	.584	.359	-.252	.217	.245
11	.294	-.245	.217	.746	.313
13	.292	-.174	.191	.714	.336
ω	.747	.848	.761	.798	
Hubristic Pride	-.003	-			
Authentic Pride	-.230	.465	-		
Guilt	.460	.417	-.104	-	

Notes. BASES = Body and Appearance Self-Conscious Emotions Scale; λ = factor loadings; δ = Uniquenesses; ω = McDonald's omega. Non-significant parameters are underlined.

Table 3.

Standardised Parameters Estimates from the Two-Factor Exploratory Structural Equation Modeling Representation of the BASES

Items	Shame-Guilt (λ)	Authentic-Hubristic Pride (λ)	δ
1	.762	-.157	.422
5	.456	.246	.705
8	.910	-.106	.183
16	.799	-.063	.370
4	.519	.251	.637
7	.843	-.018	.293
11	.745	.010	.443
13	.746	.043	.434
3	-.069	.802	.364
10	-.022	.807	.352
12	-.022	.795	.372
14	-.017	.824	.324
2	.067	.755	.414
6	.047	.840	.283
9	.052	.845	.273
15	-.012	.856	.269
ω	.905	.941	
Shame-Guilt	-		
Authentic-Hubristic Pride	.116	-	

Notes. BASES = Body and Appearance Self-Conscious Emotions Scale; λ = factor loadings; δ = Uniquenesses; ω = McDonald's omega. Non-significant parameters are underlined.

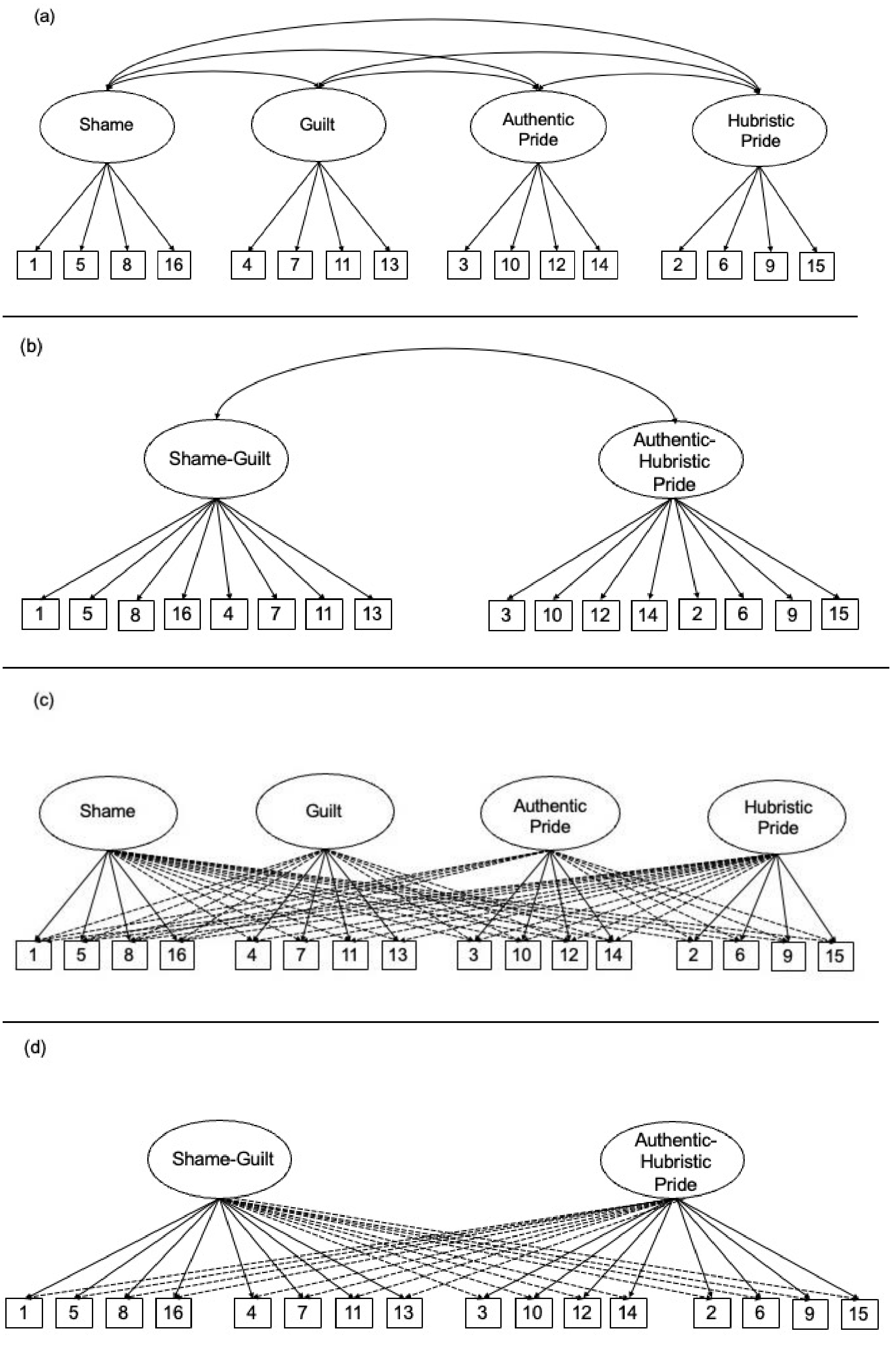

Figure 1.

(a) 4-factor CFA-model; (b) 2-factor CFA model; (c) 4-factor ESEM model; (d) 2-factor ESEM model.

Appendix 1

Items of the Body and Appearance Self-Conscious Emotions Scale.

Item	Hypothesised subscale in Castonguay et al. (2014)
1. In general, I have felt ashamed of the way I look.	S
2. In general, I have felt proud that I am more attractive than others.	HP
3. In general, I have felt proud of the effort I place on maintaining my appearance.	AP
4. In general, I have felt guilty that I do not do enough to improve the way I look.	G
5. In general, I have felt inadequate when I think about my appearance.	S
6. In general, I have felt proud that I am great looking person.	HP
7. In general, I have felt guilt that I look the way I do.	G
8. In general, I have felt ashamed of my appearance.	S
9. In general, I have felt proud of my superior appearance.	HP
10. In general, I have felt proud about my effort to improve the way I look.	AP
11. In general, I have felt regret that I do not put effort into my appearance.	G
12. In general, I have felt proud that I have achieved my appearance goals.	AP
13. In general, I have felt regret that I do not work on improving my appearance.	G
14. In general, I have felt proud of my appearance efforts.	AP
15. In general, I have felt proud that I am an attractive person.	HP
16. In general, I have felt ashamed that I am a person who is unattractive.	S

Note. S = Shame, G = Guilt, AP = Authentic Pride, HP = Hubristic Pride

Supplementary Materials

Table S1. *Standardised Parameters Estimates from the Four-Factor Confirmatory Factor Analytic Representation of the BASES*

Table S2. *Standardised Parameters Estimates from the Two-Factor Confirmatory Factor Analytic Representation of the BASES*

Table S1.

Standardised Parameters Estimates from the Four-Factor Confirmatory Factor Analytic Representation of the BASES

Items	Shame (λ)	Hubristic Pride (λ)	Authentic Pride (λ)	Guilt (λ)	δ
1	.752				.434
5	.461				.788
8	.896				.197
16	.795				.367
2		.781			.391
6		.862			.257
9		.871			.241
15		.857			.266
3			.804		.353
10			.818		.330
12			.809		.346
14			.839		.296
4				.569	.676
7				.826	.318
11				.753	.433
13				.756	.428
ω	.825	.908	.890	.820	
Hubristic Pride	.068	-			
Authentic Pride	-.032	.941	-		
Guilt	.997	.184	.143	-	

Notes. BASES = Body and Appearance Self-Conscious Emotions Scale; λ = factor loadings; δ = Uniquenesses; ω = McDonald's omega. Non-significant correlations are underlined.

Table S2.

Standardised Parameters Estimates from the Two-Factor Confirmatory Factor Analytic Representation of the BASES

Items	Shame-Guilt (λ)	Authentic-Hubristic Pride (λ)	δ
1	.745		.445
5	.474		.775
8	.895		.200
16	.796		.367
4	.542		.707
7	.837		.299
11	.752		.435
13	.755		.430
3		.788	.380
10		.802	.356
12		.788	.378
14		.821	.325
2		.765	.415
6		.847	.282
9		.857	.266
15		.857	.266
ω	.902	.941	
Shame-Guilt	-		
Authentic-Hubristic Pride	.084	-	

Notes. BASES = Body and Appearance Self-Conscious Emotions Scale; λ = factor loadings; δ = Uniquenesses; ω = McDonald's omega. Non-significant correlations are underlined.