The Breast Size Rating Scale: Development and psychometric evaluation

Swami V., Cavelti S., Taylor D. and Tovee M.J.

The Breast Size Rating Scale: Development and psychometric evaluation

Viren Swami[1-2], Silvia Cavelti[1], Donna Taylor[1], and Martin J. Tovée[3]

[1] Department of Psychology, University of Westminster, London, UK

[2] Department of Psychology, HELP University College, Kuala Lumpur, Malaysia

[3] Institute of Neuroscience, University of Newcastle, Newcastle-upon-Tyne, UK

Address correspondence to: Dr. Viren Swami, Department of Psychology, University of Westminster, 309 Regent Street, London W1B 2UW, UK. Email: v.swami@westminster.ac.uk; Telephone: +442079115000.

Abstract

Existing measures of breast size dissatisfaction have poor ecological validity or have not been fully evaluated in terms of psychometric properties. Here, we report on the development of the Breast Size Rating Scale (BSRS), a novel measure of breast size dissatisfaction consisting of 14 computer-generated images varying in breast size alone. Study 1 (N = 107) supported the scale's construct validity, insofar as participants were able to correctly order the images in terms of breast size. Study 2 (N = 234) provided evidence of the test-retest reliability of BSRS-derived scores after 3 months. Studies 3 (N = 730) and 4 (N = 234) provided evidence of the convergent validity of BSRS-derived breast size dissatisfaction scores, which were significantly associated with a range of measures of body image. The BSRS provides a useful tool for researchers examining women's breast size dissatisfaction.

[Abstract word count: 140]

Keywords: Breast size; Breast dissatisfaction; Cup size; Bust size; Figural rating scale; Body image

Accumulating evidence indicates that the breasts play an important role not only in men's judgements of women's physical attractiveness (e.g., Cornelissen, Hancock, Kiviniemi, George, & Tovée, 2009; Dixson, Grimshaw, Linklater, & Dixson, 2011; Swami, Jones, Einon, & Furnham, 2009), but also in women's anxiety about their own bodies (Beck, Ward-Hull, & McLear, 1976; Grogan, Gill, Brownbridge, Kilgariff, & Whalley, 2013). Indeed, breast-related cosmetic procedures – which include breast augmentation and breast reduction – have been the most popular cosmetic procedeures performed in the United Kingdom since at least 2008, with more than 13,000 breast-related procedures performed in 2013 alone (British Association of Aesthetic Plastic Surgeons, 2014).

Although women's breasts vary along many different dimensions that may affect corporeal experiences (e.g., shape, asymmetry, areola size; Manning, Scutt, Whitehouse, & Leinster, 1997), breast size is the most public of those dimensions (e.g., Lynn, 2009) and is also the main way in which women's breasts are objectified in popular culture (Mazur, 1986; Seifert, 2005; Swami & Tovée, 2013a; Tantleff-Dunn, 2001). For example, large breasts are commonly fetishised in mainstream media, particularly media that reproduce heteronormative cultural expectations (Einon, 2012; Gerald & Potvin, 2009; Ward, Merriwether, & Caruthers, 2006). There is also some evidence that women who are more regular consumers of this form of media are concerned with their own breasts (e.g., Harrison, 2003). Furthermore, larger breasts are associated with heightened perceptions of femininity and sexuality (Millsted & Frith, 2003), which may serve to enhance the preference among women for larger breasts, so long as they are not uncomfortably large (Reardon & Grogan, 2011).

The studies that have directly examined breast size dissatisfaction among women appear to support this preference for larger breasts (Forbes & Frederick, 2008; Forbes, Jobe, & Revak, 2006; Jacobi & Cash, 1994; Jourard & Secord, 1955; Tantleff-Dunn & Thompson, 2000; Thompson & Tantleff-Dunn, 2000). For example, in a study of 26,703 heterosexual

women, participants were asked whether they were dissatisfied with their breasts and, if they were dissatisfied, they could indicate which aspect of their breasts they were most dissatisfied with. Fully 70% of women indicated dissatisfaction with some aspect of their breasts, with 28% indicating that their biggest concern was wanting larger breasts, 33% wanting less droopy breasts, and 9% wanting smaller breasts (Frederick, Peplau, & Lever, 2008). Moreover, ethnic differences in breast size dissatisfaction appear to be negligible once body size is controlled for, suggesting that the impact of ethno-cultural influences on attitudes toward breast size may be small (Forbes & Frederick, 2008).

Research also indicates that women who are dissatisfied with their breasts report greater general body dissatisfaction (Fisher, 1973; Forbes & Frederick, 2008; Jourard & Secord, 1955). For example, in the 1972 *Psychology Today* Body Image Study, women who were more dissatisfaied with the breasts reported greater dissatisfaction with their overall appearance (Frederick, Bohrnstedt, Hatfield, & Berscheid, 2014). Similarly, Frederick et al. (2008) reported that women who were dissatisfied with their breasts were more likely to report general body dissatisfaction and greater concern about wearing a bathing suit in public. In addition, Koff and Benavage (1998) reported that breast size dissatisfaction was associated with lower self-esteem and higher public self-consciousness, social anxiety, and appearance preoccupation, regardless of whether ideal size was smaller or larger than perceived size. In short, it has been argued that the sexualisation and objectification of breasts leads to breast size dissatisfaction, which in turn may contribute to more global body image anxiety and a desire for breast augmentation (Forbes & Frederick, 2008).

A limitation of the studies on breast size dissatisfaction to date has been the multiple ways in which the construct has been measured. For example, some studies have used single-item measures of breast size dissatisfaction (e.g., “Are you satisfied with the size of your own breasts?”), typically with three or four response options (e.g., Frederick et al., 2008).

Similarly, Forbes and Frederick (2008) developed a Breast Size Dissatisfaction Scale (BSDS) consisting of three attitudinal items about breast size, with scores from this measure being significantly correlated with actual breast size (measured as cup size). Although the BSDS had good internal consistency (Cronbach's $\alpha = .89$), Forbes and Frederick (2008) did not fully examine its psychometric properties.

A different method of assessing breast size is the use of figural rating scales, which are more widely used to assess discrepancies between self-perceived and ideal body size (for a review, see Gardner & Brown, 2010). For example, the Breast/Chest Rating Scale (BCRS; Thompson & Tantleff, 1992) is a set of five schematic drawings of women and men, ordered by increasing breast and/or chest size, that have been used in a number of studies (e.g., Koff & Benavage, 1998; Tantleff-Dunn, 2002; Tantleff-Dunn & Thompson, 2000). Using this measure, Thompson and Tantleff (1992) reported that women showed a bias for larger breast sizes, although Tantleff-Dunn and Thompson (2000) reported that breast size dissatisfaction scores were not significantly associated with body image disturbance or self-esteem. Other similar figural rating scales have been developed (e.g., Furnham, Dias, & McClelland, 1998; Furnham & Swami, 2007; Swami et al., 2009), but these have not been used to examine women's breast size dissatisfaction.

Even setting aside the fact that the psychometric properties of the BCRS and other figural scales have not been evaluated, line-drawn figures that are altered to depict different bust sizes suffer from poor ecological validity. This likely results in different perceptual meaning being attributed to the images as compared with two-dimensional images of real people (Bateson, Cornelissen, & Tovée, 2007). Not surprisingly, then, within the literature on physical attractiveness, scholars have begun using photographic or computer-generated images (e.g., Dixson et al., 2011; Swami & Tovée, 2013b; Zelazniewicz & Pawłowski, 2010)

or video-clips (Swami & Tovée, 2013a) of women varying in bust size, with far superior ecological validity.

Although these new sets of images may seem useful for measuring breast size dissatisfaction, they suffer from a number of well-known problems afflicting many figural rating scales. First, they include a limited array of figures (typically less than six), which results in a loss of pertinent information (Gardner & Brown, 2010). For example, the video-clips used by Swami and Tovée (2013a) depicted women varying in five breast sizes, which is unlikely to capture the full range of breast sizes in real morphological terms. Second, the depiction of visible facial features in these scales may distract attention away from the body (Gardner, Jappe, & Gardner, 2009). Finally, as with all other measures of breast size dissatisfaction, there remains a serious dearth of information on their psychometric properties, and it is quite possible that they may not meet adequate psychometric criteria.

Here, we report on the development and psychometric validation of a novel measure of breast size dissatisfaction, namely the Breast Size Rating Scale (BSRS). The BSRS was specifically designed to overcome some of the limitations discussed above. Specifically, it consists of an array of fourteen computer-generated, headless figures of the female form varying in breast size (see Figure 1). In four studies, we report on the initial construct validation of the BSRS (Study 1: ordering of images in terms of breast size), its test-retest reliability and validity (Study 2: stability of current and ideal breast size ratings over a period of 3 months and associations with actual breast size), and its construct validity among student (Study 3: associations between breast size dissatisfaction and indices of negative body image) and community samples (Study 4).

Study 1

In Study 1, we report on the initial development of the BSRS and provide initial evidence for its construct validity. Specifically, we asked participants to order the images of

the BSRS from smallest to largest breast size so as to determine whether adjacent figures in the scale showed sufficient scalar detail to be distinguished from one another. Furthermore, in Study 1, we also examined the stability of this rank ordering of the images over a 4-week period, as has been conducted in psychometric evaluations of other figural rating scales (e.g., Swami, Salem, Furnham, & Tovée, 2008; Thompson & Gray, 1995). Finally, in a preliminary assessment of the construct validity of the BSRS, we also examined associations between current breast size ratings and self-reported bra size.

Method

Participants. The participants of Study 1 were 107 female students recruited from a university in Greater London, UK. Participants had a mean age of 21.22 years (*SD* = 3.81) and a mean self-reported body mass index (BMI) of 21.76 kg/^{2} (*SD* = 3.44). The majority of participants were of British White descent (86.0%), while the remainder were of South Asian (10.3%) or African Caribbean descent (3.7%). A total of 76 participants were re-tested after 4 weeks (age British White, 9.2% were South Asian, and 5.3% were African Caribbean.

Measures.

Breast Size Rating Scale (BSRS). We developed a new set of computer-generated images, as has been done in previous studies where breast size has been the only trait varied across figures (Swami & Tovée, 2013a, 2013b). Specifically, the stimuli were created using DazStudio 3.1 (www.daz3d.com), an interactive three-dimensional (3D) modelling software that allows for the creation of photo-realistic 3D models. As in previous work, we used the female 3D model called Victoria 4.2, with the Lana Elite skin texture, and the Victoria 4 Bikini. Breast size was modified using the breast size dimension on the Body Morphs++ add-on package. Breast size was set at 14 equidistant levels using the breast size slider, resulting in a set of 14 stimuli that were initially rendered in 24-bit colour and in 685 x 895 pixel resolution. Following earlier recommendations (Gardner & Brown, 2010; Swami et al.,

2008), we omitted the heads of the figures to remove any potential impact of facial features and presented the final images in greyscale to minimise the impact of perceived ethnicity (see Figure 1).

For the purposes of Study 1, each of the 14 images was printed onto sheets of card measuring 297 x 210 mm, with each figure measuring 272 x 96 mm. Following best practice (Gardner & Brown, 2010), the cards were presented to participants in random order. Participants were asked to order the images from smallest to largest breast size and to select the image that they perceived as most accurately matching their current breast size.

Bra size. Participants self-reported their bra size in two parts, namely cup size and band size. Cup size refers to the thoracic circumference across the fullest part of the breasts. Here, we converted responses to a categorical classification ranging from AA (smallest) to G (largest in this study). Band size refers to the thoracic circumference under the bust level at the level of the inframammary fold, converted to a categorical classification ranging from 28 (smallest) to 38 (largest in the present study).

Subjective breast size. Previous studies have suggested that British women tend to overestimate their cup size and underestimate their band size (Greenbaum, Heslop, Morris, & Dunn, 2003), with the discrepancy between reported and correct bra size being largest for large-breasted women (Wood, Cameron, & Fitzgerald, 2008). For this reason, we also asked participants to subjectively reported their breast size (1 = *Small*, 2 = *Medium*, 3 = *Large*).

Demographics. Participants provided their demographic detail consisting of age, ethnicity, height, and weight. We used height and weight data to calculate self-reported BMI as kg/m^2.

Procedures. Ethics approval was obtained from the relevant university ethics committee. Participants were recruited opportunistically from university campus settings by two female research assistants, who invited participation in a study about breast size.

Potential participants were recruited from areas of congregrate activities, such as study areas and cafeterias. All participants who agreed to take part in the study provided informed consent and completed the task requirements in a laboratory setting. All participants initially ordered the BSRS images and indicated the image that most accurately depicted their current breast size before completing a survey with the remainder of the items above.

Four weeks after the initial test, all 107 participants were invited by e-mail to take part in a second survey, again on breast size. The participants were not told that they would be retested on the same measures, but rather were told that they would be invited to take part in a second survey. Of those invited, 76 participants agreed to take part, representing a response rate of 71.0%. As required by the ethics committee, nominal codes were used to link the test and retest data without breaching participants' right to anonymity. Participants who agreed to take part in the second phase were tested in a laboratory setting. They were presented with the BSRS images in a random order and asked to arrange the images in ascending order. Following this, they selected the figure that most accurately depicted their current breast size and provided their bra size, subjective breast size rating, height, and weight. Once testing at both phases was complete, all participants were fully debriefed via e-mail and provided with the contact details of the first author.

Results and Discussion

Sample characteristics. Independent samples *t*-tests indicated that there were no significant differences between participants in both test periods on age, $t(105) = 0.39$, $p = .696$, $d = 0.08$, and self-reported BMI, $t(105) = 0.66$, $p = .510$, $d = 0.13$. In addition, there was no significant difference in the distribution of ethnic groups between testing periods, $\chi^2(2) = 1.93$, $p = .381$, $\phi = 0.07$. These results suggest that the re-test subset was equivalent demographically to the original sample.

Initial analyses. We initially examined the percentage of correctly positioned images for all 107 participants during the first testing period. Of the possible 1498 responses for the total image set, 98.8% of responses indicated correctly positioned images in ascending order. At re-test, the same procedure showed that 98.7% of a possible 1064 responses were correct. These figures are slightly higher than those provided for a body size figural rating scale with fewer images (Swami et al., 2008). It would, therefore, appear that the increase in breast size between successive images was identifiable. In terms of the image that was perceived to most accurately represented participants' current breast size, there was a fairly even distribution of selections across images (M = 7.00, SD = 3.85) based on skewness (.04) and kurtosis data (-1.10). Figures 2, 8, and 10 were the most frequently selected (12.1% each). Test-retest correlations for the figure rated as best representing current breast size was strong after 4 weeks, r = .92, p < .001, and there was no significant temporal shift in mean scores, $t(30)$ = 0.74, p = .453, d = 0.06.

Construct validity. To examine the construct validity of the BSRS, we examined correlations between the figure rated as the most accurate in depicting current breast size, cup size, band size, subjective breast size judgements, and BMI. For the total sample, current breast size ratings were significantly correlated (all ps < .001) with cup size, r = .69, band size, r = .34, subjective breast size, r = .83, and BMI, r = .41. These correlations remained stable and significant for the re-test sample: cup size, r = .70, p < .001, band size, r = .31, p = .006, subjective breast size, r = .87, p < .001, and BMI, r = .45, p < .001. Overall, the results of Study 1 provide initial support for the construct validity and test-retest reliability of the BSRS.

Study 2

In Study 2, we examined the test-retest reliability of the BSRS over a period of 3 months. Gardner and Brown (2010) have proposed rigorous methods for examining test-retest

reliabilities of figural rating scales, including the presentation of images in a random sequence and the use of separate presentation orders when asking participants to make current and ideal figure ratings. In this study, we examined the test-retest reliability of current and ideal breast size ratings using the BSRS and taking these recommendations into account. In addition, we also assessed the validity of current ratings in relation to objectively measured, rather than self-reported, breast size.

Method

Participants. The participants of Study 2 were 234 female university students from a university in Greater London, UK (age *M* = 25.53, *SD* = 10.56; BMI *M* = 21.73, *SD* = 3.60). Of this sample, 76.0% reported as being of British White descent, 20.9% as of South Asian descent, and 3.0% as of African Caribbean descent. After 3 months, a total of 168 participants were retested (age *M* = 24.73, *SD* = 10.02; BMI *M* = 21.68, *SD* = 3.60). Of this subsample, 73.8% were of British White descent, 24.4% of South Asian descent, and 1.8% of African Caribbean descent.

Measures.

Breast Size Rating Scale. As before, the figures of the BSRS were printed on sheets of card measuring 297 x 210 mm, with the figures themselves measuring 272 x 96 mm. Participants were initially presented with all figures in a random order and were asked to select the breast size that most closely matched their current breast size. The set of cards was then completely randomised and, in a subsequent presentation, participants were asked to select the breast size that most closely resembled their ideal breast size. Both ratings were considered to have been made on a 14-point scale (1 = *Figure with the smallest breast size*, 14 = *Figure with the largest breast size*). The computation of a breast size dissatisfaction score is discussed in the Results section.

***Actual bra size*.** Because the majority of women wear incorrectly sized bras, correct bra size was determined for each participant using established measurement guidelines (Spencer & Briffa, 2013; Wood et al., 2008). Two female research assistants who received professional training on bra fit made all breast size measurements using under-bust and over-bust circumference. Under-bust circumference indicated the band size (in the present study, range = 28 to 38) and the difference between under- and over-bust circumferences indicated cup size (in the present study, range = AA to FF).

***Subjective breast size*.** As in Study 1, participants reported their subjective breast size (1 = *Small*, 2 = *Medium*, 3 = *Large*).

***Breast size satisfaction*.** We included a one-item measure of breast size dissatisfaction, namely "Are you satisfied with the size of your breasts?". Responses were made on a 5-point Likert-type scale (1 = *Very dissatisfied*, 5 = *Very satisfied*). Previous studies have used similar one-item measures of breast size satisfaction (Forbes & Frederick, 2008).

***Body mass index*.** Body mass (kg) and height (cm) were directly measured to the nearest 0.5kg and 0.5cm, without shoes and in light clothing, using a standard tape measure and weighing scale. BMI was calculated as kg/m^2.

***Demographics*.** Participants provided their demographic details consisting of age and ethnicity.

Procedures. Ethics approval had been obtained from the relevant university ethics committee. As in Study 1, participants were recruited opportunistically by two female research assistants from campus settings. Participants who agreed to take part and who had not previously taken part in Study 1 were provided with information about study requirements and provided informed consent. All participants were tested in a private cubicle. They first completed the BSRS portion of testing and completed the additional measures

above. A female researcher then measured participants' under-bust and over-bust circumference, with participants in light clothing and bra-less. The same researcher also measured participants' height and weight. All participants who took part in this portion of the study were entered in a pool for a book voucher worth £50.

Twelve weeks after the initial test, all 234 participants from the initial pool were invited by e-mail to take part in a second survey. Of those invited, 168 agreed to take part (response rate = 71.2%), with nominal codes used to link test and retest data without breaching participants right to anonymity. During retest, participants only completed the BSRS portion of the test as described above. Participants who agreed to take part in this second phase of the study were entered into a new pool for a book voucher worth £50. At the end of testing, all participants in both phases received debriefing information via e-mail, which included the contact details of the first author.

Results and Discussion

Sample characteristics. The test and retest samples did not differ significantly in terms of age, $t(232) = 1.86$, $p = .064$, $d = 0.24$, and BMI, $t(232) = 0.32$, $p = .748$, $d = 0.04$. In addition, there was no significant difference in the distribution of ethnic groups between both samples, $\chi^2(2) = 3.71$, $p = .335$, $\phi = 0.03$. This suggests that the test and retest samples were generally similar in terms of key demographics.

Descriptive analyses. For the total sample at the time of initial testing, the mean current rating on the BSRS was 6.73 ($SD = 3.86$, skewness = .16, kurtosis = -1.17). Current breast size ratings were significantly correlated with cup size, $r = .77$, $p < .001$, band size, $r = .19$, $p = .004$, subjective breast size, $r = .88$, $p < .001$, and BMI, $r = .37$, $p < .001$. The mean ideal rating on the BSRS was 7.08 ($SD = 2.93$, skewness = .03, kurtosis = -0.37). We calculated breast size dissatisfaction by subtracting ideal from current ratings, such that negative integers denote a preference for larger ideal as compared current breast size. The

mean score was -0.54 (*SD* = 3.04, skewness = -.24, kurtosis = 0.38). In total, 23.4% of women reported no breast size dissatisfaction, 49.7% reported wanting a larger breast size, and 26.9% reported wanting a smaller breast size. Next, we calculated an absolute breast size dissatisfaction score, such that higher values reflect greater breast size dissatisfaction regardless of direction (i.e., whether women wanted larger or smaller breast relative to their current breast size). This score (*M* = 2.25, *SD* = 2.00) was significantly correlated with our one-item measure of breast size satisfaction ($r = -.72$, $p < .001$).

Test-retest reliability. For the subset of retest participants, there was a significant correlation between ratings of current breast size at the initial testing period and after 3 months, $r = .93$, $p < .001$, and no significant shift in mean scores, $t(65) = 1.42$, $p = .161$, $d = 0.19$. In addition, ratings of ideal breast size were also significantly correlated at test and retest, $r = .88$, $p < .001$, and mean ratings were not significantly different, $t(65) = 1.59$, $p = .118$, $d = 0.17$. Finally, breast size discrepancy scores were also significantly correlated at test and retest, $r = .90$, $p < .001$. These correlation coefficients were all far above the conservative .80 cut-off recommended by Carmines (1990). Current breast size ratings after 3 months remained significantly correlated with actual breast size (cup size, $r = .73$, $p < .001$; band size, $r = .19$, $p = .014$) as measured during the first testing session. Overall, the results of Study 2 provide further support for the construct validity of the BSRS, as well as for its test-retest reliability.

Study 3

In Study 3, we examined the convergent validity of BSRS-derived breast size dissatisfaction scores. More specifically, we examined associations between breast size dissatisfaction and indices of negative body image (actual-ideal weight discrepancy, body dissatisfaction, and drive for thinness) and positive body image (body appreciation), with the expectation that there would be small-to-medium correlations. This is based on the finding

that breast size dissatisfaction is an important facet of overall negative body image among women (Frederick et al., 2008). In addition, we examined associations between breast size dissatisfaction and the internalisation of media messages about appearance. Given that women's breasts are frequently objectified in popular culture (e.g., Mazur, 1986; Seifert, 2005; Tantleff-Dunn, 2001), we expected small-to-medium correlations between breast size dissatisfaction and attitudes toward media messages about appearance.

Previous work has also indicated that women who are dissatisfied with their breasts are more likely to express concern about wearing a bathing suit in public, are less willing to undress in front of their partners, and more likely to conceal their breasts from their partners during sex (Frederick et al., 2008). We, therefore, included measures of social physique anxiety and the tendency to cover-up one's appearance by wearing non-revealing clothing. Again, we expected small-to-moderate correlations between these variables and breast size dissatisfaction. In short, significant correlations between the variables listed here and breast size dissatisfaction would provide support for the convergent validity of the BSRS.

Method

Participants. The participants of Study 3 were 730 female students from three universities in Greater London, UK. Participants had a mean age of 24.62 years (*SD* = 9.51) and a mean self-reported BMI of 21.76 kg/m^2 (*SD* = 3.44). Of the sample, 74.7% reported being of British White descent, 11.9% of South Asian descent, and 3.4% of African Caribbean descent, while the remainder were of some other ethnic background. The majority of this sample were single and never married (63.7%), while 16.4% were cohabiting with a romantic partner, 7.5% were married, 4.1% were separated or divorced, and 8.2% were of some other marital status.

Measures.

***Breast size dissatisfaction*.** Participants completed a modified version of the BSRS in which the 14 images were presented in ascending order in two rows on a single page of the survey package (see Figure 1). All images were numbered, presented in greyscale, and shown without the appearance of facial features. Participants were asked to rate the image that most closely matched their current breast size and the image that they would most like to possess. The order of these items was presented in a random order for each participant. Responses were made on a 14-point scale, with 1 representing the figure with the smallest breast size and 14 representing the figure with the largest breast size. The computation of a breast size dissatisfaction score is discussed in the Results section.

***Weight discrepancy*.** To measure actual-ideal weight discrepancy, we used the Photographic Figure Rating Scale (PFRS; Swami et al., 2008), which consists of 10 photographic and standardised images of real women in frontal view. The women depicted in the PFRS represent the full range of established BMI categories, from emaciated to obese, and are presented in greyscale and with faces obscured. Participants were asked to rate the figure that most closely matched their own body and the figure that they would most like to possess. Responses were made on a 10-point scale, with 1 representing the figure with the lowest BMI and 10 the figure with the highest BMI. A measure of actual-ideal weight discrepancy was computed as the difference between unsigned (absolute) current and ideal ratings, such that higher scores indicate greater actual-ideal weight discrepancy. Previous work has shown that scores derived from the PFRS have good psychometric properties and test-retest reliability after a 3-week interval (Swami et al., 2008, 2012).

***Body appreciation*.** Participants completed the Body Appreciation Scale (BAS; Avalos, Tylka, & Wood-Barcalow, 2005), a 13-item scale that measures several aspects of positive body image. Items were rated on a 5-point Likert-type scale (1 = *Never*, 5 = *Always*). Among Western samples, the scale has a one-dimensional factor structure, with good

discriminant, construct, and incremental validities (Avalos et al., 2005; Swami, Steiger, Haubner, & Voracek, 2008). An overall score was computed by taking the mean of all items, with higher scores indicating more positive body appreciation. In this study, Cronbach's alpha for this scale was .92.

***Body dissatisfaction*.** Body dissatisfaction was measured with the Body Dissatisfaction subscale of the Eating Disorders Inventory-3 (EDI-3; Garner, 2004). The subscale consists of 9 items that measure attitudes and feelings about the body. Items were rated on a 5-point Likert-type scale (1 = *Never*, 6 = *Always*) and an overall score was computed as the mean of all items. Higher score on this subscale indicate greater body dissatisfaction. As indicated in the EDI-3 manual, the subscale has very good psychometric properties. In the present study, Cronbach's alpha for this subscale was .88.

***Drive for thinness*.** To measure drive for thinness, we used the 7-item Drive for Thinness subscale of the EDI-3 (Garner, 2004), which measures preoccupation with body weight, intense fear of becoming fat, and excessive concern with dieting. Items were rated on a 6-point Likert-type scale ranging from 1 (*Never*) to 6 (*Always*) and an overall score was computed as the mean of all items (higher scores indicate greater drive for thinness). The subscale has good reliability and validity (Garner, 2004) and, in this study, Cronbach's alpha was .82.

***Attitudes toward media messages*.** Participants completed the Sociocultural Attitudes Toward Appearance Questionnaire-3 (SATAQ–3; Thompson, van den Berg, Roehrig, Guarda, & Heinberg, 2004), a 30-item scale that assesses the multidimensional impact of sociocultural influences on body image. The SATAQ-3 consists of four distinct factors: Information (the extent to which various media are considered an important source of information about appearance), Pressure (pressure from various media to strive for ideals of beauty), Internalization-General (endorsement and acceptance of media messages concerning

unrealistic aesthetic ideals), and Internationalization-Athlete (endorsement and acceptance of an athletic and toned body ideal). Items were rated on a 5-point Likert-type scale ranging from 1 (*Definitely disagree*) to 5 (*Definitely agree*). Subscale scores were computed by taking the mean of items associated with each subscale. The four factors have been shown to be internally reliable, with a good pattern of psychometric properties (Thompson et al., 2004). In this study, Cronbach's alphas for the four subscales were as follows: Information, .85; Pressure, .81; Internalization-General, .89; Internalization-Athlete, .84.

***Social physique anxiety*.** Participants also completed the Social Physique Anxiety Scale (SPAS; Hart, Leary, & Rajeski, 1989), which is a 12-item measure of anxiety associated with perceived evaluation of one's body or physical appearance. Items were rated on a 5-point Likert-type scale (1 = *Not at all like me*, 5 = *Like me a lot*). An overall score was computed as the mean of all items (higher scores indicate greater social physique anxiety). The SPAS has been shown to have adequate construct validity, internal consistency, and test-retest reliability (Hart et al., 1989). In this study, Cronbach's alpha for this scale was .93.

***Bra size*.** Participants self-reported their bra size in terms of cup size (in this study, AA to G) and band size (in this study, 28 to 38).

***Subjective breast size*.** Participants were asked to subjectively reported their breast size (1 = *Small*, 2 = *Medium*, 3 = *Large*).

***Demographics*.** Participants provided their demographic details consisting of age, ethnicity, marital status, height, and weight. We used height and weight data to calculate participants' self-reported BMI as kg/m^2.

Procedures. Ethics approval was obtained from the relevant university committee. In order to achieve a large sample, potential participants were recruited using a range of methods, namely advertising via posters on university campuses, pages on social networking sites, and word-of-mouth and snowballing using the researchers' student networks. The

researchers' networks were the most popular recruitment method, resulting in 80.0% of responses. Potential for duplications was minimised through host limits of one survey per IP address. In addition, recruitment was targeted at universities other than those used in Studies 1 and 2, further minimising the risk of cross-study recruitment. A total of 952 individuals opened the first page of the survey, with 730 providing complete responses on the whole survey.

The survey was presented online on 10 webpages. The first page provided information about the study and allowed participants to confirm that they were women aged 18 years or over still in full-time education and to provide informed consent. The following eight pages of the survey presented the scales above in a random order for each participant. We did not control for the screen size used to complete the survey, which means that the size of the stimuli presented therein may have differed between participants. The final page of the survey presented participants with debriefing information and the contact details of the first author. All participants took part on a voluntary basis and were not remunerated for participation.

Results and Discussion

Descriptive analyses. The mean rating for current breast size for the total sample was 6.85 (*SD* = 3.86, skewness = .12, kurtosis = -1.02). Current breast size ratings were significantly correlated with cup size, $r = .68$, $p < .001$, band size, $r = .24$, $p < .001$, and subjective breast size, $r = .85$, $p < .001$. The mean ideal rating on the BSRS was 7.22 (*SD* = 2.67, skewness = .01, kurtosis = -0.30). We initially calculated breast size dissatisfaction by subtracting ideal from current ratings, such that negative integers denote a preference for larger ideal as compared current breast size. The mean breast size dissatisfaction score was -0.36 (*SD* = 2.91, skewness = .38, kurtosis = 0.14). In total, 16.5% of women reported no

breast size dissatisfaction, 54.3% reported wanting a larger breast size, and 30.2% reported wanting a smaller breast size.

For further analyses, we calculated absolute breast size dissatisfaction scores, so that higher scores reflect greater breast size dissatisfaction (M = 2.24, SD = 1.89). As can be seen in Table 1, greater breast size dissatisfaction was significantly associated with greater weight discrepancy, body dissatisfaction, drive for thinness, social physique anxiety, a tendency to wear non-revealing clothing, and BMI. Greater breast size dissatisfaction was also significantly correlated with three of the four SATAQ-3 subscales and with lower body appreciation. By Cohen's (1988) standards, most of the significant correlations with breast size dissatisfaction were of a small-to-medium effect size. Overall, these results provide evidence of the convergent validity of BSRS-derived breast size dissatisfaction scores.

Study 4

An important limitation of the three studies above is the reliance on student samples, which limits the generalisability of our findings to the wider population. In Study 4, we purposively recruited participants from a community sample in order to assess the generalisability of the findings in Study 3. In addition, we examined whether breast size dissatisfaction would emerge as a significant predictor of self-esteem once the effects of body dissatisfaction and weight discrepancy had been accounted for. Doing so would allow for an assessment of the degree to which breast size dissatisfaction independently contributes to overall well-being as compared to other indices of negative body image.

A final issue worthy of investigation is the extent to which the presentation size of the stimuli affects construct validity. Specifically, although we found that 98.8% of responses in Study 1 indicated correctly positioned images, it is possible that this was an artefact of the large presentation format for each image. It is unclear how alternative presentation formats (e.g., in smaller size, as is more frequently in questionnaires) might affect respondents'

ability to distinguish between images that vary at the finest level of gradation. That is, it is not apparent that the results of Study 1 would generalise to the smaller image sizes used in 'standard' administration of the BSRS, as we do in Study 4. In a pilot study, therefore, we repeated the construct validity assessment in Study 1, but used a smaller presentation format.

Method

Pilot investigation. Participants of the pilot investigation were 68 female staff recruited from a university in Greater London, UK (teaching staff *n* = 18, non-teaching staff *n* = 50). Participants had a mean age of 35.54 years (*SD* = 5.81) and a mean self-reported body mass index (BMI) of 23.21 kg/^{2} (*SD* = 3.24). The majority of participants were of British White descent (92.0%). As in Study 1, each of the 14 images of the BSRS was printed onto sheets of card; in this study, however, each card measured 95 x 40 mm, with each figure measuring 85 x 30 mm. This mirrors the size of the images as presented in the mainstage Study 4 (see below). The cards were presented to participants in random order and participants were asked to order the images from smallest to largest breast size. Of the possible 1498 responses for the total image set, 90.5% of responses indicated correctly positioned images in ascending order. This figure is substantially lower than than reported in Study 1 (98.8%, and 98.7% at re-test) and suggests that size of presentation of the BSRS images may impact on respondent ability to distinguish between figures. Nevertheless, it would appear that the BSRS figures have, at least, adequate construct validity, insofar as the vast majority of position judgements were correct, even at the smaller size used in this pilot.

Mainstage participants. The participants of the mainstage Study 4 were 234 women recruited from the community in London, UK. Participants had a mean age of 27.36 years (*SD* = 10.30) and a mean self-reported BMI of 23.82 kg/m^2 (*SD* = 3.45). The majority of participants in this sample were of British White descent (75.2%), while the remainder were of Asian (15.9%) and African Caribbean descent (8.8%). In terms of educational

qualifications, 28.6% had completed secondary education, 30.0% had completed pre-university qualifications, 25.2% had an undergraduate degree, 5.6% had a postgraduate degree, and the remainder had some other qualification.

Materials.

***Breast size dissatisfaction*.** Participants completed the BSRS as in Study 3, with the images presented on a single sheet in ascending order in two rows (each figure had the same measurements as in the pilot study above).

***Weight discrepancy*.** Participants completed the PFRS as in Study 3 and scores were used to calculate a measure of actual-ideal weight discrepancy.

***Body dissatisfaction*.** Participants also completed the Body Dissatisfaction subscale of the EDI-3 as in Study 3. Cronbach's alpha for this subscale was .85.

***Self-esteem*.** To measure self-esteem, we asked participants to complete the Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965). This 10-item measure is the most widely-used measure of self-worth. Items were rated on a 4-point scale (1 = *Strongly disagree*, 4 = *Strongly agree*) and an overall score was computed as the mean of all items. Scores on the RSES have been shown to have high internal consistency and good convergent validity (Robinson & Shaver, 1973). In the present study, Cronbach's alpha was .87.

***Bra size*.** Participants self-reported their bra size in terms of cup size (in this study, AA to GG) and band size (in this study, 28 to 40).

***Subjective breast size*.** Participants were asked to subjectively reported their breast size (1 = *Small*, 2 = *Medium*, 3 = *Large*).

***Demographics*.** Participants provided their demographic details consisting of age, ethnicity, highest educational qualification, height, and weight. We used height and weight data to calculate participants' self-reported BMI as kg/m^2.

Procedures. Once ethical approval was obtained from the relevant university ethics committee, two female research assistants opportunistically recruited participants from several public sites, including high streets, train stations, and public parks. Potential participants were invited to take part in a study on body image. Once participation had been agreed, participants were provided with an information sheet about the study and provided informed consent. They then completed a paper-and-pencil survey in a quiet location in the presence of the research assistant. Completed surveys were returned to the researchers in a sealed envelope. All surveys were anonymous and participation was on a voluntary basis. Participants were not remunerated for taking part in the study and were verbally debriefed on completion of the survey.

Results and Discussion

Descriptive analyses. In this sample, the mean rating for current breast size 6.94 (*SD* = 3.99, skewness = .08, kurtosis = -1.17). Current breast size ratings were significantly correlated with cup size, $r = .79$, $p < .001$, band size, $r = .28$, $p < .001$, and subjective breast size, $r = .84$, $p < .001$. The mean ideal rating on the BSRS was 7.30 (*SD* = 3.00, skewness = .05, kurtosis = -0.32). We calculated breast size dissatisfaction by subtracting ideal from current ratings, such that negative integers denote a preference for larger ideal as compared current breast size. The mean breast size dissatisfaction score was -0.35 (*SD* = 2.85, skewness = .43, kurtosis = 0.21). In total, 19.4% of women reported no breast size dissatisfaction, 53.3% reported wanting a larger breast size, and 27.3% reported wanting a smaller breast size.

For further analyses, we calculated absolute breast size dissatisfaction scores, so that higher scores reflect greater breast size dissatisfaction (*M* = 2.19, *SD* = 1.86). Greater breast size dissatisfaction was significantly associated with lower self-esteem, $r = -.23$, $p < .001$, greater weight discrepancy, $r = .24$, $p < .001$, greater body dissatisfaction, $r = .25$, $p < .001$,

and higher BMI, $r = .15$, $p = .022$. We next conducted a multiple linear regression with self-esteem as the criterion variable and all remaining variables entered simultaneously as predictors. The overall regression was significant, $F(4, 233) = 55.79$, $p < .001$, Adj. $R^2 = .46$. As can be seen in Table 2, breast size dissatisfaction emerged as a significant predictor of self-esteem once the effects of weight discrepancy, body dissatisfaction, and BMI had been accounted for. Collinearity statistics suggested that multicollinearity among predictor variables was not a limiting issue (Belsley, Kuh, & Velsch, 1980).

General Discussion

The results of the four studies reported herein indicate that the scores derived from the newly-developed BSRS have good psychometric properties. Specifically, Studies 1 and 2 provided evidence for the construct validity of BSRS-derived scores as well as their test-retest reliabilities after 4 and 12 weeks. Studies 3 and 4 showed that breast size dissatisfaction as measured using the BSRS has good convergent validity among both student and community samples. In short, the BSRS provides a valid and reliable method of assessing breast size dissatisfaction among women. In so doing, the BSRS brings the measurement of breast size dissatisfaction in line with the measurement of body dissatisfaction using figural rating scales that include photographs of real persons or realistic digitally-rendered images.

The BSRS improves on similar figural rating scales, such as the BCRS (Thompson & Tantleff, 1992), in a number of ways. Most importantly, the BSRS has improved ecological validity compared with previously-used line-drawings and more realistically depicts morphological change in female breast size. In addition, the BSRS includes a wider array of figures than alternative measures (14 as compared 5 in the BCRS), omits facial features that may distract attention away from breast size, and is presented in greyscale to minimise any impact of perceived ethnicity. These are all recognised as important criteria in the development of new figural rating scales (Gardner & Brown, 2010; Swami et al., 2008).

Moreover, the availability of a full psychometric evaluation of the BSRS is an additional benefit of the BSRS, especially when compared with single- or multiple-item attitudinal measures whose psychometrics have not been examined beyond internal consistency.

The results of Studies 2-4 indicated that the vast majority of women were dissatisfied with their breast size, insofar as they evidenced a discrepancy between perceived current and ideal breast sizes. More specifically, about three quarters of women in each of the three studies reported some breast size dissatisfaction, with most wanting larger breasts. In general, this is consistent with previous work with a North American sample indicating that the majority of participants were dissatisfied with their breasts (Frederick et al., 2008). The findings of Studies 3-4, in terms of reported associations between breast size dissatisfaction and a range of body image variables, also corroborates previous work (e.g., Frederick et al., 2008; Koff & Benavage, 1998).

One important point to note about the BSRS is that the presentation format, and specifically the size of the presented images, may impact on participants' ability to distinguish between figures. In our work, we found that there was a drop-off in correct placement of figures from 98.8% when large-size figures were used in Study 1 to 90.5% when smaller figures were used in the pilot study of Study 4. Image size may also have been an issue of concern in Study 3, where the online survey will have meant the stimuli being presented to participants in different perceived sizes based on the device being used. On this basis, we recommend presentation of larger-sized BSRS figures where possible – minimally at a stimulus size of 85 x 30 mm – and to avoid completion of the BSRS at sizes that may make distinguishing between figures difficult. More broadly, ensuring that the presentation format of the BSRS is constant across participants (e.g., on Internet-based presentation) may be important to minimise noise and maximise respondent accuracy in making their judgements.

Future work could also consider this issue by testing the construct validity of alternative versions of the BSRS derived from the original image set (e.g., testing if a 7-point scale is more effective than the 14-point scale). In a similar vein, we encourage scholars considering use of the BSRS to reflect on the nature of BSRS-derived scores. In Studies 2-4, we opted for measuring breast size dissatisfaction in terms of absolute (unsigned) scores. While this method has clear benefits (e.g., signed scores would mean that both negative and positive values indicate higher dissatisfaction, making it meaningless as a continuous variable), it may also obscure differences between women desire smaller breasts and those who desire larger breasts. Thus, the decision to use signed or unsigned BSRS scores will depend on the nature of the outcome that scholars wish to measure.

There are other limitations of the BSRS and a number of ways in which the present work could be developed further. First, the BSRS only measures dissatisfaction with women's breast size, but there are other variables that may affect dissatisfaction, such as shape and asymmetry (Dixson et al., 2010; Zelazniewicz & Pawłowski, 2010). For example, Frederick et al. (2008) reported that subjective perceptions of 'droopiness' was an important factor in breast dissatisfaction. Nevertheless, it remains the case that size is the primary way in which women's breasts are objectified in contemporary culture (Swami & Tovée, 2013a; Tantleff-Dunn, 2001), which necessitates a reliable and valid measure of breast size dissatisfaction. Even so, future work could seek to ascertain the contributions of different breast variables to overall breast dissatisfaction.

Second, our methods of recruitment in each of the studies limit the generalisability of our findings to the wider British population. This takes on added importance when we consider the possibility of cross-cultural differences in perceptions of ideal breast size (Dixson et al., 2010; Swami et al., 2009; Swami & Tovée, 2013b). In future work, it would be useful to examine breast size dissatisfaction in different cultural groups. In a similar vein, the

present work could be extended by examining associations between BSRS-derived breast size dissatisfaction and alternative measures of breast dissatisfaction, such as the Breast Size Dissatisfaction Scale (Forbes & Frederick, 2008). It would also be useful to examine associations between breast size dissatisfaction and a wider array of factors, including concerns about body exposure and attitudes toward cosmetic surgery. Finally, it is important to be cognisant of possible multivariate trait interactions: larger breast sizes, for example, may affect perceived waist-to-hip ratios (Furnham et al., 2006), which in turn may affect how respondents view particular figures.

These issues notwithstanding, the present set of studies suggest that breast size dissatisfaction as measured using the BSRS has good psychometric properties, including good construct and convergent validity, and good test-retest reliability up to 3 months. Given the importance of selecting measurement scales that have demonstrably good psychometric properties when assessing body image (Gardner & Brown, 2010), we are hopeful that the BSRS will emerge as an important tool in the armoury of body image scholars. Moreover, the BSRS may prove useful in conjunction with measures, such as the BREAST-Q (Pusic, Klassen, Scott, Klok, Cordeiro, & Cano, 2009), when studying the impact and effectiveness of breast surgery. In conclusion, based on the present results, we would advocate use of the BSRS over other similar figural rating scales for the measurement of breast size dissatisfaction.

References

Avalos, L., Tylka, T. L., & Wood-Barcalow, N. (2005). The Body Appreciation Scale: Development and psychometric evaluation. *Body Image, 2*, 285-297. doi: 10.1016/j.bodyim.2005.06.002

Bateson, M., Cornelissen, P. L., & Tovée, M. J. (2007). Methodological issues in studies of female attractiveness. In V. Swami & A. Furnham (Eds.), *Body beautiful: Evolutionary and sociocultural perspectives* (pp. 46-63). Basingstoke, UK: Palgrave Macmillan.

Beck, S. B., Ward-Hull, C. I., & McLear, P. M. (1976). Variables related to women's somatic preferences of the male and female body. *Journal of Personality and Social Psychology, 34*, 1200-1210. doi: 10.1037/0022-3514.34.6.1200

Belsley, D. A., Kuh, E., & Velsch, R. E. (1980). *Regression diagnostics: Identifying influential data and sources of collinearity*. Hoboken, NJ: Lawrence Erlbaum.

British Association of Aesthetic Plastic Surgeons (2014). *Tweak, not tuck.* London: British Association of Aesthetic Plastic Surgeons

Cornelissen, P. L., Hancock, P. J. B., Kiviniemi, V., George, H. R., & Tovée, M. J. (2009). Patterns of eye movements when male and female observers judge female attractiveness, body fat, and waist-to-hip ratio. *Evolution and Human Behavior, 30*, 417-428. doi: 10.1016/j.evolhumbehav.2009.04.003

Dixson, B. J., Grimshaw, G. M., Linklater,W. L., & Dixson, A. F. (2011). Eye-tracking of men's preferences for waist-to-hip ratio and breast size of women. *Archives of Sexual Behavior, 40,* 43-50. doi: 10.1007/s10508-009-9523-5

Dixson, B. J., Vasey, P. L., Sagata, K., Sibanda, N., Linklater, W. L., & Dixson, A. F. (2010). Men's preferences for women's breast morphology in New Zealand, Samoa, and Papua New Guinea. *Archives of Sexual Behavior, 40,* 1271-1279. doi: 10.1007/s10508-010-9680-6

Einon, D. (2012). Breast size. In T. Cash (Ed.), *Encyclopedia of body image and human appearance* (pp. 282-292). Oxford, UK: Elsevier.

Fisher, S. (1973). Aniseikonic perception by women of their own breasts. *Perceptual and Motor Skills*, *36*, 1021-1022. doi: 10.2466/pms.1973.36.31021

Forbes, G. B., & Frederick, D. A. (2008). The UCLA Body Project II : Breast and body dissatisfaction among African, Asian, European, and Hispanic American college women. *Sex Roles*, *58*, 449-457. doi: 10.1007/s11199-007-9362-6

Forbes, G. B., Jobe, R. L., & Revak, J. A. (2006). Relationships between dissatisfaction with specific body characteristics and the Sociocultural Attitudes toward Appearance Questionnaire-3 and Objectified Body Consciousness Scale. *Body Image*, *3*, 295-300. doi: 10.1016/j.bodyim.2006.07.003

Frederick, D. A., Bohrnstedt, G. W., Hatfield, E., & Berscheid, E. (2014). Factor structure and validity of the Body Parts Satisfaction Scale: Results from the 1972 Psychology Today Survey. *Psychological Topics*, *23*, 223-243.

Frederick, D. A., Peplau, A., & Lever, J. (2008). The Barbie mystique: Satisfaction with breast size and shape across the lifespan. *International Journal of Sexual Health*, *20*, 2002-11. doi: 10.1080/19317610802240170

Furnham, A., Dias, M., McClelland, A. (1998). The role of body weight, waist-to-hip ratio, and breast size in judgements of female attractiveness. *Sex Roles*, *39*, 311-326. doi: 10.1023/a:1019910723493

Furnham, A., & Swami, V. (2007). Perceptions of female buttocks and breast size in profile. *Social Behavior and Personality*, *35*, 1-8.

Furnham, A., Swami, V., & Shah, K. (2006). Female body correlates of attractiveness and other ratings. *Personality and Individual Differences*, *41*, 443-454. doi: 10.1016/j.paid.2006.02.007

Garner, D. M. (2004). *Eating Disorder Inventory–3 professional manual*. Lutz, FL: Psychological Assessment Resources.

Gerald, W., & Potvin, L. (2009). Boobs, boxing, and bombs: Problematizing the entertainment of Spike TV. *Spaces for Difference, 2*, 3-14.

Gardner, R. M., & Brown, D. L. (2010). Body image assessment: A review of figural drawing scales. *Personality and Individual Differences, 48*, 107-111.

Gardner, R. M., Jappe, L. M., & Gardner, L. (2009). Development and validation of a new figural drawing scale for body-image assessment: The BIAS-BD. *Journal of Clinical Psychology, 65*, 113-122. doi: 10.1002/jclp.20526

Greenbaum, A. R., Heslop, T., Morris, J., & Dunn, K. W. (2003). An investigation of the suitability of bra fit in women referred for reduction mammaplasty. *British Journal of Plastic Surgery, 56*, 230-256. doi: 10.1016/S0007-1226(03)00122-X

Grogan, S., Gill, S., Brownbridge, K., Kilgariff, S., & Whalley, A. (2013). Dress fit and body image: A thematic analysis of women's accounts during and after trying on dresses. *Body Image, 10*, 380-388. doi: 10.1016/j.bodyim.2013.03.003

Harrison, K. (2003). Television viewers' ideal body proportions: The case of the curvaceously thin women. *Sex Roles, 48*, 255-264. doi: 10.1023/A:1022825421647

Hart, E. H., Leary, M. R., & Rajeski, W. J. (1989). The measurement of social physique anxiety. *Journal of Sport and Exercise Psychology, 11*, 94-104.

Jacobi, L., & Cash, T. F. (1994). In pursuit of the perfect appearance: Discrepancies among self-ideal percepts of multiple physical attributes. *Journal of Applied Social Psychology, 24*, 379-396. doi: 10.1111/j.1559-1816

Jourard, S. M., & Secord, P. P. (1955). Body-cathexis and the ideal female figure. *Journal of Abnormal and Social Psychology, 50*, 243-246. doi: 10.1037/h0041128

Koff, E., & Benavage, A. (1998). Breast size perception and satisfaction, body image, and psychological functioning in Caucasian and Asian American college women. *Sex Roles, 38,* 655-673. doi: 10.1023:a.1018802928210

Lynn, M. (2009). Determinants and consequences of female attractiveness and sexiness: Realistic tests with restaurant waitresses. *Archives of Sexual Behavior, 38,* 737-745. doi: 10.1007/s10508-008-9379-0

Manning, J. , Scutt, D., Whitehouse, G., & Leinster, S. (1997). Breast asymmetry and phenotypic quality in women. *Evolution and Human Behavior, 18,* 223-236. doi: 10.1016/S0162-3095(97)00002-0

Mazur, A. (1986). US trends in feminine beauty and overadaptation. *Journal of Sex Research, 22,* 281-303. doi: 10.1080/00224498609551309

Millsted, R., & Frith, H. (2003). Being large-breasted: Women negotiating embodiment. *Women's Studies International Forum, 26,* 455-465. doi: 10.1016/j.wsif.2003.08.003

Pusic, A. L., Klassen, A. F., Scott, A., Klok, J., Cordeiro, P. G., & Cano, S. J. (2009). Development of a new patient-reported outcome measure for breast surgery: The BREAST-Q. *Plastic and Reconstructive Surgery, 124,* 345-353. doi: 10.1097/PRS.0b013e3181aee807

Reardon, R., & Grogan, S. (2011). Women's reasons for seeking breast reduction: A qualitative investigation. *Journal of Health Psychology, 16,* 31-41. doi: 10.1177/1359105310367531

Robinson, J. P., & Shaver, R. R. (1973). *Measures of social psychological attitudes.* Ann Arbor, MI: Survey Research Center, Institute for Social Research.

Rosenberg, M. (1965). *Society and the adolescent self-image.* Princeton, NJ: Princeton University Press.

Seifert, T. (2005). Anthropomorphic characteristics of centerfold models: Trends towards slender figures over time. *International Journal of Eating Disorders, 37*, 271-274. doi: 10.1002/eat.20086

Spencer, L., & Briffa, K. (2013). Breast size, thoracic kyphosis, and thoracic spine pain – Association and relevance of bra fitting in post-menopausal women: A correlational study. *Chiropractic and Manual Therapies, 21*, 20. doi: 10.1186/2045-709X-21-20

Swami, V., Jones, J., Einon, D., & Furnham, A. (2009). Men's preferences for women's profile waist-to-hip ratio, breast size, and ethnic group in Britain and South Africa. *British Journal of Psychology, 100*, 313-325. doi: 10.1348/000712608X329525

Swami, V., Salem, N., Furnham, A., & Tovée, M. J. (2008). Initial examination of the validity and reliability of the female Photographic Figure Rating Scale for body image assessment. *Personality and Individual Differences*, *44*, 1752-1761. doi: 10.1016/j.paid.2008.02.002

Swami, V., Stieger, S., Harris, A. S., Nader, I. W., Pietschnig, J., Voracek, M., & Tovée, M. J. (2012). Further investigation of the validity and reliability of the Photographic Figure Rating Scale for body image assessment. *Journal of Personality Assessment, 94*, 404-409. doi: 10.1080/00223891.2012.660293

Swami, V., Stieger, S., Haubner, T., & Voracek, M. (2008). Translation and validation of the German Body Appreciation Scale. *Body Image, 5*, 122-127. doi: 10.1016/j.bodyim.2007.10.002

Swami, V., & Tovée, M. J. (2013a). Men's oppressive beliefs predict their breast size preferences in women. *Archives of Sexual Behavior, 42*, 1199-1207. doi: 10.1007/s10508-013-0081-5

Swami, V., & Tovée, M. J. (2013b). Resource security impact men's female breast size preferences. *PLoS ONE, 8*, e57623. doi: 10.1371/journal.pone.0057623

Tantleff-Dunn, S. (2001). Breast and chest size: Ideals and stereotypes through the 1990s. *Sex Roles, 45,* 231-242. doi: 10.1023/A:1013505928458

Tantleff-Dunn, S. (2002). Biggest isn't always best: The effect of breast size on perceptions of women. *Journal of Applied Social Psychology, 32,* 2253-2265. doi: 10.1111/j.1559-1816.2002.tb01862.x

Tantleff-Dunn, S., & Thompson, J. K. (2000). Breast and chest size satisfaction: Relation to overall body image and self-esteem. *Eating Disorders: Journal of Treatment and Prevention, 8,* 241-246. doi: 10.1080/10640260008251231

Thompson, J., K. & Tantleff, S. (1992). Female and male ratings of upper torso: Actual, ideal, and stereotypical conceptions. *Journal of Social Behavior and Personality, 7,* 345-354.

Thompson, J. K., van den Berg, P., Roehrig, M., Guarda, M. S., & Heinberg, L. J. (2004). The Sociocultural Attitudes Towards Appearance Scale–3 (SATAQ–3): Development and validation. *International Journal of Eating Disorders, 35,* 293-304. doi: 10.1002/eat.10257

Ward, L. M., Merriwether, A., & Caruthers, A. (2006). Breasts are for men: Media, masculinity ideologies, and men's beliefs about women's bodies. *Sex Roles, 55,* 703-714. doi: 10.1007/s11199-006-9125-9

Wood, K., Cameron, M., & Fitzgerald, K. (2008). Breast size, bra fit, and thoracic pain in young women: A correlational study. *Chiropractic and Osteopathy, 16,* 1. doi: 10.1186/1746-1340-16-1

Zelazniewicz, A. M. , & Pawłowski, B. (2010). Female breast size attractiveness for men as a function of sociosexual orientation (restricted versus unrestricted). *Archives of Sexual Behavior, 40,* 1129-1135. doi: 10.1007/s10508-011-9850-1

Table 1

Inter-scale correlations between breast size dissatisfaction scores and all other variables in Study 3.

	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) Breast size dissatisfaction	.26**	-.23**	.25**	.15**	.27**	.15**	.20**	.23**	.05	.13**
(2) Weight discrepancy		-.54**	.58**	.39**	.51**	.11*	.34**	.16**	.06	.34**
(3) Body appreciation			-.75**	-.71**	-.80**	-.23**	-.51**	-.52**	-.18**	-.10*
(4) Body dissatisfaction				.70**	.70**	.22**	.52**	.48**	.30**	.21**
(5) Drive for thinness					.66**	.27**	.62**	.63**	.34**	.26**
(6) Social physique anxiety						.20**	.48**	.46**	.22**	.10*
(7) Information							.47**	.47**	.24**	-.02
(8) Pressures								.68**	.44**	.29**
(9) Internalisation-General									.44**	.06
(10) Internalisation-Athlete										.06
(11) Body mass index										

Note: $N = 730$. * $p < .05$, ** $p < .001$.

Table 2. Unstandardised and standardised coefficients for the multiple regression in Study 4 with self-esteem as the criterion variable.

Predictor	B	SE	ß	*t*	*p*	Tolerance	VIF
Weight discrepancy	-.15	.04	-.22	-4.01	< .001	.60	1.67
Body dissatisfaction	-.53	.05	-.62	-11.53	< .001	.64	1.55
Body mass index	-.02	.01	-.10	-2.14	.033	.85	1.18
Breast size dissatisfaction	-.08	.03	-.11	-2.48	.014	.97	1.03

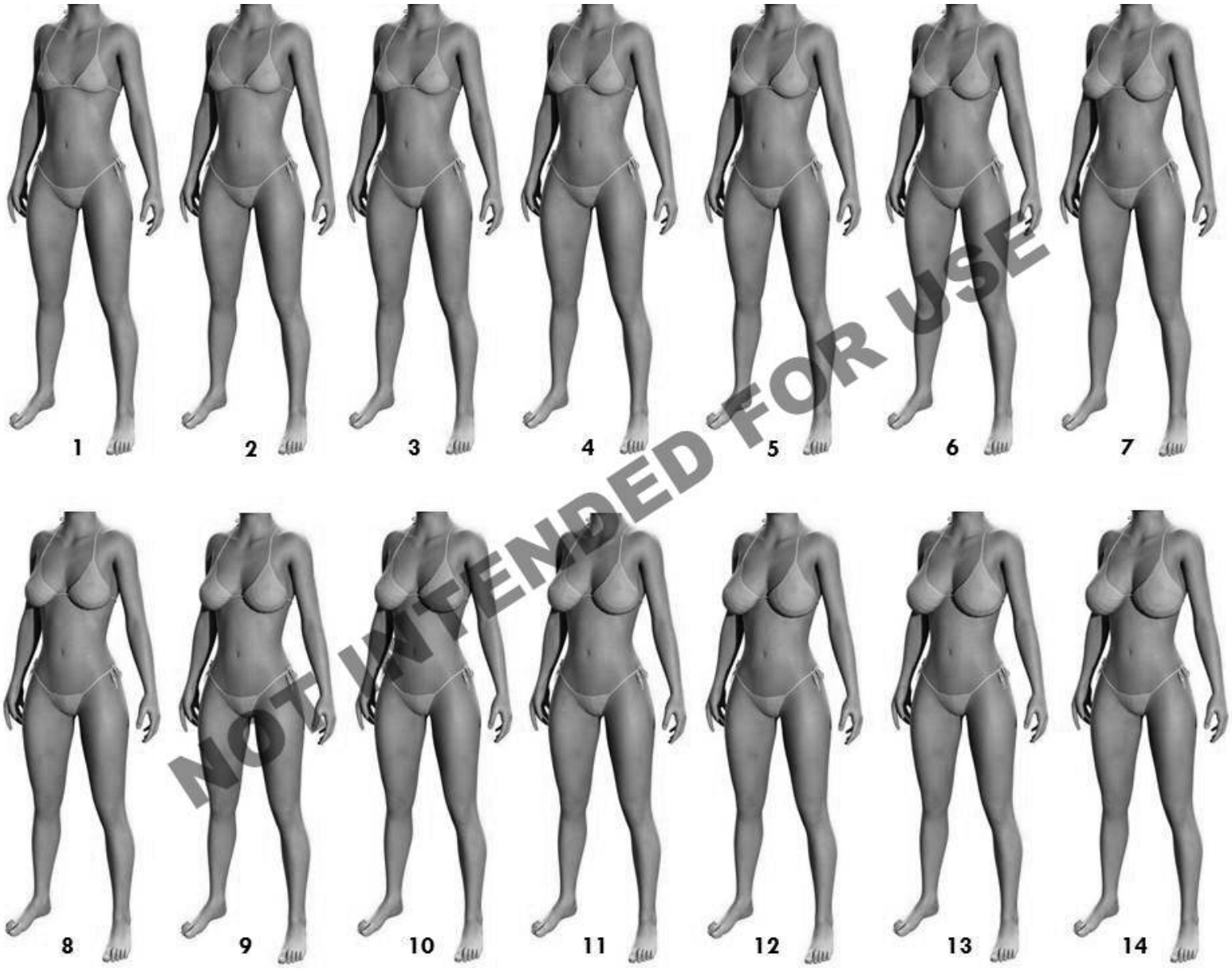

Figure 1. The Breast Size Rating Scale (BSRS), with figures presented in ascending order of breast size. Note this is not the actual size of the images used in Study 4. For a copy of the BSRS, please contact the first author.