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The Breast Size Rating Scale: Development and psychometric evaluation

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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.

Introduction

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 procedures 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; Tantleff-Dunn, 2002). 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).

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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 dissatisfied 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 Fig. 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/m^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 × 895 pixel resolution. Following earlier recommendations (Gardner & Brown, 2010; Swami, Salem, 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 Fig. 1).