



Brief research report

Factor structure of the Body Image Concern Inventory in a Japanese sample

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ARTICLE INFO

Article history:

Received 18 March 2014

Received in revised form 8 September 2014

Accepted 24 September 2014

Keywords:

Body Image Concern Inventory (BICI)

Web-based survey

Japan

Confirmatory factor analysis

Measurement invariance

ABSTRACT

The purpose of this study was to investigate the factor structure of the Body Image Concern Inventory (BICI) using a Japanese population as a web-based survey. Two thousand and sixty individuals (1030 women, 1030 men) ranging from 20 to 69 years of age ($M = 40$, $SD = 16$) took part in the present research. A confirmatory factor analysis showed that the second-order factor model of the BICI, which had three first-order factors and one second-order factor of dysmorphic appearance concern was an adequate fit to the data. Additionally, the Cronbach's alpha values of the overall and three subscales of the BICI were adequate. Furthermore, measurement invariance tests revealed that the second-order factor model of the BICI had acceptable measurement invariance at the scale and factor-loading levels between genders. These findings suggested that the BICI was reliable, and able to compare its mean scores between women and men in Japan.

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Introduction

Dysmorphic appearance concern is characterized by intense preoccupation with one's appearance and perceived appearance flaws, excessive checking or camouflaging of appearance flaws, social avoidance due to concerns about appearance, and reassurance seeking with respect to one's appearance (Littleton, Axsom, & Pury, 2005). While dysmorphic appearance concern manifests among individuals with both eating disorders and obsessive-compulsive symptomatology (McKay, Neziroglu, & Yaryura-Tobias, 1997; Rosen & Ramirez, 1998), Buhlmann et al. (2010) revealed that 35.3% of the German general population (42.2% women, 26.7% men) were concerned about at least one part of their body. Bartsch (2007) also showed that up to 62% of individuals had dysmorphic appearance concerns in a student sample.

In Japan, there are few studies about dysmorphic appearance concern because of the lack of psychometrically appropriate measures. The Body Image Concern Inventory (BICI) is one particularly promising measure for assessing dysmorphic appearance concern,

originally developed by Littleton et al. (2005). The BICI is a brief self-report measure designed to comprehensively assess multiple aspects of dysmorphic appearance concerns, as opposed to focusing on only appearance dissatisfaction or one aspect of dysmorphic concern (e.g., appearance-related checking). Littleton et al. (2005) demonstrated that the BICI had good internal consistency and construct and convergent validity. Additionally, they found that the BICI had a two-factor structure by an exploratory factor analysis (EFA) (Littleton et al., 2005). The primary factor was called "dysmorphic concern," which was made up of 12 items relating to dissatisfaction and shame regarding one's appearance. The second factor was named "symptom interference" and consisted of seven items related to interference with functioning due to appearance concerns.

The BICI was also translated into Spanish (Littleton & Breitkopf, 2008) and Italian (Luca, Giannini, Gori, & Littleton, 2011). These studies replicated the two-factor structure model of the BICI originally demonstrated by Littleton et al. (2005) using a confirmatory factor analysis (CFA). Tanaka and colleagues (Tanaka, Arimura, & Tayama, 2011; Tanaka & Tayama, 2013; Tanaka, Tayama, Arimura, & Sugawara, 2010) developed the Japanese version of the BICI (J-BICI). They found that the J-BICI had a unique three-factor structure. The first factor was named "safety behavior against one's (imagined) flaws (SB)" and consisted of seven items. The second factor was designated as "avoidant behavior from one's (imagined) flaws (AB)" and had six items. These two factors reflected the various

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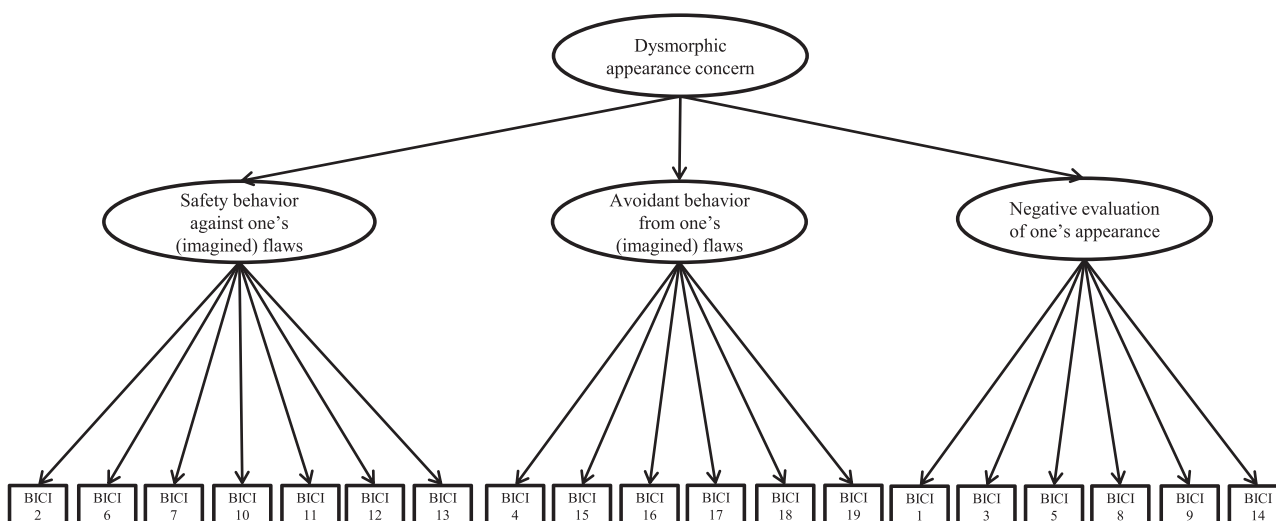


Fig. 1. Hypothesized second-order factor model of the J-BICI, unconstrained.

behavioral aspects of dysmorphic appearance concern. Tanaka et al. (2011) revealed that AB had a significant positive correlation with depression, while SB did not. The third factor was called “negative evaluation of one’s appearance” and consisted of six items reflecting cognitive symptoms of dysmorphic appearance concern. Tanaka et al. (2010, 2011) reported that both overall and within these subscales, the J-BICI had high internal consistency as well as good test-retest reliability and concurrent and convergent validity. In addition, Tanaka and Tayama (2013) tested for the measurement invariance of this three-factor model using a multi-group CFA (MGCFA) across genders. They showed that configural invariance across genders was confirmed.

Based on this three-factor model of the J-BICI, Tanaka’s (2010) results are consistent with the cognitive-behavioral model of dysmorphic appearance concern among student samples in Japan. However, previous studies conducted in Japan were limited to student samples. It is necessary to confirm reproducibility of this model in the general population. Additionally, Littleton et al. (2005) proposed to think of the BICI as tapping a single construct of dysmorphic appearance concern because all items that loaded on the second factor also loaded significantly on the first factor, and the two factors were highly correlated although they confirmed that the two-factor model of the BICI was interpretable. When lower-order factors in a model substantially correlate with each other, and a higher-order factor is hypothesized to account for the relations among the lower-order factors, second-order factor models can be tested (Chen, Sousa, & West, 2005). However, participants in previous BICI studies in Western countries (Littleton et al., 2005; Littleton & Bretkopf, 2008; Luca et al., 2011) consisted mainly of women. It was not clear if the measurement invariance of the second-order factor model of the BICI was equivalent at the scale, the factor-loading, or the intercept levels across genders.

The first purpose of the current study was to test the second-order factor model of the J-BICI, which has three first-order factors and one second-order factor of dysmorphic appearance concern, in the general population (Fig. 1). The second purpose was to test the measurement invariance of this model between genders.

Method

Participants

Two thousand and sixty individuals ranging from 20 to 69 years of age took part in the present study, $M = 40$, $SD = 16$. They consisted

of 1030 women and 1030 men. There was no significant difference in age between genders, $t(2058) = .05$, $p = .96$, $d = .00$. No specific inclusion or exclusion criteria were used.

Measures

Demographic variables. All participants were asked to respond to the questions about their age and gender.

Body Image Concern Inventory. The BICI has 19 items. For each item, individuals are asked to indicate how often they experience the described feelings or perform the described behaviors on a 5-point Likert scale ranging from 1 (*never*) to 5 (*always*). In the initial study by Littleton et al. (2005), scores on the English version of the BICI spanned the entire possible range from 19 to 95, $M = 50.4$, $SD = 14.2$. In this study, we used the J-BICI. In the preliminary studies of Tanaka et al. (2010, 2011), the BICI was translated into Japanese by two independent professional translators. To ensure consistency with the original BICI, the J-BICI was translated back into English by two additional independent translators. This back-translated version was confirmed to be equivalent to the original BICI by Littleton in December 2006 (personal communication). For specific item content in English, see Littleton et al. (2005) or Littleton & Bretkopf (2008).

Procedures

We conducted a cross-sectional, nationwide, web-based survey in November 2011. Participants were recruited from the database of Macromill Inc. in Japan. This database had over one million independent users at the time of this survey, with a local demographic distribution similar to that reported in the national census data of Japan. An equal number of participants were assigned to each age group ranging from 20s to 60s and to each gender.

This study adhered to the ethical guidelines laid out in the Helsinki Policy Statements, which are comparable to regulations by institutional review boards at U.S. universities. First, participants were instructed about the research content and the intended use of the data on the web questionnaire. They were also guaranteed anonymity should they decide to take part. Individuals who agreed to these procedures were able to participate in the current study. After they consented, participants filled out demographic questions and completed the J-BICI on the Internet. After completing the web-based questionnaires, they received about 100 Japanese

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