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Brief Report

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Preliminary Validation of a Korean Version of the Body Investment Scale

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Body image attitudes can be divided into body evaluation and body investment. Most previous works on body image attitudes focused primarily on body evaluation. This study tested whether the Body Investment Scale (BIS) is a reliable and valid instrument to capture body evaluation and investment. Korean BIS's factor structure, reliability, and validity were examined using a sample of 382 South Korean college students. Confirmatory factor analysis showed that the original and alternative solutions fit the data well. However, the internal consistencies of the alternative three-factor model were only within a satisfactory range. Appearance and reasons for living exhibited significant positive correlations with all BIS subscales, whereas depression demonstrated significant negative correlations with all subscales. These findings suggest that the Korean BIS is reliable and valid instrument for measuring body image attitudes. Limitations and suggestions for future research are discussed.

Keywords: body image, body investment, scale validation

Introduction

Body image attitude is a multi-dimensional construct encompassing cognitive appraisals and behaviors on one's bodily appearance (Cash, 2011). Specifically, body image attitude consists of the following two facets: 1) body evaluation, which refers to one's cognitive judgment and associated emotions on the physical attributes; 2) body investment, which refers to the extent of cognitive-behavioral emphasis on one's physical attributes, including investment behavior on the body as well. Previous studies focused primarily on body evaluation over investment, possibly due to limited tools that cover both facets (Kling et al., 2019).

The Body Investment Scale (BIS) (Orbach & Mikulincer, 1998) is one such tool that measures both body evaluation and body investment. Previous validation studies have identified that the BIS may consist of four subscales; 1) body feeling, encompassing positive emotions, satisfaction, and contentment regarding one's appearance; 2) body touch, which represents comfortableness about physical contact with others; 3) body care, comprising cognitive attitudes and behaviors about taking care of one's own body; and 4) body protection, involving cognitive attitudes and behaviors related to protecting one's body upon the detection of potential threats. However, certain studies have reported relatively low internal consistency within specific subscales (e.g., body care, body protection), thereby raising doubts regarding the reliability of the scale (Cella et al., 2021; Marco et al., 2018).

Psychopathologies like suicide attempt (Brausch et al., 2021) and eating problems (Vieira et al., 2020) can occur without sufficient emotional investment in one's body. Additionally, Orbach and Mikulincer (1998) suggested that a diminished desire to enjoy life might lead to decreased psychological investment in bodily plea-

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sures. Several studies supported this assumption by considering reasons for living or purpose in life as a protective factor for body investment (Osman et al., 2010; Vieira et al., 2020).

Despite the current literature, a paucity of Korean instruments that measure body investment exists. Therefore, the current study aimed to explore the psychometric properties of a Korean version of the BIS using a sample of South Korean undergraduates. It was hypothesized that (1) the Korean BIS has the same four-factor structure as the original version; and (2) its reliability and validity are similar to that of the original version. Concurrent validity of BIS was demonstrated through correlations with measures of appearance and reasons for living. Also, considering the theoretical concept of BIS (e.g., body feeling as evaluative, other as investment), body feeling was expected to show higher correlations with appearance scale than others. The discriminative efficiency of BIS was tested by depression scale.

Methods

Participants

This study was approved by the Institutional Review Board of Seoul National University (IRB No. 2004/001-018). A total of 382 undergraduates participated by completing web-based surveys. All participants were informed about the study's purpose and confidentiality, and voluntarily signed the informed consent form. Participation credit for a class was given to all participants. Twenty-seven multivariate outlier cases were removed based on their calculated Mahalanobis distances, $p < .001$ (Kline, 2016). As a result, 355 cases were included in the analysis. Participants (male = 183, female = 169, no response = 3) were 17-27 years old ($M = 20.02$, $SD = 1.88$).

Measures

Body Investment[1)]

The BIS contains twenty-four items that measure the degree of emotional, cognitive, and behavioral attention paid to one's own body. Responses are scored on a 5-point Likert scale where higher scores indicate a higher degree of body investment. The BIS author gave permission for the scale to be translated and validated in Korean. The BIS was translated into Korean by the first author of this paper and was reviewed by three clinical psychologists. Afterwards, it was back-translated into English by a clinical psychologist who received a doctorate in clinical psychology in USA. Original author confirmed the back-translated version.

Appearance

Appearance Appreciation Scale (AAS) contains twenty-nine items that measure body image positivity (Lee & Son, 2015). Responses are made on a 5-point Likert scale where higher scores indicate more positive feelings about one's appearance. Coefficient alpha was .92 in the current study.

Depression

The Center for Epidemiologic Studies Depression Scale (CES-D) contains twenty items that assess cognitive and emotional depressive symptoms (Chon et al., 2001). Responses are made on a 4-point Likert scale where higher scores indicate greater depressive symptoms during the past week. Coefficient alpha was .89 in the current study.

Reasons for Living

The Korean version of the Reasons for Living for College Students (K-RFL) was developed to assess suicide risk and protective factors among South Korean university students (Park & Ahn, 2014). Responses are made on a 6-point Likert scale where higher scores indicate a lower risk of committing suicide. In this study, twenty-five items from the Survival/Coping Beliefs and Future Expectations section were used. Coefficient alpha was .96 in the current study.

Data Analysis

Psychometric property and statistical analyses were carried out using IBM SPSS statistics 25.0 and Mplus 8. A confirmatory factor analysis (CFA) with weighted least square mean, variance-adjusted (WLSMV) estimation, and Geomin rotation was conducted to analyze the factor structure of the translated BIS. The comparative fit index (CFI), the root mean square error of the approximation (RMSEA), and the standardized root mean square residual (SRMR)

1) The Korean BIS is presented in Appendix.

were used as fit estimates. A CFI of .90-.95 and an RMSEA and SRMR < .08 indicate a good fit (Kline, 2016).

Results

Confirmatory Factor Analysis

The original four-factor model fit the data poorly to moderately well, χ^2 (224, N = 355) = 940.45, p < .001, CFI = .85, RMSEA = .10, SRMR = .08. The squared coefficient of multiple correlation (SMC) was calculated to identify items with overlapping meanings (Lee et al., 2015). Consequently, item 10, showing a high SMC (.86) and redundancy with items 5 and 21, was excluded. Additionally, due to a low factor loading and similarity to item 3, item 7 was removed. Covariances between items 2 and 11, 9 and 11, and 1 and 14 were allowed based on content similarity and modification indices. Correlation between these pairs could possibly be because of wording and similar meanings as observed in previous studies (Marco et al., 2018; Vieira et al., 2020). The modified four-factor model[2] demonstrated satisfactory fit indices, χ^2 (200, N = 355) = 639.38, p < .001, CFI = .91, RMSEA = .08, SRMR = .07.

Subsequently, psychometric properties of three-factor structure proposed by Gouveia et al. (2008), consisting of body feeling, body touch, and body care/protection, were examined. The body care/protection subscale incorporated all items from the original BIS's body care and body protection subscales, given their theoretical similarity as indicated by Orbach and Mikulincer (1998). Modifications were made following the same approach as the four-factor model above, yielding similar results (e.g., covariances were allowed on the same items as in the modified four-factor model). Finally, fit indices of the alternative model (Fig. 1) were within acceptable range, χ^2 (200, N = 355) = 651.50, p < .001, CFI = .91, RMSEA = .08, SRMR = .07.

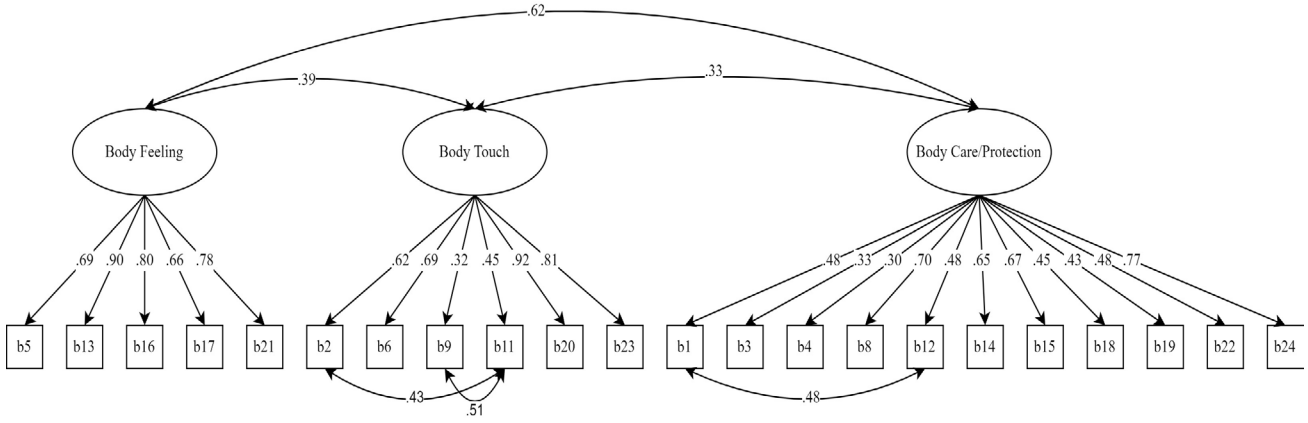

Figure 1. *The alternative three-factor model of the BIS.*

Table 1. *Correlations between the BIS and Other Measures*

		BIS	2	3	4	5	6	7
2.	Body feeling	.73**	-					
3.	Body touch	.65**	.25**	-				
4.	Body care	.79**	.46**	.18**	-			
5.	AAS	.49**	.74**	.14**	.28**	-		
6.	CES-D	-.42**	-.52**	-.14**	-.29**	-.36**	-	
7.	K-RFL	.59**	.51**	.28**	.50**	.37**	-.51**	-
	Mean	83.64	19.20	19.59	44.85	96.40	33.11	124.85
	SD	8.47	3.17	3.92	4.56	15.64	8.52	17.61

***p < .01.*

2) Factor loadings are presented in Supplementary Material A.

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Reliability

The coefficient alphas for the total score (α = .82), body feeling (α = .83), and body touch (α = .80) remained consistent in both the original and alternative model, as they shared identical items per factor. However, undesirable internal consistency was observed for body care (α = .62) and body protection (α = .60) in the four-factor structure. Conversely, the coefficient alpha for body care/protection (α = .72) in the alternative model fell within an acceptable range.

Correlations

Correlation was examined using the alternative model. The correlations between the BIS and other measures were all significant, $p < .01$ (Table 1). AAS and K-RFL were significantly positively correlated with all BIS subscales, while CES-D showed significantly negative correlation with all BIS subscales.

Discussion

The current study translated the BIS into Korean and examined its psychometric properties in South Korean undergraduates. The first hypothesis was partially supported, as both the original and alternative models showed acceptable fit indices. However, the reliability of the original model's body care and body protection fell below acceptable thresholds (Kline, 2016), suggesting potential heterogeneity. In contrast, the alternative model demonstrated an improved coefficient alpha, particularly for body care/protection factor. Interpretational challenges arise from inconsistencies in reliability for body care and body protection across prior studies, with values exceeding .70 reported in some (Brausch et al., 2021), and lower values similar to the current findings reported in others (Cella et al., 2021; Lamis et al., 2010). A plausible explanation is that these two components represent a unified concept, aligning with Orbach and Mikulincer's (1998) emphasis on the learned nature of self-care and self-protection through the identification of early parental caring behaviors. Considering comparable fit indices, potential reliability improvement, and theoretical background, future studies may benefit from combining body care and body protection as a singular component (Gouveia et al., 2008). Otherwise, refinement of items within body care or body protection may be warranted if intention is to maintain all four subscales as proposed by the original authors.

Second, all subscales showed significant correlations with appearance, depression, and reasons for living. The robust correlation was observed between body feeling and AAS, suggesting that its superior ability to capture the evaluative nature of body image attitudes compared to other subscales (Cash, 2011). While statistically significant, correlations between body touch and other variables were modest. Several studies documented weak or non-significant correlations between body touch and body protection (Orbach & Mikulincer, 1998), depression (Lamis et al., 2010), and reasons for living (Osman et al., 2010). This may imply the presence of confounding variables influencing the relationship between body touch and other variables. For instance, Cella et al. (2021) reported that the mediating role of body touch between self-esteem and binge eating varied by gender. Further research is necessary to elucidate whether body touch falls under the BIS umbrella.

The current study has several limitations. First, its cross-sectional nature necessitates caution in result interpretation. Second, the incremental validity and test-retest reliability were not tested. Third, the study exclusively targeted a narrow non-clinical group, suggesting the need for future inclusion of clinical samples. Lastly, regarding modifications such as excluding items 7 and 10, cautious interpretation is warranted due to potential risks of model misspecification or low content validity. Despite these limitations, this study thoroughly explores the BIS in the Korean cultural context, contributing to the debate on its factor structure. Notably, the suggestion to combine body care and body protection reflects a constructive approach, offering directions for future scale refinement and development to enhance conceptual clarity.

Author contributions statement

CM, a graduate student at Seoul National University who is now a clinical psychologist at Severance Hospital, designed the research, collected the data, performed analysis, and wrote the manuscript.

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Appendix 1. *The Body Investment Scale*

#	Korean version
1.	내 몸을 돌보는 것이 나의 웰빙을 증진시킨다고 믿는다
2.	사람들이 나를 만지는 것을 좋아하지 않는다(R)
3.	위험한 행동을 하면 기분이 좋아진다(R)
4.	내 외모에 신경을 쓴다
5.	내 신체적 외모가 불만족스럽다(R)
6.	다른 사람들과의 신체적 접촉을 즐긴다
7.	위험한 활동에 참여하기를 두려워하지 않는다*(R)
8.	내 몸을 소중히 아끼는 것을 좋아한다
9.	내가 대화하고 있는 사람과 일정한 거리를 두는 경향이 있다(R)
10.	내 외모에 만족한다*
11.	사람들이 신체적으로 너무 가까이 다가오면 불편하다(R)
12.	목욕하기를 즐긴다
13.	내 몸이 싫다(R)
14.	몸을 돌보는 것은 매우 중요하다고 생각한다
15.	다쳤을 때 바로 상처를 치료한다
16.	내 몸에 대해 편안하게 느낀다
17.	내 몸에 대해 분노를 느낀다(R)
18.	길을 건너기 전 좌우 양쪽을 다 확인한다
19.	바디케어 제품들을 규칙적으로 사용한다
20.	친밀한 사람들과의 스킨십을 좋아한다
21.	비록 내 외모가 완벽하지 않아도 나는 내 외모가 좋다
22.	때때로 나는 의도적으로 스스로에게 상해를 입힌다(R)
23.	친밀한 사람이 포옹해 주는 것은 나를 편안하게 한다
24.	질병의 징조가 느껴지면 언제나 나 자신을 보살핀다

R = reversed items.
**Removed items in the modified four-factor model and alternative three-factor model.*

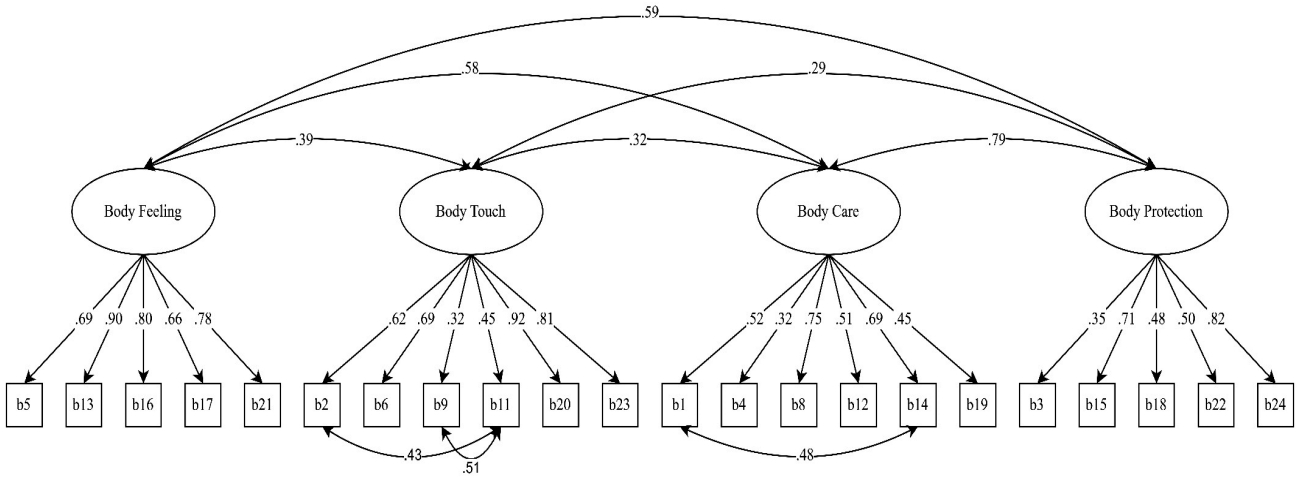

Figure 1. *The modified four-factor model of the BIS.*

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