



MEASUREMENT INVARIANCE OF THE ASI-R AND BIQLI ACROSS GENDER AND AGE

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ABSTRACT

This study investigated the measurement invariance of the Appearance Schemas Inventory-Revised (ASI-R) and the Body Image Quality of Life Inventory (BIQLI) in a sample of 1262 adults (422 men, 840 women) aged 18 to 98 years to determine whether it is appropriate to make gender and age comparisons using these scales. The results showed that, with the exception of older women for the ASI-R, these measures could be used with the present sample to assess gender and age differences.

INTRODUCTION

Horn and McArdle (1992) have argued that, in any study involving the comparison of different groups, it is necessary to show measurement invariance before valid inferences and interpretations can be made. Typically, there are three levels of measurement invariance that are examined. First, configural invariance assesses whether the configuration of the salient and nonsalient factor loadings are equivalent across groups. Second, metric invariance assesses whether the factor loadings are equal across groups (i.e., is the same unit of measurement used for each group?). Third, scalar invariance assesses whether there is consistency between group differences in latent means and observed means by examining whether the item intercepts are the same across groups. It is commonly recognized that evidence of scalar invariance is necessary to make mean comparisons across groups (Meredith, 1993; Steenkamp & Baumgartner, 1998).

The purpose of the present study was to examine the configural, metric, and scalar invariance of the ASI-R and BIQLI across three age groups of men and women to determine if it is appropriate to make age and gender comparisons using these measures.

METHOD

Participants

A total of 1262 participants (422 men, 840 women) took part in this study. Participants were grouped into three age categories as follows: 18 to 29 years = young adulthood¹ (185 men, 364 women), 30 to 54 years = middle-age (131 men, 267 women), and 55 years and older = older adulthood (106 men, 209 women). The majority of participants identified themselves as White (74.7%) or East Asian (12.5%) and tended to be well-educated, with 83.4% having at least some college or university education.

Measures

The 20-item ASI-R (Cash, 2003; Cash, Melnyk, & Hrabosky, 2004) is a measure of dysfunctional investment in appearance and is composed of two subscales. The Self-Evaluative Salience subscale (12 items) assesses the extent to which individuals believe that their appearance is important to their sense of self worth. The Motivational Salience subscale (8 items) assesses the extent to which individuals attend to their appearance and engage in appearance-management behaviors. A Composite ASI-R score can also be calculated.

The 19-item BIQLI (Cash & Fleming, 2002) is a measure of the impact of body image and, specifically, feelings about one's appearance on a variety of life domains.

Procedure

Participants were recruited using a student listserve, posters distributed throughout the community, and oral announcements made in classrooms, community centres, senior citizens' centres, and shopping malls. Participants took part in this study via an internet survey ($n = 819$) or a paper and pencil survey ($n = 443$) and completed the ASI-R and BIQLI in addition to three other questionnaires not relevant to the present study.

RESULTS

Model Evaluation

A series of multi-group confirmatory factor analyses in LISREL were used to conduct all tests of measurement invariance. Up to a total of six models were tested for each of the three levels of invariance, beginning with the "full model" that tested all six age and gender groups together. If the full model was not found to be invariant, then five age and gender subgroups were tested (see [Table 1](#)). Configural invariance was assessed by examining overall model fit using the chi-square test as well as four fit indices (RMSEA, CFI, NNFI, and CAIC). Metric and scalar invariance were tested by hierarchically nesting the models in order to conduct systematic comparison tests (Joreskog, 1971). That is, the metric and scalar invariance models were

¹ Young adults were categorized as 18 – 29 because the majority of research in the body image field has focused on young adults in their late teens and early 20s. It was felt that this age grouping would make the group of young adults in the present study more comparable to those in previous research.

compared to the configural invariance model to determine if holding the factor loadings constant (metric invariance) and also holding the item intercepts constant (scalar invariance) resulted in a significantly poorer fit of the model. Metric and scalar invariance requirements were met if there was not a significantly poorer fit of the model. Chi-square difference tests and change in CFI were used to assess differences between nested models, with change in CFI given more weight in cases of disagreement (Brannick, 1995; Cheung and Rensvold, 2002; Kelloway, 1995).

Invariance Testing of the ASI-R and BIQLI

Table 2 provides a summary of the levels of invariance achieved for the ASI-R and the BIQLI. Because the ASI-R can be used as two subscale scores and/or as an overall composite score, separate analyses were run testing for the invariance of both a two factor and one factor model. For the two factor model, the results indicated that all groups, except for the older women, met requirements for scalar invariance indicating that mean comparisons may be made across all adult age groups for men, between young and middle-aged women, and across gender for young and middle-aged adults. For the one factor model, configural invariance was not met for the full model or for any subgroup model indicating that a composite score should not be used for this scale. Table 3 presents the means and standard deviations for this scale.

With the BIQLI, missing data were particularly problematic for three of the items (involving school/work and sexuality). Thus, separate analyses were conducted with (“full scale”) and without (“reduced scale”) these items included in the scale. The results from these two analyses were highly similar; scalar invariance was met for the full model in both cases, indicating that mean comparisons could be conducted across all age and gender groups. Table 4 presents the means and standard deviations for the BIQLI (“full scale”) total score.

DISCUSSION

The results of this study provided support for the measurement invariance of both the ASI-R and BIQLI and indicated that, with the exception of older women for the ASI-R, these measures could be used with the present sample to assess gender and age differences. This study points to the importance of examining measurement invariance for *any* measure that one wants to use to make cross-group mean comparisons – whether those groups consist of gender, age, cultural, or other groups. Without evidence of measurement invariance, any differences found among groups on a measure cannot be clearly interpreted. Furthermore, claiming group differences on measures without evidence of measurement invariance impacts the validity of conclusions drawn using those measures which may result in negative social consequences for some groups and, in turn, distort theory development (Hubley & Zumbo, 1996; Messick, 1988).

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Table 1

Groups Included in Each Model Tested for Configural, Metric, and Scalar Invariance

Model	Young men	Middle-aged men	Older men	Young women	Middle-aged women	Older women
Full	√	√	√	√	√	√
Male	√	√	√			
Female				√	√	√
Young adult	√			√		
Middle-aged adult		√			√	
Older adult			√			√

Table 2

Levels of Invariance Attained for the ASI-R and BIQLI

Subscale	Configural	Metric	Scalar
ASI-R			
Two-factor model	Full model	Male model Young adult model Middle-aged model Older adult model Reduced female model	Male model Young adult model Middle-aged model Older adult model Reduced female model
One-factor model	No	No	No
BIQLI			
Full scale	Full model	Full model	Full model
Reduced scale	Full model	Full model	Full model

Table 3

Means (Standard Deviations) for the Subscales of the ASI-R

	Young <i>M (SD)</i>	Middle-aged <i>M (SD)</i>	Older <i>M (SD)</i>
Self-Evaluative Salience			
Men	2.95 (0.72) ^{ac}	2.82 (0.71) ^{ad}	2.59 (0.60) ^a
Women	3.25 (0.69) ^{bc}	3.01 (0.73) ^{bd}	2.71 (0.65)
Motivational Salience			
Men	3.39 (0.67) ^{ac}	3.27 (0.71) ^{ad}	3.21 (0.67) ^a
Women	3.62 (0.63) ^{bc}	3.52 (0.68) ^{bd}	3.50 (0.68)

Note. Means with the same superscript exhibit scalar invariance with each subscale and can be compared.

Table 4

Means (Standard Deviations) for the BIQLI

	Young <i>M (SD)</i>	Middle-aged <i>M (SD)</i>	Older <i>M (SD)</i>
Full Scale			
Men	1.12 (0.88)	.97 (1.09)	1.26 (0.88)
Women	.89 (1.03)	.70 (1.25)	1.23 (1.02)

Note. All means exhibit scalar invariance and can be compared.