# Reliability and concurrent validation of the IPIP Big-Five factor markers in China: Consistencies in factor structure between Internet-obtained heterosexual and homosexual samples

Lijun Zheng [a], Lewis R. Goldberg [b], Yong Zheng [a,*], Yufang Zhao [a], Yonglong Tang [a], Li Liu [a]

[a] Key Laboratory of Cognition and Personality (Southwest University), Ministry of Education, China
[b] Oregon Research Institute, 1715 Franklin Boulevard, Eugene, USA

## ARTICLE INFO

## ABSTRACT

Previous studies have suggested the cross-cultural generalizability of a 5-factor structure for personality traits. In this article, we analyzed the utility of 2 versions (100-item and 50-item) of the IPIP Big-Five factor markers in both heterosexual ($N$ = 633) and homosexual ($N$ = 437) samples in China. Factor analysis within versions showed that both versions of these IPIP measures showed clear 5-factor orthogonal structures that were nearly identical to the American structure in both subject samples. The reliabilities of the five factors were quite high except for the 50-item measure of Agreeableness. The part-whole correlations between the 100-item and 50-item factors were high, as were the factor congruence coefficients between the heterosexual and the homosexual samples. Both versions of the IPIP Big-Five factor markers were strongly correlated with the scales from the Big-Five Inventory (BFI: John, Donahue, & Kentle, 1991), thus providing some concurrent validation in a Chinese context.

© 2008 Elsevier Ltd. All rights reserved.

## 1. Introduction

Goldberg (1999) has argued that "the science of personality assessment has progressed at a dismally slow pace since the first personality inventories were developed over 75 years ago." Goldberg attributed the seeming lack of progress in part to the policies and practices of commercial inventory publishers, given that most broad-bandwidth personality inventories are proprietary instruments. As a consequence, there are many inconveniences to researchers, who require permission from the copyright holders and are charged for each questionnaire used. Goldberg therefore proposed an international collaboration that places a large set of personality items in the public domain, thus freeing researchers from the constraints imposed by copyrighted personality inventories. Hence the International Personality Item Pool (IPIP) was born. Over the years, the IPIP web site has provided an ever increasing set of measures, all in the public domain, available to Scientists world wide. The IPIP has over 2500-items, and new sets of items are added each year. IPIP items have been constructed as public domain equivalents of the constructs in a variety of popular commercial personality inventories including the NEO-PI-R (Costa & McCrae, 1992), 16 Personality Factor Questionnaire (16PF: Conn & Rieke, 1994), California Psychological Inventory (CPI: Gough & Bradley, 1996), and the Hogan Personality Inventory (HPI: Hogan & Hogan, 1992). Currently, items from the IPIP have been translated from English into more than 25 other languages, and the rate of publications using IPIP scales has been increasing rapidly.

The IPIP Big-Five factor markers (Goldberg, 1992) consist of a 50 and 100-item version which are available on the IPIP web site. These markers have been translated into more than 10 languages, such as Arabic, Bulgarian, Chinese, Croatian, and so on (Goldberg et al., 2005). But there are only a few reports on the characteristics of the IPIP Big-Five factor markers in other languages and cultures. The IPIP have good internal consistency and relate strongly to major dimensions of personality assessed by the NEO-FFI and EPQ-R (Gow, Whiteman, Pattie, & Deary, 2005). Mlačić and Goldberg (2007) studied a Croatian version of both the 100-item and the 50-item versions of the IPIP Big-Five markers; both self-reports and peer ratings in large Croatian samples of research participants showed clear 5-factor orthogonal structures that were nearly identical to the American structure.

In the present study, we examined the consistency and concurrent validation of the IPIP Big-Five markers in China. To add generality to the findings from our study, we used two types of samples, which past research has shown to differ in Big-Five factor traits (Lippa, 2005). Lippa (2005) synthesized the results of eight studies showing that gay men scored higher than heterosexual men in Agreeableness, Conscientiousness, Neuroticism, and Openness to experience. Heterosexual women scored higher than lesbians in Neuroticism, whereas lesbians scored higher than heterosexual women in Openness to experience. Analyzing a large international

---

* Corresponding author. Tel.: +86 136 6763 6167.
E-mail address: zhengy@swu.edu.cn (Y. Zheng).

data set generated by a recent BBC Internet Survey, Lippa (2008) replicated these results across cultures in a large and diverse sample.

Consequently, we used separate samples of heterosexual and homosexual adults to examine the utility of the IPIP Big-Five factor markers in the Chinese context. We analyzed a Chinese version of both 100-item and the 50-item versions of the IPIP Big-Five factor markers, in both heterosexual and homosexual samples obtained from the Internet.

## 2. Method

### 2.1. Questionnaires

#### 2.1.1. IPIP Big-Five factor markers (Goldberg, 2001)

The IPIP Big-Five factor markers consist of a 50-item and 100-item inventory which can be freely downloaded from the Internet (Goldberg, 2001). The current study makes use of the 100-item version consisting of 20-items for each of the Big-Five personality factors: Extraversion (E), Agreeableness (A), Conscientiousness (C), Emotional Stability (ES), and Intellect (I). We administered the IPIP items with a 5-point, Likert-type scale ranging from 1 (very inaccurate) to 5 (very accurate) as in the original instrument (Goldberg, 1999). Because all of the items in the 50-item version (short form) of the IPIP instrument are included in the 100-item version, it is possible to analyze both versions from a single administration of the 100-items. The 100 IPIP Big-Five factor markers were translated into Mandarin Chinese (and then back-translated and checked for accuracy) by Xian Xu at the University of South Florida.

#### 2.1.2. Big-Five inventory (BFI, John et al., 1991)

The other instrument used in this study was the Big-Five Inventory (BFI: John et al., 1991). The BFI is a 44-item self-report inventory designed to assess the Big-Five Factors of personality: Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to Experience. The BFI scales have shown substantial internal consistency, retest reliability, and clear factor structure, as well as considerable convergent and discriminant validity with longer Big-Five measures (Benet-Martinez & John, 1998). Items on this scale were also scored on a Likert scale (5-point) from "disagree strongly" to "agree strongly." Considering the length of the questionnaire and the participants' patience, only a subsample of the heterosexual participants were administered the BFI.

### 2.2. Participants and procedures

Because it is difficult in China to recruit homosexual samples, we used the Internet. We recruited participants in a number of web sites including homosexual forums and homosexual chat rooms, and our research participants entered requests like "free personality test" in each of these web sites. Persons interested in completing the "personality test" sent us their e-mail addresses. Then the questionnaires were sent to the participants as e-mail attachments and returned to our e-mail address (again as e-mail attachments) after they had been completed. Finally, we sent their personal "personality test" feedback to all participants by e-mail. Based on the e-mail addresses, some duplicate questionnaires were excluded from our analyses. In total, we received 1070 seemingly valid questionnaires between August and October of 2007. The heterosexual sample included 633 participants, and the homosexual sample included 437 participants. Within the heterosexual sample, 301 (105 men and 196 women) completed both the IPIP Big-Five and the BFI.

#### 2.2.1. Heterosexual sample

The heterosexual sample included 633 participants from 109 cities in China, 216 men (34%) and 417 women (66%). The mean age of the sample was 23 years and 3 months (SD = 3 years and 8 months), ranging from 13 years to 45 years. In response to a question about their occupations, 52% were currently students, and the other 48% were engaged in all kinds of occupations. In respect to education level, 14 (2%) reported junior high school level or less, 48 (8%) senior high school level, 483 (76%) college level, and 82 (13%) postgraduate level or more.

#### 2.2.2. Homosexual sample

The homosexual sample included 437 participants from 111 cities in China, 220 gay and 217 lesbian. The mean age of the sample was 23 years and 5 months (SD = 4 years and 5 months), ranging from 13 years to 46 years. In response to a question about their occupations, 42% were currently students, and the other 58% were engaged in all kinds of occupations. In education level, 11 (2.5%) were junior high school or less, 64 (14.6%) senior high school level, 323 (74%) college level, and 39 (9%) postgraduate level or more.

## 3. Results

### 3.1. Factor structure of the 100 IPIP items

#### 3.1.1. Heterosexual sample

To establish whether the expected 5-factor structure of the 100 IPIP items was present in the current Chinese data-set, five principal components were extracted and rotated using the Varimax procedure. The plot of the first 15 eigenvalues is presented in Fig. 1. There was a clear discontinuity in the sizes of the eigenvalues between the fifth and the sixth factors in the scree plot. It suggested the extraction of 5 factors, accounting for 38.2% of the variance. The factor loadings are available from the first author. Of the 100-items, 93 (93%) loaded as expected based on the original findings in an American community sample (Goldberg et al., 2005).

All Extraversion items loaded highest on the same factor, as did all of the Conscientiousness items. For the factor of Agreeableness, 15-items loaded most highly on the same factor. The item "Insult people" loaded highest on the Intellect factor. 4-items ("Am interested in people, Am not really interested in others, Am hard to get
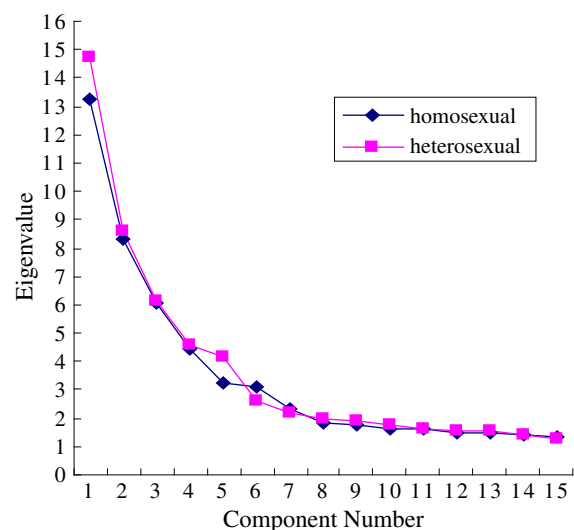


**Fig. 1.** Plot of the first 15 eigenvalues on 100-items in both heterosexual and homosexual samples.