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More of a (wo)man offline? Gender roles measured in online and offline environments

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ABSTRACT

The increased availability of and access to the Internet has resulted in online psychological assessment becoming an attractive mode of collecting data. However, equivalence between online measures and their offline counterpart cannot be assumed. The aim of the current study was to examine for the first time the online and offline equivalence of a commonly employed measure of gender role orientation: the Bem Sex Role Inventory (BSRI) short-form. Participants ($N = 372$) completed the BSRI short-form either online ($n = 244$) or offline ($n = 128$). Equivalence was assessed through reliability measures and mean differences. Reliability analyses indicated good and comparable levels of internal consistency. There was no significant difference between femininity scores depending on mode of administration. However, masculinity scores were significantly higher when the BSRI short-form was administered offline. An additional and unexpected finding was that there was no significant difference between men and women's masculinity scores. Explanations for the pattern of results seen are considered, including the possible role of social desirability. Future research should further consider conceptualisations of gender in the online environment. Given the findings reported here, it is recommended that researchers collecting gender role data online interpret their findings mindful of possible administration mode effects.
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1. Introduction

The increased availability of the Internet makes online assessment an attractive venue for collecting data (Naus, Philipp, & Samsi, 2009) and the use of technology to administer psychological assessment continues to increase (Yuen, Goetter, Herbert, & Forman, 2012). However, it has been recommended (e.g., Buchanan, 2002) that all web-based questionnaires be examined for equivalence with their pen and paper versions. The current research examined for the first time the online and offline equivalence of a commonly employed measure of gender roles.

Online assessment may be an attractive alternative to traditional (i.e., pen and paper) methods of data collection (vanGelder, Bretveld, & Roeleveld, 2010). There are several advantages of online psychological assessment, including broader geographical reach (De Beuckelaer & Lievens, 2009; Sowan & Jenkins, 2010), minimisation of missing data (as programs can ensure participants answer all questions before submission) and data entry errors (vanGelder et al., 2010) and reduced cost (Sowan & Jenkins, 2010). In addition, participants have reported more positive reactions to online assessment than paper-and-pen assessment, specifically feeling more comfortable and less intimidated when completing online assessment (Naus et al., 2009; Salgado & Moscoso, 2003). Research has reported that online assessment may be less subject to social bias (vanGelder et al., 2010) as certain Internet attributes such as lack of controllability and anonymity may encourage participants to disclose more intimate and personal information (Mesch, 2012).

Although there are many benefits of online assessment, researchers should be aware that potential disadvantages also exist, such as higher non-response rates (participants not completing questionnaire when invited) (De Beuckelaer & Lievens, 2009), lack of experimental control (Buchanan, 2002), and multiple submissions from one respondent (De Beuckelaer & Lievens, 2009). Most importantly however, is evidence that suggests transforming offline questionnaires to online questionnaires may change the structure of the measure, ultimately affecting psychometric properties (Naus et al., 2009). In particular, concerns exist regarding the reliability of data obtained from assessment conducted online (vanGelder et al., 2010). For example, the reliability and validity of many measures has been established in the traditional paper-and-pencil format, and therefore researchers cannot assume the

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online measure will have similar reliability and validity indices (Chuah, Drasgow, & Roberts, 2006). Additionally, if norms of measures were originally established from pencil-and-paper format, then equivalence must be determined if scores from online assessment are to be accurately interpreted in line with existing norms (Chuah et al., 2006).

Researchers have generally found that online versions of traditional pen and paper tests are equivalent (Naus et al., 2009). Online and offline equivalence has been examined and established in a range of assessments, for example personality (Chuah et al., 2006; Grieve & de Groot, 2011; Salgado & Moscoso, 2003), clinical (Coles, Cook, & Blake, 2007; Grieve & de Groot, 2011; Naus et al., 2009) and intelligence (Franzis & Helge, 2003) measures. However, although many measures have been deemed equivalent, Buchanan (2002) stated that the equivalence of online and offline tests cannot just be assumed, and recommended that equivalence should be demonstrated for every test. Despite this recommendation and the increasing use of the Internet for psychological testing, to date, the equivalence of many measures remains unexamined, including The Bem Sex Role Inventory (BSRI) (Bem, 1974).

The BSRI was developed to assess and determine an individual's predominant gender role (Bem, 1974). Bem (1974) asked participants to judge whether a number of traits would be considered a desirable trait for a man or for a woman in Western society. These ratings resulted in the construction of the BSRI, which included separate scales for masculinity and femininity. The masculine and feminine scales were subsequently defined in terms of socially desirable traits for men and women, respectively (Hoffman & Borders, 2001). Bem (1974) reported high internal consistency (masculinity scale Cronbach's $\alpha = .86$; femininity scale Cronbach's $\alpha = .82$) and test–retest reliability of the BSRI (masculinity test re-test reliability $r = .90$; femininity test re-test reliability $r = .90$), suggesting that the measure had sound psychometric properties.

The BSRI is a widely used tool in psychological measurement, primarily because the BSRI enables researchers to measure masculine and feminine gender roles separately (Holt & Ellis, 1998). Although the original measure is now nearly four decades old, the BSRI is still considered to be a useful measure of masculine and feminine gender roles (Kasen, Chen, Sneed, Crawford, & Cohen, 2006) and the BSRI is commonly used in more recent gender research (e.g., Choi, Herdman, Fuqua, & Newman, 2011; Parent, Moradi, Rummell, & Tokar, 2011; Szymanowicz & Furnham, 2011). Validation studies of the BSRI have determined the short-form (BSRI short-form; Choi, Fuqua, & Newman, 2009) demonstrates better reliability and validity than the original, longer measure (Choi & Fuqua, 2003; Choi et al., 2009). The short-form of the BSRI contains half of the original BSRI items, specifically 10 masculine items and 10 feminine items, and correlates highly with the original BSRI ($r > .9$) (Holt & Ellis, 1998). The internal consistency of the BSRI short-form is higher than the original BSRI scale (masculinity scale Cronbach's $\alpha = .95$, femininity scale Cronbach's $\alpha = .92$) (Holt & Ellis, 1998).

1.1. The current research

Research has not yet examined the psychometric equivalence of the online and offline scores of the BSRI short-form. As the BSRI short-form is a widely used measure of gender roles (Kasen et al., 2006), and in light of recommendations to establish psychometric equivalence for all measures being conducted online (Chuah et al., 2006), the need to empirically assess the comparability of the online and offline versions of this measure is indicated. The BSRI short-form was employed in the current study due to its increased validity and reliability in comparison to the long form. The current study therefore aimed to assess whether there were differences in men and women's rating of masculinity and femininity when comparing online test scores to offline test scores.

As the current research was exploratory in nature, no specific hypotheses were formulated. Following existing methodologies (e.g., Lewis, Watson, & White, 2009), equivalence was assessed through consideration of reliability analyses and mean differences. In addition, due to potential problems when testing what is essentially a null hypothesis, in line with previous research investigating equivalence (e.g., Grieve & de Groot, 2011), a close examination of effect sizes was included, in order to more closely observe and quantify the effect, if any, of administration mode.

2. Method

2.1. Participants

There were 372 (169 men and 203 women) participants recruited from a large Australian university and the general public. The mean age for participants was 22.31 years ($SD = 3.5$). Of the participants, 244(87 men and 157 women) completed the BSRI short-form online and 128 (82 men and 46 women) completed the BSRI short-form offline by pen and paper. Of the participants, 227 were currently enrolled as university students, and 145 were not current university students. Of the university students, 152 participants completed the questionnaire online, whereas 75 participants completed the questionnaire offline. Of the non-university students, 92 participants completed the questionnaire online, whereas 53 completed the questionnaire offline.

An a priori power analysis was conducted using G*Power (Faul, Erdfelder, Buchner, & Lang, 2009) and indicated that in order to detect a small effect size (=.10) with power of .95 and with alpha set at .05, a sample size of 210 was required. However, according to Cohen (1992), to detect a small effect, the sample should exceed 274. Thus, a conservative approach was taken and a larger sample was recruited.

2.2. Design

This study used a 2×2 independent measures design. The two independent variables were sex (two levels: Men and women) and administration mode (two levels: Online and offline). The dependent variables were BSRI short-form ratings (masculinity and femininity). To improve ecological validity, similar levels of experimental control were used in both administration modes, with participants able to choose their own time and environment to complete the questionnaire.

2.3. Materials and procedure

The BSRI short-form was used to measure gender roles. The BSRI short-form assesses 10 masculine traits (for example, "defends own beliefs", "independent", "assertive") and 10 feminine traits (for example, "sensitive", "sympathetic", "understanding"). Participants were asked to indicate the degree the statement personally reflected themselves by rating their responses on a Likert scale (*1 = Always or almost always untrue, 7 = Always or almost always true*). The BSRI short-form has previously shown good reliability (masculinity scale Cronbach's $\alpha = .95$, femininity scale Cronbach's $\alpha = .92$; Holt & Ellis, 1998). Prospective participants were invited to complete a short personality questionnaire. University students were informed of the study by the researcher during class time, and participants outside the university were recruited by social media and word of mouth. The questionnaire included a short demographics section (which asked age, sex and primary spoken language) and the BSRI short-form. Participants

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