



Brief Report

Does self-esteem account for the higher-order factors of the Big Five?

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ABSTRACT

The purpose of this study was to determine whether higher-order factors of the Big Five personality factors are artifacts of self-esteem. Based on previous research, it was predicted that two higher-order factors, Stability and Plasticity, would emerge from correlations among the Big Five factors. It was also predicted that self-esteem would be related to the higher-order factors but would not account for them. The Big Five and self-esteem were measured in a sample of 628,640 participants using an interactive website on the Internet. Results showed that the two higher-order factors of the Big Five existed and were substantially correlated with self-esteem but remained intact when self-esteem was statistically controlled, indicating that they are not artifacts of self-esteem.

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1. Introduction

In the first decade of the 21st century, the Five-Factor Model or Big Five has been the most widely researched structural model of personality (John, Naumann, & Soto, 2008). The Big Five include the factors of openness, extraversion, agreeableness, conscientiousness, and emotional stability (neuroticism reversed). The model was developed from the lexical tradition (Goldberg, 1981) and has become the leading taxonomy of personality structure (John et al., 2008; McCrae & Costa, 2008). The Big Five factors have been found to be coherent (high within-scale correlations) and differentiated (low between-scale correlations) (Soto, John, Gosling, & Potter, 2008).

Despite the coherence and differentiation of the Big Five factors, some researchers have explored higher-order factors (DeYoung, 2006; DeYoung, Peterson, & Higgins, 2002; Digman, 1997). Digman (1997) found two higher-order factors in the Big Five which he termed alpha (agreeableness, conscientiousness, and emotional stability) and beta (extraversion and openness). He related the two factors to a variety of personality theories, linking factor alpha with socialization processes and factor beta with personal growth. DeYoung et al. (2002) and DeYoung (2006) found the same two higher-order factors which were termed Stability (alpha) and Plasticity (beta), and linked to the serotonergic and dopaminergic systems, respectively. McCrae et al. (2008) found that the two higher-order factors were partially due to artifact (method variance) but also had a substantive component. Similarly, Backstrom, Bjorklund, and Larsson (2009) found that social desirability contributed to a high-

er-order factor underlying the Big Five, but that the dimensions were still recovered when controlling the effects of social desirability.

Self-esteem has been found to be positively correlated with each of the Big Five factors (Robins, Tracy, Trzesniewski, Potter, & Gosling, 2001). It is possible, therefore, that higher-order factors of the Big Five are artifacts of self-esteem. The purpose of the present study was to determine if higher-order factors of the Big Five existed in a large sample of participants and whether they were artifacts of self-esteem.

2. Method

2.1. Participants

Participants were 628,640 people who completed the self-report questionnaires using an interactive website on the Internet (for a discussion of the viability and benefits of collecting Internet data, see Gosling, Vazire, Srivastava, & John, 2004). Participants were residents of the USA, were of both sexes (55% women), and ranged in age from 9 to 90 (median = 24, SD = 9.8) (for details, see Rentfrow, Gosling, & Potter, 2008).

2.2. Measures

The Big Five personality factors were measured using the Big Five Inventory (BFI; John & Srivastava, 1999). The BFI is a 44-item self-report measure comprised of short items assessing the Big Five personality factors. Items are responded to on a 5-point scale ranging from “strongly disagree” to “strongly agree”. The BFI scales have been shown to be both reliable and valid (John et al., 2008; Soto et al., 2008).

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Self-esteem was measured by the Single-Item Self-Esteem Scale (SISE; Robins, Hendin, & Trzesniewski, 2001). The item “I see myself as someone who has high self-esteem” was rated on a 5-point scale ranging from “strongly disagree” to “strongly agree”. The SISE has been found to have high test–retest reliability, criterion validity coefficients above .80 (median = .93 after correcting for unreliability) with the Rosenberg Self-Esteem Scale (RSE), and a similar pattern of construct validity coefficients as the RSE with 37 different constructs (Robins et al., 2001). Using longitudinal data, Robins et al. (2001) estimated the reliability of the SISE to be .75 (Heise, 1969).

2.3. Procedure

Participants completed the BFI and SISE using an interactive website (for details, see Rentfrow et al., 2008). Bivariate and partial correlation analyses and factor analyses were used to examine the relationships among the BFI scales and the SISE.

3. Results

Bivariate correlation analyses were performed to examine the relationships among the BFI scales and self-esteem (see Table 1). Self-esteem correlated positively with all of the BFI scales, ranging from .13 to .48. A principle-components factor analysis of the BFI scales was performed. A scree test yielded two factors, accounting for 35% and 21% of the variance, respectively. A varimax rotation of the two factors revealed that agreeableness, conscientiousness, and emotional stability loaded strongly on the first factor (Stability), and extraversion and openness loaded strongly on the second factor (Plasticity) (see Table 2). Composite scores were computed for Plasticity by averaging extraversion and openness scores, and for Stability by averaging agreeableness, conscientiousness, and emotional stability scores. The correlation between Plasticity and Stability was .24. Self-esteem correlated positively with Plasticity (.39) and Stability (.41).

Partial correlation analyses were performed to examine the inter-scale correlations of the BFI with self-esteem controlled (see Table 1). A principle-components factor analysis of the partial correlations among the BFI scales was performed. A scree test yielded

Table 1

Bivariate correlations among BFI scales and self-esteem (above diagonal) and partial correlations among BFI scales with self-esteem controlled (below diagonal).

	O	E	A	C	ES	Self-esteem
O	1.00	.19	.09	.07	.08	.18
E	.13	1.00	.15	.12	.26	.40
A	.07	.10	1.00	.26	.30	.13
C	.03	.02	.24	1.00	.27	.26
ES	-.01	.09	.27	.17	1.00	.48

Note: all coefficients are significant at the .001 level ($N = 628,640$). O, openness; E, extraversion; A, agreeableness; C, conscientiousness; and ES, emotional stability (neuroticism reversed).

Table 2

Loadings from factor analyses of bivariate and partial correlations among BFI scales.

	Stability		Plasticity	
	Bivariate	Partial	Bivariate	Partial
Openness	-.07	-.05	.83	.77
Extraversion	.26	.11	.68	.72
Agreeableness	.71	.73	.06	.16
Conscientiousness	.71	.66	-.01	-.06
Emotional stability	.70	.70	.21	.01

two factors, accounting for 30% and 22% of the variance, respectively. A varimax rotation of the two factors, revealed that, even after controlling for self-esteem, agreeableness, conscientiousness, and emotional stability continued to load strongly on the first factor (Stability), and extraversion and openness continued to load strongly on the second factor (Plasticity) (see Table 2). The partial correlation between Stability and Plasticity with self-esteem controlled was .10.

4. Discussion

The results of this study showed that higher-order factors of the Big Five existed and were not simply artifacts of self-esteem. Factor analyses showed evidence for the higher-order factors of Stability and Plasticity. The higher-order factor structure remained intact when self-esteem was statistically controlled. The finding of higher-order factors of the Big Five is consistent with findings reported by other researchers (DeYoung, 2006; DeYoung et al., 2002; Digman, 1997; McCrae & Costa, 2008). The results, which were derived from a very large sample, provide compelling evidence for higher-order factors of the Big Five. Social desirability almost certainly accounts for some of the shared variance found in higher-order factors (Backstrom et al., 2009). However, with respect to self-esteem, the results demonstrated that higher-order factors of the Big Five are related to, but not simply artifacts of, self-esteem. Those high in self-esteem tend to be high in Plasticity (extraverted and open) and high in Stability (agreeable, conscientious, and emotionally stable).

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