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Brief Report

No evidence for a General Factor of Personality in the HEXACO Personality Inventory

Reinout E. de Vries

VU University Amsterdam, Department of Social and Organizational Psychology, Van der Boechorststraat 1, 1081 BT, Amsterdam, The Netherlands

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ABSTRACT

There have been an increasing number of articles that have speculated on the existence of a General Factor of Personality (GFP) similar to 'g' in intelligence research. In this study, I provide evidence that this general factor may be an artifact of the personality instrument used. Specifically, in two samples I show that depending on the type of analysis used there is either no evidence for a GFP in the HEXACO Personality Inventory or the GFP is found to be uncorrelated to GFPs based on Big Five or FFM instruments.

1. Introduction

Recent studies have suggested that a General Factor of Personality (GFP), akin to the 'g'-factor in intelligence, exists and accounts for a significant portion of personality variance (Van der Linden, Te Nijenhuis, & Bakker, 2010). Not only is it argued that this factor occupies the top of the personality trait hierarchy, but it is also argued that it may be possible to interpret this factor in terms of a real substantial trait, with genetic and neurophysiologic roots and with important real-life consequences (Musek, 2007). If such a trait exists, not only would it have important theoretical implications for our thinking on personality, but it would also provide important practical ramifications because it may offer the opportunity to capture personality in selection and assessment using much shorter and focused personality questionnaires.

However, the GFP stance has become contested by scholars who have argued that the GFP is an artifact of the measurement method or instruments used (Ashton, Lee, Goldberg, & de Vries, 2009; Bäckström, Björklund, & Larsson, 2009). According to these scholars, the highest descriptive level of personality is the Big Five or HEXACO level. If this stance is correct, further research on the GFP is unlikely to yield any theoretical or practical advantages. In fact, such a search may even detract from research on lower levels of personality, which are thought to offer even higher levels of predictive validity than the Big Five or HEXACO factors.

The advent of the HEXACO model of personality may provide the opportunity to test for the existence of a GFP. The HEXACO model has arisen as a result of reanalyses of the same lexical data on which the Big Five has been grafted (Ashton et al., 2004). These reanalyses have provided evidence of a sixth dimension of personality differences named Honesty–Humility. In a number of studies, the HEXACO Personality Inventory has been found to yield almost unrelated domain-level scales, with correlations between the domain scales seldom surpassing the .30 level (e.g., Lee & Ashton, 2004). Note that this is accomplished with an instrument that closely matches the main six personality dimensions obtained from lexical data (Lee & Ashton, 2008). Furthermore, if a GFP is found to be present, the inclusion of an additional dimension and the rotational shift of Emotionality and Agreeableness in the HEXACO model may cause a distinctively different higher order factor to emerge than is found in the Big Five model.

In this study I will investigate whether the GFP is an artifact of the instrument used by examining whether a general factor in the HEXACO Personality Inventory exists, and, if it does, whether it is substantially different from a general factor in a lexically based instrument, the FFPI (Hendriks, Hofstee, & De Raad, 1999), and from a general factor in the most often used questionnaire in GFP studies, the NEO-PI-R (Costa & McCrae, 1992). Finding GFPs that are distinctively different may falsify the claim that a GFP in personality research is akin to *g* in intelligence research. After all, cognitive ability tests are noted to exhibit a positive manifold instead of a circumplex correlation pattern and thus any test that is perpendicular to *g* basically does not measure intelligence. If personality instruments have a perpendicular or even a contrasting GFP, this may undermine the assumption of GFP proponents that a single GFP exists and thus may falsify the idea of a consistent higher order factor in general.

2. Method

2.1. Sample and procedure

To test the presence and correlation of GFPs from different instruments, I used two samples. Sample 1 consists of data on

E-mail address: re.de.vries@psy.vu.nl

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the HEXACO-PI and the FFPI and Sample 2 consists of data on the HEXACO-PI-R and the NEO-PI-R.

Sample 1: Sample 1 has been used before as part of a study on Egoism (De Vries, De Vries, De Hoogh, & Feij, 2009; Study 2). Community respondents filled out the Dutch version of the HEXACO-PI and the FFPI with the promise of obtaining a personality report in return. The sample consisted of 276 participants (59.8% female) and the mean age was 38.0 years (*sd* = 12.1).

Sample 2: As part of an undergraduate personality psychology course, 377 psychology and educational science students (83% women) filled out a paper version of the NEO-PI-R and an electronic version of the HEXACO-PI-R spaced approximately one week apart. A personality report was written by another undergraduate student from the same course based on the personality scores. The mean age of the respondents was 20.5 years (*sd* = 3.5).

2.2. Instruments

HEXACO-PI(-R): The HEXACO Personality Inventory (Sample 1; de Vries, Lee, & Ashton, 2008; Lee & Ashton, 2004) and the HEXACO Personality Inventory Revised (Sample 2; Ashton & Lee, 2008; De Vries, Ashton, & Lee, 2009) operationalize the HEXACO model using the following six personality dimensions: Honesty–Humility, Emotionality, Extraversion, Agreeableness, Conscientiousness, and Openness to Experience. Each of the HEXACO domain-level scales consists of 32 items. Items were answered using a 1-to-5 (strongly disagree–strongly agree) response scale. In both studies, all of the alpha reliabilities of the HEXACO domain scales exceeded .85 (Table 1).

FFPI (Sample 1): The Five Factor Personality Inventory (Hendriks et al., 1999) consists of 100 items which represent the Big Five personality dimensions in Dutch lexical studies. Each of the five domain scales, Extraversion, Agreeableness, Conscientiousness, Emotional Stability, and Autonomy, contains 20 items. Items were answered using a 1-to-5 (strongly disagree–strongly agree) response scale and the alpha reliabilities of the FFPI scales ranged between .84 and .93.

NEO-PI-R (Sample 2): The NEO-PI-R (Costa & McCrae, 1992; Hoekstra, Ormel, & De Fruyt, 1996) consists of 240 items, divided among 5 domain-level scales with 48 items each. The answering categories ranged from 1 (strongly disagree) to 5 (strongly agree). The alpha reliabilities ranged from .81 to .89 and all of the absolute intercorrelations between the domain scale were lower than .30 except for the correlation between Neuroticism and Conscientiousness ($r = -.36$, $p < .01$).

3. Results

Principal Component Analyses (PCAs) were conducted on the HEXACO, FFPI, and NEO-PI-R domain scales. The six eigenvalues in the HEXACO domain scales were 1.4, 1.3, 1.0, 0.9, 0.7, and 0.6 in Sample 1 and 1.5, 1.4, 1.0, 0.9, 0.8, and 0.5 in Sample 2. The first HEXACO component, which explained 23.5% of the variance in Sample 1 and 24.3% in Sample 2, explained only between 2 and 3 times more variance in the HEXACO domain scales than the smallest component in both studies. In sharp contrast to FFM and Big Five findings, in the – on PCA based – HEXACO GFP, Extraversion and Reversed Emotionality had opposite loadings from Agreeableness and Conscientiousness (Table 2).

The five eigenvalues in the FFPI (Sample 1) were 2.1, 1.3, 0.7, 0.5, and 0.4 and thus the first component was more than 5 times larger than the smallest component, explaining 42% of the variance in the FFPI domain scales data. In contrast to findings in the meta-analysis of Big Five scales of Van der Linden et al. (2010), Agreeableness and Conscientiousness did not load on the on PCA based GFP of the FFPI. The five eigenvalues of the NEO-PI-R (Sample 2) were 1.5, 1.2, 1.0, 0.8, and 0.5 and thus the first component was 3 times larger than the smallest component, explaining 31% of the variance in the NEO-PI-R domain scales data. The findings with respect to the NEO-PI-R are very much in line with earlier findings, with all of the scales (when Neuroticism is reversed) loading positively on a PCA based GFP.

The first unrotated component from the PCA in the HEXACO, FFPI, and NEO-PI-R domain scales was saved. Subsequently, the correlations between the different PCA based GFP scales were calculated. The HEXACO domain-level GFP correlated −.25 ($p < .01$) with the FFPI domain-level GFP and .18 ($p < .01$) with the NEO-PI-R domain-level GFP (Table 1). Except for Openness to Experience, the GFP loadings of the HEXACO Personality Inventory were very similar in Samples 1 and 2, having a profile correlation of .75 ($p < .01$). Thus, the HEXACO PCA based GFP appears to be distinctively different from the FFPI PCA based GFP and the NEO-PI-R PCA based GFP, having only a small negative correlation with the former and a small positive correlation with the latter.

However, PCA may severely distort the results when the correlations between the variables is low (Fabrigar, Wegener, MacCallum, & Strahan, 1999), as is the case in this study. Consequently, Structural Equation Modelling (SEM) using AMOS was used to further test the GFP hypothesis in both studies. The GFP models for the HEXACO and FFPI/NEO-PI-R scales were tested in two ways: (a) using manifest domain-level scales, and (b) using a full model in which the HEXACO and FFPI/NEO-PI-R manifest domains and latent GFPs were combined.

Sample 1 HEXACO SEM: In Sample 1, the GFP of the manifest HEXACO domain variables did not fit the data well ($\chi^2(df = 9) = 50.14$, $p < .001$; CFI = .32; RMSEA = .13; SRMR = .09). Although the structural equation λs (path coefficients from the latent GFP to the manifest domain scales) resembled the loadings in PCA, most were considerable lower (see Table 2). In fact, the λs of Agreeableness and Conscientiousness were virtually indistinguishable from zero. Additionally, (1) the Bayesian Information Criterion (BIC), which takes into account the parsimony of the model, was lower in the independence model (BIC = 109.61) than in the GFP model (BIC = 117.59), showing that an independent manifest variable model had a better fit than the model with a GFP, and (2) the GFP did not contain a significant amount of systematic variance ($s^2 = .07$; se = .04, cr = 1.84, $p = .07$). I scaled the GFP using each of the domain scales separately (setting one of the six λs equal to one), but in none of the cases the variance of the GFP was significantly different from zero.[1]

Sample 1 FFPI SEM: The model which included paths from a GFP to the manifest FFPI domains had somewhat better fit than the HEXACO model ($\chi^2(df = 5) = 38.09$, $p < .001$; CFI = .88; RMSEA = .15; SRMR = .08). Furthermore, the λs closely resembled the loadings in PCA. Note however, that two of the λs, from the FFPI GFP to Agreeableness and Conscientiousness, were again virtually indistinguishable from zero.

Sample 1 full SEM: A full model, which included a GFP from the HEXACO domain-level scales and a – correlated – GFP from the FFPI domain-level scales, was found to be inadmissable due to a nonpositive definite covariance matrix. Several models were tried in which all the loadings of the higher order factors were fixed to +1 or −1 and six error covariances between the HEXACO and FFPI scales were allowed to be free. A model which conformed to the GFP position, with all unstandardized path coefficients fixed to one, except for a −1 coefficient from the HEXACO GFP to Emotion-

[1] Note that in the case of a larger sample size the standard error would be lower and the variance would be significantly different from zero. However, also note that the findings still imply that the GFP extracts a relatively low level of variance from the HEXACO domain-level scales.