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Testing the generality of the general factor of personality: An exploratory bifactor approach☆

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ABSTRACT

Objective: To investigate whether the psychometric properties of the general factor of personality (GFP) obtained through self-reported measures support its interpretation as a substantive dimension of general order.
Method: We estimated oblique and orthogonal bifactor exploratory structural equation models of the Big Five.
Results: The GFP explained considerably less variance than the five group factors and showed poor model-based reliability. The pattern of GFP loadings was consistent with those of a reverse-keyed wording factor. When related to an external variable (dispositional optimism) the GFP was primarily associated to method variance, and not to the substantive criterion.
Conclusions: Although there is a certain degree of variance common to most behavioral indicators of personality, its properties are not compatible with an interpretation of the GFP as a reliable and psychometrically meaningful general factor of personality.

1. Introduction

The five-factor model (FFM or Big Five) is possibly the dominant conceptualization of personality structure. The FFM assumes that the five basic dimensions of personality are orthogonal (Costa & McCrae, 1992) and thus placed at the highest hierarchical level of personality structure. However, it has been repeatedly shown that the Big Five are not empirically independent; rather, they exhibit correlations of variable but not negligible magnitude. This fact has led the scientific community to hypothesize the existence of non-modeled broader factors as an explanation for these correlations (Digman, 1997), generating a growing interest in the study of potential higher order dimensions of personality.

Since Musek's (2007) seminal study, research has proliferated regarding theoretical and empirical support for a general factor of personality (GFP; Just, 2011). Substantive interpretations view the GFP as a general dimension representing different adaptation and survival strategies in multiple domains of life, whose positive pole reflects a combination of high levels of stability, extraversion, intellect, agreeableness, and conscientiousness (Rushton, Bons, & Hur, 2008). In the last ten years, a broad field of research has emerged, with the aim of investigating the GFP as a substantive cause of general systematic variance (Rushton & Irwing, 2008), its role in broader nomological networks and as a predictor of relevant outputs (Van der Linden, Nijenhuis, & Bakker, 2010), and its relationship with other constructs such as general intelligence (Dunkel, 2013).

However, the hypothesis of the GFP as a mega-trait at the apex of human personality has not been without criticism (Ferguson, Chamorro-Premuzic, Pickering, & Weiss, 2011). One of the most frequent argument has been that the low correlations between basic personality factors, as well as the strength and regularity with which the indicators saturate in the GFP, are insufficient to postulate the existence of a general factor useful for the assessment of personality beyond the five traditional dimensions. Alternative approaches to studying the GFP have suggested that the shared variance between indicators belonging to different domains is due to an artifact related to the evaluative valence of items (Bäckström & Björklund, 2016), response trends associated with general self-evaluative traits such as self-esteem (Anusic, Schimmack, Pinkus, & Lockwood, 2009), or a combination of both (Davies, Connelly, Ones, & Birkland, 2015). Moreover, Revelle and Wilt (2013) demonstrated that some of the procedures used in previous studies to estimate the amount of variance explained by the GFP have not been adequate (e.g., interpreting the size of the first eigenvalue in exploratory factor analysis as an indicator of the presence of a general

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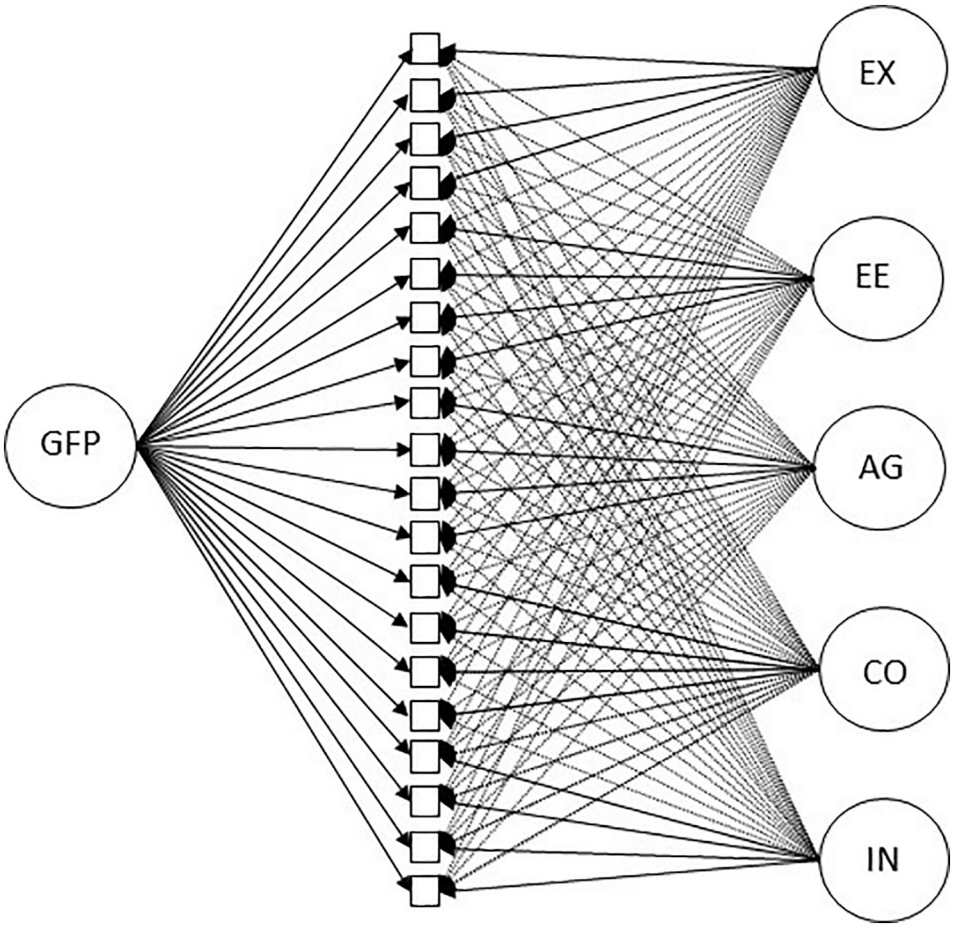

Fig. 1. Conceptual representation of Mini-IPIP ESEM orthogonal bifactor model. Note: Solid lines represent targeted loadings; GFP = General Factor of Personality; EX = Extroversion; ES = Emotional Stability; AG = Agreeableness; CO = Conscientiousness; IN = Intellect. For clarity, factor and residual variances are not represented.

Table 1
Model fit indexes.

Model	RMSEA (CI)	SRMR	CFI	TLI	χ^2	*df*	AIC	BIC
M1a (Five factors)	0.103 (0.094–0.112)	0.042	0.837	0.690	491	100	19,338	19,847
M1b (Five factors, CUs allowed)	0.056 (0.045–0.066)	0.029	0.953	0.909	210	98	19,107	19,625
M2 Bifactor)	0.019 (0.000–0.036)	0.017	0.995	0.989	94	83	19,020	19,596
M3 (Random intercept)	0.039 (0.026–0.050)	0.023	0.977	0.956	151	97	19,052	19,573
M4 (Extended measurement model)	0.033 (0.023–0.041)	0.028	0.979	0.966	271	195	24,338	25,051

Note: CUs = Correlated uniqueness; RMSEA = Root Mean Square Error of Approximation; CI = Confidence Interval; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; df = Degrees of Freedom; AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion.

factor). Instead, these authors suggested the use of other indices, such as explained common variance and the coefficient omega hierarchical, as an optimal means of assessing the unidimensionality of the model and accurately quantifying the ratio of reliable variance captured by the general factor. When Revelle and Wilt estimated these indices on eight datasets, they found that the GFP tended to explain little reliable variance and focused its saturations on certain sub-sets of items. However, the number of studies that have used these indexes to assess the psychometric properties of the GFP remains very limited (Davies et al., 2015).

1.1. The present study

In a strict sense, a factor is a mathematical abstraction derived from the empirical covariance between a set of variables, which may (or may not) be interpreted as a common, substantive cause underlying a set of observable behaviors. Interpreting the GFP as a true reflection of individual differences in personality requires the factor to be reliable, large enough to be psychologically and psychometrically meaningful, replicable, and ultimately, useful for personality assessment above and beyond the traditional five factors.

The aim of the present study was to investigate whether the psychometric properties of the GFP and its correlates with external variables support its interpretation as a general entity with causal activity over all personality indicators of a given instrument. Specifically, we evaluated (a) the degree of unidimensionality present in the FFM model, (b) the accuracy with which a FFM based instrument measures the GFP, and (d) the relation of the GFP with an external variable (dispositional optimism) that is known to be related with the Big Five (Sharpe, Martin, & Roth, 2011). To this end, we conducted a study in two steps. In the first step, we compared the fit and internal structure of three models: an oblique first order model, an orthogonal bifactor exploratory structural equation model (ESEM; Asparouhov & Muthén, 2009), and an exploratory factorial model with random intercepts (RI-