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The General Factor of Personality: A meta-analysis of Big Five intercorrelations and a criterion-related validity study

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ABSTRACT

Recently, it has been proposed that a General Factor of Personality (GFP) occupies the top of the hierarchical personality structure. We present a meta-analysis ($K = 212$, total $N = 144{,}117$) on the intercorrelations among the Big Five personality factors (Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism) to test for the existence of a GFP. In addition, we report a multi-method validity study testing the relationship between the GFP and supervisor-rated job performance. The meta-analysis provided supporting evidence for the two meta-factors Stability and Plasticity (or α and β, respectively) and a GFP at the highest hierarchal level. The validity study indicated that the GFP has a substantive component as it is related to supervisor-rated job performance.

1. Introduction

A fundamental question in personality research is how many basic dimensions are needed to describe individual differences in personality. Over the past decades researchers have made substantial progress in answering this question by using hierarchical models that group behavioral measures into higher-order clusters. One well-known example of such a hierarchical model is the Big Five (Digman, 1990; Goldberg, 1981; McCrae & Costa, 1999), consisting of Openness to experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism. These basic factors can explain and predict individual differences over a wide range of settings, including mental health, job satisfaction, and work performance (e.g., Barrick & Mount, 1991; Judge, Heller, & Mount, 2002). Yet, the theoretical discussion about the number of underlying basic personality dimensions remains open. Among the best-known competing hierarchical models are Cattell's (1987) 16 factors model, Eysenck's (1947, 1970) Big Three factors of Psychoticism, Extraversion, and Neuroticism (often referred by the acronym, PEN), and the Big Six (see, Ashton & Lee, 2007), which adds a Honesty–Humility dimension to the Big Five.

Digman (1997) and DeYoung, Peterson, and Higgins (2002) made an important contribution to the debate by identifying two meta-factors beyond the Big Five. These meta-factors were later described as Stability and Plasticity (DeYoung et al., 2002). Stability subsumes Conscientiousness, Emotional Stability (the reverse of Neuroticism), and Agreeableness, and refers to the extent to which an individual is consistent in motivation, mood, and social interactions. Plasticity encompasses Extraversion and Openness to experience, and refers to the extent to which a person actively searches for new and rewarding experiences, both intellectual and social.

More recently, it has been suggested that a General Factor of Personality (GFP) is at the top of the hierarchical structure of personality, analogous to Spearman's *g*, the general factor of mental ability (Hofstee, 2001; Hofstee & Ten Berge, 2004; Musek, 2007; Rushton, Bons, & Hur, 2008). Musek (2007) emphasized the potential relevance of the GFP by stating that it might be a substantive construct with "...deep biological roots, evolutionary, genetic, and neurophysiological." (p. 1213).

Currently, the evidence in favor of a GFP is accumulating. For example, in Musek's (2007) study, a GFP was identified in each of the three large samples with Big Five measures. Rushton and Irwing (2008) identified a GFP in the original 14 Big Five studies as mentioned by Digman (1997) and in a meta-analysis ($N = 4000$) of Mount, Barrick, Scullen, and Rounds (2005). Although these previous studies already provided evidence for the existence of a GFP in Big Five measures, they either used raw item-level data or comprised data from a limited number of studies. Current scientific discussions about the GFP would benefit however from a meta-analysis based on a large number of Big Five studies. We therefore collated the results of 212 Big Five studies that reported intercorrelations among Big Five measures and estimated the matrix of true intercorrelations. We then applied factor analysis to test for the viability of a GFP in personality measures (Study 1).

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Although showing the *existence* of a GFP in personality measures is an important step, it does not necessarily reveal information about the theoretical or practical relevance of such a construct. Therefore, in Study 2 we test whether the GFP is related to job performance, as assessed by means of supervisor ratings. To our knowledge, there are no previous studies yet that have directly linked the GFP to such real-life outcomes. Nevertheless, it may be important to examine the criterion-related validity of the GFP because the debate about how to interpret a GFP is ongoing. Some researchers support the notion of a substantive GFP (e.g., Figueredo et al., 2006; Hofstee, 2001; Musek, 2007; Rushton et al., 2008). Other researchers suggest that higher-order personality factors (beyond the Big Five) more likely reflect artifact than substance. For example, factors beyond the Big Five (including the GFP) have been argued to reflect social desirable response tendencies (Bäckström, Björklund, & Larsson, 2009) or statistical artifacts (Ashton, Lee, Goldberg, & de Vries, 2009). Regarding the social desirability account of the GFP, McCrae et al. (2008) used confirmatory factor analysis on twin-study data to argue that higher-order factors reflect a tendency to present oneself in a positive way when responding to questionnaires. While their reasoning specifically applied to the Big Two (α and β) as proposed by Digman (1997) and DeYoung et al. (2002), it would apply just as well to any level above the Big Five, and thus also to the GFP. However, even though their artifact (response tendencies) models fit the data better than the substantive factor models, they also noted that models containing *both* artifacts and substance fit even better.

DeYoung (2006) compared personality self-reports against peer ratings and came to a different conclusion than McCrae et al. (2008). Namely, he concluded that the Big Two are indeed substantive and reflect genuine personality factors. Notably, he also found a relatively strong correlation between the Big Two ($M_r \approx .45$) but stated that it was uncertain whether this correlation was substantive or artifact.

Bäckström (2007) examined social desirability and higher-order personality factors. He found a clear GFP in his IPIP-based personality dataset. This GFP showed an association with social desirability but he stated that despite this association it could not be concluded whether the general factor indeed was an artifact or instead reflected a fundamental factor of personality. Part of this uncertainty can probably also be ascribed to the status of social desirability as a mere response tendency causing artifacts. More specifically, some researchers would argue that social desirability does not only reflect response bias but is also partly a substantive personality construct (e.g., Hofstee, 2001). Ones, Viswesvaran, and Reiss (1996) referred to social desirability as a "red herring" distracting from the true content of factors. In addition, Carroll (2002) interpreted higher-order personality factors to reflect true social desirability in terms of General Social Competence and General Goodness of Personality.

Regarding the statistical artifact explanation of a GFP (or other higher-order factors beyond the Big Five), Ashton et al. (2009) argued that higher-order factors reflect personality facets scores that correlate with multiple Big Five dimensions. Due to these multiple correlated facets, higher-order factors will emerge beyond the Big Five, but these higher-order factors may not represent true correlations between the Big Five but instead are statistical artifacts. Thus, they stated that the Big Five or Big Six in the HEXACO model reflect the highest meaningful personality dimensions. They also showed that structural equation models based on correlated facets showed a better fit than models based on substantive higher-order factors.

In conclusion, there is evidence supporting the *artifact explanation* of the general personality factor, but there is also evidence in favor of its substantive nature. For example, Figueredo et al. (2006) showed that a GFP is, similar to other personality factors, related to several major life domains such as parent–child relationship, financial status, self- directedness/planning, subjective well-being, and medical symptoms. In addition, at least one study suggests that the GFP has a heritability coefficient of approximately .50 (Rushton et al., 2009). In the substantive GFP-view, high-GFP individuals are assumed to have a mix of positive traits that pose an advantage in dealing with many social and environmental demands. In Big Five terms, high-GFP individuals are described as open-minded, hard-working, sociable, friendly, and emotionally stable.

In our second study we indirectly address the social desirability or statistical artifact account of the GFP. Our reasoning is based on the assumption that if the GFP is indeed related to performance in a multi-method study (self-report and supervisor ratings) then it is likely to have a substantive component that either affects behavior directly or otherwise affects how other people (e.g., supervisors) perceive a specific individual. Before we outline the validity study however we will first describe how in a meta-analysis (Study 1) we collated the psychometric evidence bearing on the GFP.

2. Study 1: the GFP in a meta-analysis of Big Five correlations

In Study 1, we present a large meta-analyses ($K = 212$) leading to a matrix containing estimates of true Big Five intercorrelations. These meta-analytic intercorrelations provide a robust test of a GFP in personality measures. The meta-analysis can provide reliable estimates of major GFP-characteristics such as the amount of explained variance and the specific GFP-factor loadings of the Big Five. Previous studies did not reveal a consistent picture of GFP-characteristics. For example, in Musek's (2007) studies Neuroticism and Conscientiousness showed the highest GFP loadings, while Openness showed the lowest loading. In a large national survey, Figueredo et al. (2006) found Openness, Extraversion, and Agreeableness to show the highest GFP loadings, and Neuroticism the lowest. In smaller-scale meta-analyses Rushton and Irwing (2008) found that the Big Five contribute to the GFP mainly in an indirect way, through the meta-factors Stability and Plasticity. Our meta-analysis provides an accurate picture of how separate Big Five constructs contribute to a GFP. Moreover, in order to test the generalizability of the GFP we also examine the GFP in different subsamples of participants and among six large categories of Big Five (or FFM) questionnaires. We expect that a reliable GFP is found using different questionnaires and subgroups of participants.

2.1. Method Study 1

2.1.1. Meta-analysis and sample of studies

We use psychometric meta-analysis, which is a tool for summarizing and correcting empirical findings across independent studies in order to get better estimates of the relationship between variables (Hunter & Schmidt, 2004). After the meta-analysis, the resulting matrix of ten corrected intercorrelations is used as input for factor analyses to test for a GFP. The hierarchical approach we use is similar to that of Digman (1997) and of Viswesvaran, Schmidt, and Ones (2005) although these studies never went so far as to test for a general personality factor.

Computerized and manual searches were conducted to find studies for inclusion in the meta-analysis. We searched for studies that used the Big Five, but also included studies that used the Five Factor Model of personality which has strong overlap with the Big Five. Although many studies used one of these models, the large majority of them did not report the intercorrelations among the personality constructs. We set the following three criteria for inclusion in the meta-analysis: (i) the personality measures in the study had to be clearly based on the Big Five or the FFM dimensions, (ii) the study had to contain a table that reported the ten

first-order Pearson correlations between the factors, and (iii) the correlation matrices had to be based upon independent samples.

With these criteria we conducted the following searches. First, electronic databases were searched using the terms 'Personality', 'Big Five', and 'Five Factor Model' or combinations of these terms. The databases used were Sciencedirect, PsychInfo, EricLit, and Pubmed. Second, manual article-by-article searches were conducted of a specific set of journals in the area of personality or applied psychology: *Applied Psychology: A International Review, European Journal of Personality, International Journal of Selection and Assessment, Journal of Applied Psychology, Journal of Personality, Journal of Personality and Social Psychology, Journal of Research in Personality, Personality and Individual Differences, Personnel Psychology.* Third, we searched the reference list of all articles retrieved. Finally, we contacted various researchers and asked for additional intercorrelation matrices.

Correlations in the meta-analysis were taken directly from the matrices reported in the original articles, with the exception of 12 of the 14 correlation matrices as reported by Digman (1997). These could not be found in the references as reported and therefore we used the matrices as described in the appendix of that article.

This search yielded 212 Big Five intercorrelations matrices from independent samples. Sample size varied from 39 to 21,105 (see also Section 2.1.2 on this) which produced a total *N* of 144,117. Mean sample size was 679.8 (Median sample size = 233.5). We decided to limit the search period for the journals specified above, but not searches of the database or the reference list, to the years 2000–2008. Since the electronic and the reference lists search produced a large number of studies with a huge *N*, and since the studies were from many different journals, manual searches were conducted to refine the results. The concluding set of 212 samples with a total *N* of 144,117 is, by any means, a large meta-analysis, allowing strong conclusions. Since there is no good argument why values of the correlation matrices should differ substantially before 2000 or after 2000 we did not widen our manual article-by-article search to collect additional studies.

The nature of the participants in study samples differed widely. To be able to examine subgroups we constructed five large categories of participant types, namely (1) undergraduate students ($N = 39{,}595$), (2) employees from several occupations ($N = 10{,}654$), (3) mixed samples consisting of adults – with or without jobs, studying, etc. ($N = 88{,}305$), (4) children or young adolescents – age, 4–17 ($N = 4045$), and (5) participants from very specific groups such as psychiatric patients ($N = 747$).

In 67% of the studies, the Big Five personality factors were measured by well-known personality questionnaires, including the NEO Five Factor Inventory (NEO-FFI), the NEO Personality Inventory (NEO-PI), the revised version of that survey (NEO-PI-R), the Big Five Inventory (BFI), or the International Personality Item Pool (IPIP). Questionnaires that were less frequently used were the Big Five Observer (BFO), the Personal Characteristic Inventory (PCI), the Hamburg Personality Inventory (HPI), the Five-Dimensional Temperament Inventory (FDTI), the Trait Descriptive Adjective Scale (TDA), the Ten Item Personality Inventory (TIPI), and the Personal Style Inventory (PSI). As the individual studies were conducted in a number of different countries, the language of the instruments also differed.

To be able to examine whether a GFP would differ depending on the type of questionnaire used, we differentiated six categories of questionnaires. We differentiated between studies based on (1) NEO-FFI measures ($N = 19106$), (2) NEO-P-R measures ($N = 34{,}924$), (3) Big Five Inventory ($N = 51{,}987$), (4) IPIP-based questionnaires ($N = 5619$), (5) personality assessment based on other-ratings, such as peers, parents, or teacher ratings ($N = 2{,}898$), and (6) miscellaneous personality questionnaires ($N = 29{,}583$).

2.1.2. Meta-analytic procedure

To correct for statistical artifacts in the meta-analysis, we used the artifact distribution method, which uses average correction factors and their distribution. In the current study we applied the following corrections:

2.1.2.1. Correction for sample size. The sample size, *N*, of a study affects the reliability of the reported relationships. On average, sampling error is greater for smaller studies than for those with a larger sample size. Therefore, sample size was taken into account, yielding a weighted mean correlation between the Big Five dimensions. In the present meta-analysis sample size varied greatly – in three studies it was very large: $N = 21{,}105$ for the study by Rammstedt (2007), $N = 20{,}183$ for the study by Fruyt De, Aluja, Garcia, Rolland, and Jung (2006), and $N = 16{,}363$ for the study by Schmitt (2004), respectively. Two other studies had samples sizes that were lower than these three, yet still very substantial – $N = 8603$ for the study by Noftle and Shaver (2006) and $N = 7500$ for the study by Smith, Hanges, and Dickson (2001).

Large differences in sample size can bias outcomes if there is systematic error in the large studies, although Hunter and Schmidt (2004) argued that if the sample of studies in the meta-analysis is large enough this is almost never a problem. To ensure that the largest samples did not bias the outcomes we carried out sensitivity analyses. We compared the meta-analytic outcomes based on the total set of studies to the meta-analytic outcomes based on: (i) a set in which we excluded the three largest studies, (ii) a set in which we excluded the five largest studies, and (iii) the meta-analytic values obtained from the unweighted observed correlations.

2.1.2.2. Correction for Unreliability. The reliability distributions in our meta-analysis were based on 136–138 coefficients as reported in the articles or in the manuals of the questionnaires that served as data points. Most coefficients reflected internal reliability. Results are shown in Table 1 and the mean values are almost identical to the ones reported in the meta-analysis on personality by Salgado (2002, p.120), which were based on 52–60 coefficients. For each of the ten mean Big Five correlations we calculated the correction factor for unreliability and the relevant distribution parameters of this artifact.

2.1.2.3. Correction for restriction of range. Range restriction refers to situations in which the measurement variance in a specific sample is smaller than the variance of the population, which has a detrimental influence on effect sizes. The distribution of range restriction was based upon the information available in our sample of studies. For 32 of the studies we could directly calculate the range restriction or enhancement value *u* by using information about the sample *SD* and the population *SD*. The latter values were either reported in the individual studies or obtained from the questionnaire manuals. Distribution of range restriction in our set of studies, for each Big Five construct, is reported in Table 1. Again, the mean values are comparable to those reported by Salgado (2002, p. 121) who based range restriction estimates on 27–49 studies. Using this information, we calculated the average range restriction.

2.1.3. Factor analysis

We report in detail the outcomes of Principal Factor Analysis (PFA). However, to check whether outcomes depended on specific factor-analytic techniques, we also used other methods of factor analysis, namely Principal Components Analysis (PCA), and Maximum Likelihood (ML). For the confirmatory factor analyses, we only used the ML method.

To test for a GFP we adopted different approaches. First we conducted traditional exploratory factor analyses with Eigenvalue >1

Table 1
Summary of reliability and range restriction distribution for the Big Five dimensions.

	Summary reliability distribution			Summary range restriction distribution		
	R_{xx}	SD_{Rxx}	$N_{coefficients}$	RR	SD_{RR}	N_{RR}
Openness	.75	.11	136	.75	.43	32
Conscientiousness	.81	.08	138	.85	.49	32
Extraversion	.80	.09	136	.75	.40	32
Agreeableness	.76	.10	137	.86	.49	32
Neuroticism	.82	.09	138	.60	.34	32

as criterion for extracting the number of factors. Second, we looked at the viability of the one-factor solution. Similar to research on the cognitive factor *g*, we operationalized GFP as the first unrotated factor. Third, we used confirmatory factor analysis.

Additionally, to test for the consistency of the GFP over different measures and populations we conducted separate meta-analyses and factor analyses for subgroups of questionnaires and populations (see above).

Finally, we reran all the analyses described above using the intercorrelation matrices with either the three or five largest studies excluded, or the unweighted corrected matrix (the sensitivity analyses), or using the intercorrelation matrix based on uncorrected correlations. This provided us with information about the stability of the results. For obvious reasons we do not provide details of all analyses that we conducted although that information is available upon request from the first author.

2.2. Results Study 1

2.2.1. Meta-analytic results

Table 2 displays the meta-analytical intercorrelations between the Big Five dimensions (and *SD*s), next to the 10 mean observed correlations (and *SD*s), and the 80% credibility intervals. Table 2 also reports the percentages of variance due to artifacts. On average, 30.5% of the variance could be ascribed to artifacts (Range 13–58%). For several correlations the credibility intervals remained relatively wide, even after correction, but the overall picture is clear: the Big Five intercorrelate, which justifies the search for higher-order factors.

2.2.2. Exploratory factor analyses

A traditional exploratory factor analysis with the criterion of Eigenvalue >1 and oblique rotation methods initially led to a two-factor solution. The first factor had an Eigenvalue of 2.3 and explained 45% of the Big Five variance. Conscientiousness, Agreeableness, and Neuroticism loaded highly on this first factor (.73, .60, and −.54, respectively). This first factor is similar to the factor Stability or α (DeYoung et al., 2002; Digman, 1997). The second factor had an Eigenvalue of just 1.0 and explained 20% of the variance. Openness and Extraversion loaded substantially on this factor (.99, and .39, respectively). This factor is similar to Plasticity or β.

The results from these initial analyses provided several arguments for testing a higher-order factor solution. First, the Eigenvalue was only just 1 (specifically, 1.007) for the second factor whereas it was more than twice as large for the first factor. Second, inspection of the scree plot showed that the only clear drop occurred after the first factor. Third, the two factors correlated considerably ($r = .45$), which means that the two meta-factors (Stability and Plasticity) were not independent.

The analyses in which we examined the first unrotated factor supported the notion of a GFP. All Big Five dimensions showed substantial loadings on the general factor ($M = |.56|$). Conscientiousness loaded highest on the general factor (.63), followed closely by Neuroticism (−.62), Agreeableness (.57), and Extraversion (.57). Openness showed the lowest loading, although in absolute terms it was still substantial (.42). The communalities of the five factors were also high, namely .40, .38, .33, .32, and .17, respectively. Note that the communalities reflect the level of variance that is attributed to the GFP. It's reverse (1 minus the communality) reflects the level of unique variance that remains in the Big Five dimensions.

Parallel analyses in which we used the PCA and ML methods led to identical conclusions, as did the sensitivity analyses in which we either excluded the three or five studies with the largest *N*s, or which used the unweighted instead of weighted corrected correlations. We also conducted the same factor analyses on the observed (uncorrected) Big Five correlations (as reported in Table 2). This uncorrected data are important too as they reflect the mean correlations that can be found in the articles we used in the meta-analyses. Therefore, we also report details of these analyses. In general, the pattern was the same. Factor analyses with criterion of EV = 1 led to the two meta-factors α and β. Yet, the correlation between these factors was even stronger than for the corrected data, namely $r = .54$. Also, the Scree plot showed that the first factor was the strongest, which in this case explained 38.4% of the variance. The loadings of the Big Five on the first unrotated factor were $O = .34$, $C = .54$, $E = .49$, $A = .48$, $N = -.53$. These loadings are, by definition, lower than the loadings of the corrected values (they involve more error variance) but they nevertheless support the notion that all Big Five dimensions contribute to the GFP.

2.2.3. Confirmatory factor analyses

With confirmatory factor analyses (using ML estimates) we tested three different models. The first model was one in which the Big Five were assumed to be uncorrelated (orthogonal). As expected, all fit-indices confirmed that this model does not fit the data ($\chi^2 = 154472.8$, $df = 10$, RSMEA = .33, CFI = .01, NNFI = .01). The second model was one in which each of the Big Five dimensions directly loaded on a GFP. The fit of this model was better, but still not good ($\chi^2 = 18142.7$, $df = 5$, RSMEA = .16, CFI = .88, NNFI = .77). The best fitting model was the hierarchical one in which the Big Five loaded as expected on the two meta-factors Stability (*C*, *A*, −*N*) and Plasticity (*O*, *E*), which then loaded on a GFP (see Fig. 1). In this model ($\chi^2 = 2818.5$, $df = 4$) the RSMEA was .07 suggesting an acceptable fit. Other fit indices such as the CFI = .98 and the NNFI = .95 indicated a good model fit.

Confirmatory analyses on the uncorrected Big Five correlations (described in Table 2) also supported the hierarchy in which the Five dimensions load on the two meta-factors, which both loaded on the GFP (similar as in Fig. 1). In fact, the model for the uncorrected values even fit somewhat better to the data than the model for the corrected values, ($\chi^2 = 1053.7$, $df = 4$, RSMEA = .04, CFI = .99,

Table 2
Uncorrected Big Five intercorrelations, corrected Big Five intercorrelations (ρ), credibility intervals, and percentages of explained variance in the meta-analysis in Study 1 ($N = 144{,}117$).

	r	SD(*r*)	ρ	SD(ρ)	80% credibility interval	% variance due to artifacts
O–*C*	.14	.15	.20	.21	(−.06, .46)	13
O–*E*	.31	.12	.43	.09	(.30, .57)	58
O–*A*	.14	.12	.21	.15	(.01, .41)	21
O–*N*	−.12	.12	−.17	.15	(−.36, .02)	19
C–*E*	.21	.15	.29	.16	(.06, .52)	21
C–*A*	.31	.14	.43	.12	(.26, .61)	43
C–*N*	−.32	.18	−.43	.16	(−.69, −16)	24
E–*A*	.18	.15	.26	.19	(.01, .50)	17
E–*N*	−.26	.11	−.36	.08	(−.48, −.23)	53
A–*N*	−.26	.14	−.36	.09	(−.55, −.17)	35

Note: *O* = Openness, *C* = Conscientiousness, *E* = Extraversion, *A* = Agreeableness, *N* = Neuroticism.

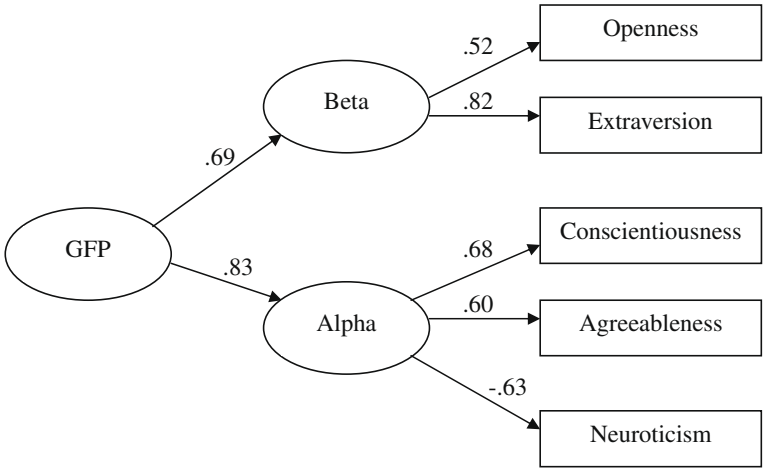

Fig. 1. The Confirmatory Factor analyses model of the GFP.

NNFI = .97). *C*, *A*, and *N* loaded, .58, .50, and −.55 on Alpha, respectively. *O* and *E* loaded .43 and .71 on Beta, respectively. Alpha loaded .84 and Beta .68 on the GFP.

2.2.4. Subsamples and questionnaires tests

Test of the different categories of questionnaires and sample populations showed that, even though correlations sometimes varied, a GFP could be identified in every subset. In each subgroup there was a general factor that explained a substantial percentage of the Big Five variance (range 42.2–78.7; see Table 3) and in each subgroup the separate Big Five dimensions showed positive loadings on the GFP (or negative in case of Neuroticism). The loadings of Openness were often somewhat lower than the loadings of the other dimensions, but still substantial as they ranged from .18 to .68 with an outlier of .08 in the subsample of psychiatric patients. The other four dimensions all consistently showed high loadings, ranging from .46 for Extraversion in the sample that used miscellaneous questionnaires, to .95 for Agreeableness in the sample that used the other-rated measures.

In general, the most extreme subgroup was the one that used other-ratings. Apparently, the Big Five show the highest correlations when personality is assessed by other persons. After correction for artifacts, some of these correlations almost reached unity, suggesting that a GFP is stronger when using other-ratings compared to self-report measures (See Table 3).

2.3. Discussion Study 1

Our meta-analysis of Big Five correlations confirms that there are two levels higher up the hierarchy. First, there are the two meta-factors, Stability and Plasticity (or α and β) as originally described by Digman (1997) and DeYoung (2006). However, Study 1 clearly shows that these two factors do not necessarily represent the highest factor level in personality. Rather, a single factor lies above them and occupies the apex of the hierarchy. The two meta-factors were not independent but substantially correlated and the best fitting model in confirmatory factor analyses was the one in which the two meta-factors loaded on a single higher-

Table 3
Meta-analytic Big Five intercorrelations and GFP loadings for different personality questionnaires and different subsamples.

	Questionnaire categories (+ *N*)						Subsample categories (+ *N*)				
	1. NEO1	2. NEO2	3. BFI	4. IPIP	5. Peer	6. Misc	1. Stud	2. Empl	3. Adult	4. School	5. Spec
	19106	34924	51987	5619	2898	29583	39595	10654	88305	4045	747
O–C	.02	.11	.26	.27	.77	.34	.24	.31	.19	.62	−.02
O–E	.23	.54	.47	.45	.75	.44	.39	.50	.50	.48	.14
O–A	.15	.14	.20	.43	.68	.31	.30	.34	.17	.52	.01
O–N	−.06	−.12	−.16	−.22	−.58	−.34	−.18	−.40	−.16	−.41	−.02
C–E	.38	.48	.28	.18	.35	.18	.27	.26	.35	.24	.26
C–A	.40	.45	.46	.40	.99	.50	.46	.56	.45	.79	.36
C–N	−.42	−.68	−.28	−.31	−.78	−.52	−.36	−.66	−.47	−.61	−.32
E–A	.40	.22	.20	.45	.55	.36	.33	.45	.23	.38	.37
E–N	−.51	−.46	−.35	−.37	−.44	−.28	−.37	−.40	−.38	−.41	−.51
A–N	−.40	−.43	−.37	−.21	−.86	−.37	−.34	−.51	−.39	−.58	−.33
GFP											
%var	44.5	54.9	50.8	46.5	78.5	56.0	47.4	42.2	47.4	62.2	42.2
Factor loadings B5 dimensions on GFP											
O	.18	.35	.48	.67	.88	.54	.47	.56	.42	.70	.07
C	.57	.85	.61	.51	[a]	.64	.59	.72	.67	.87	.48
E	.69	.69	.56	.70	.78	.46	.59	.58	.62	.49	.68
A	.59	.54	.59	.74	.95	.62	.65	.73	.55	.85	.57
N	−.69	−.83	−.54	−.47	−.83	−.61	−.55	−.80	−.65	−.71	−.69

NEO1 = NEO-FFI; NEO2 = NEO-PI or NEO-P-R; BFI = Big Five inventory; IPIP = IPIP-based questionnaires; Peer = peer or other-ratings; Misc = miscellaneous questionnaires; Stud = undergraduate students; Empl = employees; Adult = mixed adult samples; School = primary or high school children; Spec = special groups.

[a] Due to near complete overlap of constructs (no positive definite matrix), the loading of Conscientiousness could not be calculated in this case.

order factor. The results of this meta-analysis build on, and extend previous findings on the GFP, and also provides reliable estimates of true GFP-characteristics. For example, we found that the GFP explains roughly 45% of the Big Five variance. As others (Musek, 2007; Stankov, 2005) have already noted, there is no clear guideline or cut-off point regarding proportion of explained variance that can be used in determining whether or not to adopt the one-factor solution. However, as Stankov (2005) has pointed out, the amount of variance explained by the first factor in personality research is not necessarily lower than the variance explained by the general factor in cognitive tests. He observed that in test batteries that included sensory tests, the amount of total variance accounted for by *g* is between 20% and 25%. Moreover, this is often not very much higher than the variance explained by the second largest factor. In personality, a general factor has been found to explain between 30% and 50% of the variance and often the first factor is much larger than the second factor. Thus, to some extent the magnitudes of *g* and the GFP can be compared.

In the present study, the evidence in favor of a GFP becomes stronger when taking into account that each individual Big Five dimension had considerable loadings and communalities on the general factor. Saucier and Goldberg (1998) considered a lower-level construct to fall within a higher-order factor space if it had a communality of .09 or larger. Paunonen and Jackson (2000) disagreed and argued for stricter decisional rules for including constructs into higher-order factor space. They suggested a communality of .20 or higher as a more reasonable cut-off point. Four out of the five communalities in our meta-analysis (Study 1) were well above this more conservative cut-off point of .20 thus supporting the conclusion that the Big Five factors substantially contribute to the GFP. Note that communalities reflect the proportion of shared variance between the lower-order and higher-order factors.

Study 1 also showed that the GFP is rather consistent over different populations and questionnaires. In general, the characteristics of the GFP were largely independent of the type of questionnaire used and the population that was studied. Sporadically, some correlational values differed from those of the general analyses or from the majority of the other subgroups. For example, the correlation between *O* and *C* was relatively low ($r = .02$) in the NEO-FFI compared to the other personality measures or populations. Nevertheless, the overall picture was clear and showed replication of the main characteristics of the GFP. These findings provide solid evidence for a GFP. The next step, examining whether the GFP is related to actual behavior, is addressed in Study 2.

3. Study 2: Is the General Factor of Personality related to job performance?

Although there are now several studies supporting the *existence* of a GFP (e.g., Musek, 2007; Rushton & Irwing, 2008; Rushton & Irwing, 2009a, 2009b; Rushton et al., 2008) there are hardly any studies that directly addressed its potential theoretical or practical value. Therefore, in Study 2 we test whether a GFP, derived from Big Five measures, is related to job performance. Such a test would provide valuable information and would contradict the notion that the GFP is merely an empty construct.

A second aim of Study 2 is to compare the relationship between performance and GFP with the relationship between performance and each of the Big Five dimensions taken separately. This comparison sheds light on the practical relevance of a GFP. Specifically, it can illuminate whether the GFP, like *g*, the general factor in the cognitive domain, is useful for selection and assessment purposes.

In order to adequately interpret the relationship between the GFP and performance, it is useful to first consider the more general literature on personality and task performance. Barrick and Mount (1991) used meta-analysis to show that the Big Five predict work and training performance. They found Conscientiousness to be the best predictor of overall mean work performance ($\rho = .22$), followed by the other traits that showed lower predictive validities, namely $\rho = .13$ for Extraversion, $\rho = .08$ for Emotional Stability, $\rho = .07$ for Agreeableness, and $\rho = .04$ for Openness to experience. These values are sometimes higher for specific job types or criteria. For example, the ρs for Extraversion and Agreeableness became .16 and .24, respectively, in the case of sales jobs. For training proficiency ρ rose to .24 for Openness to experience. The study of Barrick and Mount (1991) demonstrates that the Big Five or related personality dimensions show relatively low to moderate, yet relevant validities for actual performance.

Ones and Viswesvaran (2001a, 2001b) used compound measures of personality to predict job performance and subsequently found higher validities. For example, they reported operational validities of around .40 for compound measures that incorporated aspects from multiple Big Five dimensions, namely Emotional Stability, Agreeableness, and Conscientiousness. Thus, the literature in personnel psychology research demonstrates that the operationalization of constructs based on combinations of personality traits yield reliable measures for selection and assessment. Yet, to the best our knowledge, no previous studies took the final step of directly testing the validity of a GFP.

Study 2 tests GFP-validity by using a multi-method approach to directly examine the relationship between a GFP and job performance. This test is relevant for theoretical as well as practical reasons. Theoretically, it adds to the discussion about whether the general personality factor is a viable construct. Its practical value lies in the comparisons between validities of lower-level personality constructs (the individual Big Five constructs or Stability and Plasticity) and the GFP.

3.1. Method Study 2

3.1.1. Participants

Participants were 144 employees working in the chemical industry, consultancy and personnel agencies, telemarketing, education, or catering service. The mean age was 33 years, with an average job experience of 9 years. Fifty-seven percent were male. For the assessment of performance, 23 supervisors participated. They had a mean age of 43 years and an average relevant job experience of 20 years. Only one supervisor was female.

3.1.2. Procedure

Thirty-three supervisors at different companies or educational institutes were asked to participate. Twenty-three responded positively, a response rate of 72%. The supervisors received a mail containing: (i) a survey on which to rate the performance of one or more of their employees (the Supervisor Rating Form), and (ii) a self-report personality questionnaire that had to be filled out by the employees who were rated. After employees filled out the personality questionnaire they were instructed to send it back directly to the researcher, without involvement of the supervisor. The supervisor who filled out the performance ratings also sent these forms back directly to the researchers.

3.1.3. Instruments

3.1.3.1. Personality Questionnaire (for the employee). Employee personality was measured with the Dutch version of the Five-Factor Personality Inventory (FFPI: Hendriks et al., 1999). The FFPI measures the Big Five constructs: Openness to experience, Conscientiousness, Extraversion, Agreeableness, and Emotional Stability (i.e. Neuroticism, reversed-scored). The questionnaire consists of 100 items, phrased in a third-person format (e.g., "works according

to a fixed format"). This format is assumed to yield a more objective perspective when filling out the questionnaire. Questions were in a five-point Likert-scale format. The FFPI has high internal consistency, validity, and test–retest reliability (Hendriks et al., 1999).

3.1.3.2. Supervisor rating survey. Supervisors had to rate overall performance of their employees in three categories: Task Performance, Contextual Performance, and Active Learning behavior. These three performance indicators reflect either the performance of the core work tasks or on extra-role tasks. These types of performance indicators have been used in several previous studies (for example, Goodman & Svyantek, 1999; Viswesvaran et al., 2005). *Task Performance* (TP) was assessed with five items of the nine-item scale developed by Goodman and Svyantek (1999). An example is: "achieves the objectives of the job" (to be scored as 1 = does not apply to 7 = applies very strongly). Reliability of the Task Performance scale was $\alpha = .78$. *Contextual Performance* (CP) was assessed with five items from Goodman and Svyantek's (1999) scale for extra-role performance. An example item is "takes initiative to orient new employees to the department even though not part of his/her job description". The items had the same answering format as the Task Performance scale. Reliability was $\alpha = .77$. *Active Learning* (AL) measured the extent to which an employee actively engaged in searching new knowledge or new ways to improve performance. For this scale five items were constructed that assessed this type of behavior, including "the employee asks for feedback regarding his or her own performance" In addition, two items in the same answering format as the two scales described above were added from Taris, Kompier, de Lange, Schaufeli, and Schreurs (2003). The reliability of the total, seven-item scale was $\alpha = .85$.

3.1.4. Statistical analysis

We calculated whether a GFP was related to the three performance indicators (TP, CP, AL). In addition, we also tested the relationship between the performance indicators and lower-level constructs. That is, we considered each individual Big Five dimensions separately and also looked at the two meta-factors Stability and Plasticity.

To test for the consistency of the GFP, we extracted general factor scores in two ways. First, we extracted the first unrotated factor (Principal Axis Factoring) from the Big Five data in the current sample. Factor loadings of the Big Five on this factor were .30, .05, .43, .28, and .50 for *O*, *C*, *E*, *A*, and ES, respectively. This factor explained approximately thirty percent of the Big Five variance. Second, we built a GFP based on factor loadings from the meta-analysis (Study 1). These meta-analytic loadings are less prone to sample-fluctuation and thus are helpful in constructing a more stable GFP.

The three performance indicators measured in this study reflect different types of job behavior. Previous reviews of optimal bandwidth suggest that broad criterion measures show the strongest relationship with broad, overall measures of performance (Ones & Viswesvaran, 1996). We therefore also calculated a general performance factor, based on the weights obtained from a factor analysis of the three performance measures (see Results Section). Besides the traditional methods extensively used in criterion validity research (e.g., factor analyses, regression), we also used Structural Equation Modeling to test the robustness of our findings and to examine whether different statistical methods would lead to converging conclusions.

3.2. Results Study 2

We found that the GFP based on sample loadings and the GFP calculated from the meta-analytic loadings, correlated highly ($r = .87$). This suggests that the GFP is stable and relatively insensitive to sample fluctuations in factor loadings. Table 4 reports the intercorrelations between the study variables. Table 4 shows that the range of personality-performance correlations was between −.01 to .30. According to the guidelines of Cohen (1977) most of these effect sizes would fall between small and moderate. However, these effect sizes are comparable to those reflecting the relationships between personality measures and multi-method performance indicators, as have been reported in previous meta-analyses (e.g., Barrick & Mount, 1991).

In the current study the GFP correlated with the performance indicators. For example, in absolute numbers, the meta-analytically based GFP showed the highest and significant correlations with Task Performance (TP) and Contextual Performance (CP), and was among the highest for Active Learning (AL).

However, in some cases, the specific Big Five dimensions or one of the two meta-factors (Stability or Plasticity) showed performance correlations that were significant and similar or higher than that of the GFP (see Table 4).

Factor analysis of the three performance measures (TP, CP, AL) led to one component with an Eigenvalue of 1.80, which explained 60 percent of the variance in performance. Loadings of TP, CP, and AL on the general performance factor were, .84, .82, and .66, respectively. This confirmed that there was also a single factor underlying supervisor ratings of performance. Table 4 shows that,

Table 4
Means, standard deviations, and correlations between variables in Study 2, $N = 144$.

	Mean	STDDV	1	2	3	4	5	6	7	8	9	10	11	12	13
1. TP	28.1	3.5	–												
2. CP	27.5	3.5	.55*	–											
3. AL	36.8	4.9	.34*	.29*	–										
4. Performance[a]	0	1	.84*	.81*	.65*	–									
5. GFP1[a]	0	1	.17*	.12	.26*	.23*	–								
6. GFP2	14.7	.90	.22*	.18*	.27*	.28*	.90*	–							
7. Stability	5.9	.50	.14*	.14*	.30*	.24*	.76*	.69*	–						
8. Plasticity	8.1	.60	.20*	.14*	.16	.22*	.61*	.84*	.19*	–					
9. Openness	3.7	.37	.20*	.13	.28*	.25*	.45*	.50*	.71*	.24*	–				
10. Conscientiousness	3.7	.53	.19*	.15*	.10	.19*	.08*	.50*	-.02	.74*	.20*	–			
11. Extraversion	3.7	.47	.02	.08	.16*	.10	.66*	.52*	.78*	.05	.10	−.20*	–		
12. Agreeableness	3.8	.37	−.01	.04	.09	.05	.43*	.50*	.16*	.56*	.09	.12	.12	–	
13. Emotional Stability	3.9	.41	.17*	.04	.12	.14*	.76*	.61*	.26*	.56*	.15*	.24*	.05	.10	–

GFP1 = Sample-based GFP; GFP2 = meta-analytic loadings based GFP.
TP = Task Performance; CP = Contextual Performance; AL = Active Learning; performance = the general factor from TP, CP, and AL.
[a] These variables are standardized scores.
* $p < .05$.

again in absolute numbers, the meta-analytically based GFP showed the strongest relationship to this general performance factor (r = .28), and the sample-based GFP was among the highest. Openness and Conscientiousness, and the two meta-factors were also significantly related to the general performance factor.

In comparing the influence of individual Big Five dimensions and the GFP, there are two approaches that are informative. One is to examine how the relationship between each of the Big Five dimensions and job performance changes after controlling for the GFP. Another approach is to examine how the level of explained variance in performance by the total Big Five differs from the explained variance in performance by the GFP. Such an approach is conducted with regression analyses.

Regarding the first approach, we found that after controlling for GFP, correlations between the other personality constructs and performance indicators were attenuated (see Table 5). Many of the relationships between personality and performance that were significant in the initial analyses were no longer significant after controlling for the GFP. The percentages of reductions in correlations were considerable. For example, when comparing the correlations reported in Table 4 with the partial correlations in Table 5, we found that associations between Openness and the performance indicators were reduced with 45% for Task Performance (from .20 to .11), 61% for Contextual Performance (from .13 to .05), 36% for Active Learning (from .28 to .19), and 40% (from .25 to .15) for the Overall Performance factor. In a similar way, Conscientiousness, which was the other Big Five dimension that was relatively strongly related to performance, showed reductions of 58%, 53%, and 74%, for Task Performance, Contextual Performance, and Overall Performance, respectively (see Tables 4 and 5).

In the second approach we first conducted regression analyses with i) all Big Five dimensions as independent variables, ii) then conducted regression analyses with only the GFP as independent variable, and iii) finally regression analyses in which we looked at the contribution of the Big Five beyond the GFP. In the regression analyses in which all Big Five factors were entered, we found that 5, 1, 8, and 7% of the variance (R^2) was explained for Task Performance, Contextual Performance, Active Learning, and the Overall Performance factor respectively. Only the Big Five-Contextual Performance relations did not reach the significance level whereas the others did reach significance at $p < .05$. Regression analyses with the GFP as independent variable and the performance indicators as dependent variables showed that the GFP explained, 4, 2, 7, and 7% of the variance of Task Performance, Contextual Performance, Active Learning, and Overall Performance, respectively. In this case, all levels of explained variance reached significance at the $p < .05$ level. Thus, it appears that with the regression method, the GFP in this sample explains a similar amount of variance as the total Big Five.

Table 5
Relationship Between Personality Factors and job performance after controlling for GFP, Study 2, N = 144.

	Task Performance	Contextual Performance	Active Learning	General Performance Factor
Stability	.01	.04	.17*	.08
Plasticity	.03	−.02	−.14*	−.05
Openness	.11	.05	.19*	.15*
Conscientiousness	.09	.07	−.05	.05
Extraversion	−.10	−.01	.04	−.03
Agreeableness	−.15*	−.06	−.06	−.12
Emotional Stability (reversed of Neuroticism)	.06	−.08	−.05	−.03

* $p < .05$.

The regression analyses in which we examined the Big Five (in step 2) after entering the GFP (in step 1) show how the unique variance of Big Five adds variance *beyond* the GFP. In these analyses, adjusted R^2 for Task Performance revealed that the explained variance was 5% for the GFP (p = .03), and 4% for the Big Five in the second step (p = .21). Regarding Contextual Performance, values were 3% for GFP (p = .04), and 1% for the Big Five (p = .75). Active Learning showed values of 7% for the GFP (p = .001) and 4% for the Big Five (p = .21). Finally, for the Overall Performance factor, values were 8% for the GFP (p = .001) and 3% (p = .35) for the Big Five in the second step. Thus, the additional total unique variance of the Big Five beyond the GFP often did not lead to a significant increase in predictive power.

3.2.1. Structural equation modeling

In applying SEM, we compared three different models, namely i) a model in which the Big Five are each directly related to the performance measures (modeled as observed variables), ii) a model in which the Big Five load on two uncorrelated latent meta-factors Stability (*C*, *A*, and ES) and Plasticity (*O*, *E*), which both have paths to the performance measures, iii) a model with a latent GFP factor with five indicators (Big Five), and a path from this latent GFP factor to the performance measures.

The sample in Study 2 was relatively small for SEM and it is well-know that small-scaled individual samples show large variability regarding Big Five measures (see also the meta-analysis in Study 1). In the current sample, the unique variances of Conscientiousness and Extraversion seemed to be correlated. Therefore, in each of the models described above we consistently included one additional association between these two traits. As noted by Anusic, Schimmack, Pinkus, and Lockwood (2009), correlated residuals mainly influence model fit but have negligible effects on theoretically important parameters.

Model 1 with the Big Five as independent predictors of performance showed a poor fit to the data for Task Performance (χ^2 = 27.83, df = 9, RSMEA = .12, CFI = .41, NNFI = .01), Contextual Performance (χ^2 = 27.83, df = 9, RSMEA = .12, CFI = .26, NNFI = 0), and Active Learning (χ^2 = 27.83, df = 9, RSMEA = .12, CFI = .47, NNFI = .12) separately, as well as for General performance (χ^2 = 27.83, df = 9, RSMEA = .12, CFI = .46, NNFI = .10). The fit indices for the two-factor model (with Stability and Plasticity) were better, but still not satisfactory (Task Performance: χ^2 = 25.48, df = 9, RSMEA = .11, CFI = .48, NNFI = .13; Contextual Performance: χ^2 = 20.36, df = 9, RSMEA = .09, CFI = .55, NNFI = .25; Active Learning: χ^2 = 19.21, df = 9, RSMEA = .09, CFI = .71, NNFI = .52; General Performance: χ^2 = 20.87, df = 9, RSMEA = .10, CFI = .66, NNFI = .43). The model with the GFP (shared variance), however, showed a very good fit for each of the four performance measures (Task Performance: χ^2 = 9.16, df = 8, RSMEA = .03, CFI = .96, NNFI = .93; Contextual Performance: χ^2 = 4.43, df = 8, RSMEA = .01, CFI = 1.00, NNFI = 1.04: Active Learning: χ^2 = 7.01, df = 8, RSMEA = .01, CFI = .1.00, NNFI = 1.07; General Performance: χ^2 = 6.60, df = 8, RSMEA = .01, CFI = 1.00, NNFI = 1.07). In addition, we used χ^2-difference test to compare the five-, two-, and one-factor models described above. This showed that, for each of the four performance indicators, the GFP-model was significantly better than the models with either five or two factors (χ^2-differences >12, all $ps < .01$).

3.3. Discussion Study 2

Study 2 demonstrated that the GFP had significant relationships with the performance indicators. Moreover, the sample-based GFP and the meta-analysis-based GFP showed a similar pattern of results, leading to the same conclusions. Namely, that the GFP likely has real-life implications. Simple correlations and regressions revealed relationships between the GFP and supervisor ratings. In

addition, we found that structural equation models with a general factor fitted the data significantly better than models with five factors or with two factors. The fact that GFP was associated with how supervisors rated their employees makes it less likely that the GFP is a mere response bias or statistical artifact because there was agreement between the self-report and the other-ratings.

As such, Study 2 supports the notion that the GFP reflects a factor consisting of a mix of undesirable traits on the low end of the continuum and a mix of desirable traits on the other (Hofstee, 2001). Conceptualized this way, it may become evident how such a mix of traits may have affected the supervisor ratings. First, colleagues or managers would prefer as workers individuals who are open, hard-working, extraverted, friendly, and emotionally stable. Moreover, a high GFP may actually enhance performance in a more direct way. For example, colleagues or even customers may be more willing to cooperate with, or provide support for people who show a positive profile of traits.

A recent study of Anusic et al. (2009) suggested that correlations between the Big Five are predominantly based on halo-biases, either within individuals reporting about their own personality or in other-ratings that tend to rate another person's personality as either overall positive or negative. In the Anusic et al. (2009) study, the apparent lack of agreement between raters on the halo-effect led these researchers to conclude that correlations between the Big Five are mainly bias. In the present sample, we did not have personality ratings from self-report and other-ratings. Therefore, it was not possible to directly compare the outcomes of the Anusic et al. (2009) study with our findings. Nevertheless, our finding that a self-report based GFP was related to supervisor-rated performance suggests that employees and supervisors agreed regarding the favorability of individual persons. For example, the overall performance factor derived from supervisor ratings showed a relatively strong association with the overall personality profile as assessed by the employees.

Regarding comparisons between the GFP and the individual Big Five dimensions, several authors stated that in the majority of cases compound measures of personality will show the highest validities because they provide stable and relatively error-free estimates of the relationship between a construct and a criterion (e.g., Ones & Viswesvaran, 1996). For example, in previous studies a mix of Conscientiousness, Emotional Stability, and Agreeableness turned out to be a better predictor of performance than any of the three traits taken separately (Ones & Viswesvaran, 1996, 2001a). Others however, have argued that lower-level measures of personality (e.g., personality facets) may show similar or even stronger relationships to criteria than higher-order constructs (Ashton, 1998; Paunonen & Ashton, 2001). For instance, a carefully selected set of personality facets was more strongly related to smoking and attending parties among students than higher-order Big Five traits (Paunonen & Ashton, 2001).

In Study 2, the GFP indeed was among the strongest and most consistent of the correlations with performance. Nevertheless, several lower-order constructs did have similar validities as the GFP (e.g., Openness). After controlling for GFP, the relationship between the lower-order personality constructs and performance was attenuated but some constructs remained significantly related to performance. On the other hand, by using regression analyses we found that the amount of variance in performance, explained by the GFP, was often as high as the amount of variance explained by the total of the Big Five. Moreover, beyond the GFP, the predictive value of unique variance of the Big Five often did not reach significance.

In general, Study 2 showed that compared to the Big Five, the GFP was a relatively good predictor of supervisor-rated performance. Yet, additional validity studies are required to determine whether the GFP is, just as the *g* factor in the cognitive domain, also the strongest and most consistent predictor in different jobs and different settings.

A limitation that one needs to take into account when interpreting the current results is that the findings on the Big Five dimensions and the performance measures were not completely in line with what has been reported in previous meta-analyses (e.g., Barrick & Mount, 1991). For example, compared tot the other Big Five dimensions, Openness was a relatively strong predictor in this sample whereas in the meta-analysis of Barrick and Mount (1991), Openness had a relative low validity. We also found that Conscientiousness was a relatively strong predictor for performance, which is in line with general findings on personality and performance.

4. General discussion

At the end of his 2007 paper about the general personality factor, Musek posed two questions: (1) Can the highest-order factor be interpreted as a personality factor in technical terms? and (2) What is its psychological meaning?

Regarding the first question, it is relevant to note that in personality literature, several studies already described the existence of a general factor several decades ago. However, such results did not receive much scientific attention. One possible reason is that, as Bäckström (2007) noted "...there is no obvious place for a common factor within the FFM model of personality" (p. 69). A more recent series of articles however indicates a lively debate about whether a General Factor of Personality is indeed plausible and if so, what is it nature. The current study contributes to this discussion by providing robust support for a GFP in Big Five measures, in a large number of studies and among a diversity of different measures and samples. We believe that the results of the present meta-analysis provide additional support for the existence of a GFP.

More likely grounds for discussion is its interpretation, with some researchers supporting the notion that the GFP is a substantive factor, whilst others would argue that higher-order factors beyond the Big Five merely reflect methodological or statistical artifacts. For both points of view there seems to be evidence. The support for the artifact view comes from studies such as Ashton et al. (2009) who used simulated data to argue that higher-order factors (beyond the Big Five) are artificial and based on facet correlations, Bäckström et al. (2009) who showed that a general factor in personality measures is related to social desirability, or Anusic et al. (2009) who argued that a general personality factor from supervisor ratings might be caused by halo-bias.

Support for the substantive view comes from studies such as Rushton et al. (2009) who found the GFP to have a hereditary component, Figueredo et al. (2006) who found a GFP to relate to several life domains, and Hofstee and Ten Berge (2004) who indicated that the first principal component of Big Five personality measures is related to general goodness of character.

Based on the above described contradictions in evidence and conclusions, it can be expected that consensus about what a GFP might actually reflect will not be reached easily. Regarding this, Study 2 might contribute to the GFP discussion as it was one of the first studies using a multi-method approach to show that the GFP is related to actual behavioral outcomes (supervisor ratings). In this study we did not directly address social desirability or statistical artifact accounts of the GFP. Instead we reasoned that if a GFP, based on self-report is related to the way supervisors rate their employees, then this construct is likely to have a substantive component. In Study 2 we indeed found such a relationship that was approximately as strong as the relationship with several personality factors lower in the hierarchy.

Thus, if GFP indeed strongly overlaps with social desirability, as some would suggest, then this would most likely not only relate to

desirability as a mere response bias. In contrast, it would relate to a relevant characteristic that apparently can affect behavior either directly or otherwise affects the judgment of the supervisors. In accordance with this, Hofstee (2001) argued that interpreting a GFP as social desirability might be valid as long as such a desirability is considered as substantive construct instead of a response bias. He stated:

"There is nothing against this interpretation as long as it is realized that social desirability is more than just an artifact of social perception. Some people are more socially desirable than others (Hofstee & Hendriks, 1998): Different judges agree on target persons' scores on the first principal component and there can be no reasonable doubt that its heredity coefficient is as high as is usually found in traits". (pp. 49–50).

Future research might want to elaborate on this idea and study why a GFP might be associated with higher social desirability in a true (not artifact) sense. Regarding this, Rushton et al. (2009) and Veselka et al. (2009) found the GFP to show a relatively strong overlap with measures of emotional intelligence. Similarly, Van der Linden, Scholte, Cillessen, te Nijenhuis, and Segers (submitted for publication) found a correlation of .64 between GFP and self-rated social intelligence. Emotional or social intelligence consists of knowledge about other people's behavior, motives and intentions, and the ability to act on that knowledge in order to reach personal or social goals. Having such knowledge and abilities might affect general social behavior by shifting it towards a more socially desirable level. For example, it would make someone behave less rigid, more cautious, sociable, and friendly, and less unstable. In this way, high social intelligence allows one to establish high-quality contact with supervisors, co-workers, or customers and thus affect their judgment and willingness to cooperate.

As a final remark, it is important to note that the existence of a GFP does not mean that other personality factors that are lower in the hierarchy necessarily lose their relevance. As others have also argued, it is sometimes useful to take specific measures of personality into account (Paunonen & Jackson, 2000), while in other cases compound measures may be more useful (Ones & Viswesvaran, 2001b). In the domain of mental ability, thinking in terms of a single factor *g* has contributed to the theoretical development as well as to practical implications of ability testing. It may be that thinking about personality in terms of different locations on a single continuum, reflected in a GFP, will reveal similar advantages in the future.

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References

Articles used in the meta-analysis are marked with a ''*

*Abe, J. A. A. (2005). The predictive validity of the Five-Factor Model of personality with preschool age children: A nine year follow-up study. *Journal of Research in Personality, 39*, 423–442.

*Adler, J. M., Wagner, J. W., & McAdams, D. P. (2007). Personality and the coherence of psychotherapy narratives. *Journal of Research in Personality, 41*, 1179–1198.

*Anderson, C., Spataro, S. E., & Flynn, F. J. (2008). Personality and organizational culture as determinants of influence. *Journal of Applied Psychology, 93*, 702–710.

*Antonioni, D., & Park, H. (2001). The effects of personality similarity on peer ratings of contextual work behaviors. *Personnel Psychology, 54*, 331–360.

*Asendorf, J. B., & Aken van, M. A. G. (2002). Validity of Big Five Personality judgments in childhood: A 9-year longitudinal study. *European Journal of Personality, 17*, 1–17.

*Asendorf, J. B., & Aken van, M. A. G. (2003). Personality-relationship transaction in adolescence: Core versus surface personality characteristics. *Journal of Personality, 71*, 629–666.

*Austin, E. J., Deary, I. J., & Gibson, G. J. (1997). Relationships between personality and ability: Three hypotheses tested. *Intelligence, 25*, 49–70.

*Austin, E. J., Dore, T. C. P., & O'Donovan, K. (2007). Associations of personality and emotional intelligence with display rule perceptions and emotional labour. *Personality and Individual Differences, 44*, 679–688.

*Aziz, S., & Jackson, C. J. (2001). A comparison between Three and Five-Factor Model of Pakistani personality data. *Personality and Individual Difference, 31*, 1311–1319.

*Barbaranelli, C., Fida, R., Paciello, M., Giunta Di, L., & Caprara, G. V. (2008). Assessing personality in early adolescence through self-report and other-ratings a multitrait–multimethod analysis of the BFQ-C. *Personality and Individual Difference, 44*, 876–886.

*Barrick, M. R., & Mount, M. K. (1993). Autonomy as a moderator of the relationships between the Big Five personality dimensions and job performance. *Journal of Applied Psychology, 78*, 111–118.

*Barrick, M. R., Parks, L., & Mount, M. K. (2005). Self-monitoring as a moderator of the relationships between personality traits and performance. *Personnel Psychology, 58*, 745–767.

*Barrick, M. R., Stewart, G. L., & Piotrowski, M. (2002). Personality and job performance: Test of the mediating effects of motivation among sales representatives. *Journal of Applied Psychology, 87*, 43–51.

*Bastian, V. A., Burns, N. R., & Nettelbeck, T. (2005). Emotional intelligence predicts life skills, but not as well as personality and cognitive abilities. *Personality and Individual Differences, 39*, 1135–1145.

*Beauducel, A., Liepmann, D., Felfe, J., & Nettelnstroth, W. (2007). The impact of different measurement models for fluid and crystallized intelligence on the correlation with personality traits. *European Journal of Psychological Assessment, 23*, 71–78.

*Becker, P. (1999). Beyond the Big Five. *Personality and Individual Differences, 26*, 511–530.

*Beer, A., & Watson, D. (2008). Asymmetry in judgments of personality: Others are less differential than the self. *Journal of Personality, 76*, 535–560.

*Berg van den, P. T., & Pitariu, H. (2005). The relationship between personality and well-being during societal change. *Personality and Individual Differences, 39*, 229–234.

*Berry, C. M., Page, R. C., & Sackett, P. R. (2007). Effects of self-deceptive enhancement on personality–job performance relationships. *International Journal of Selection and Assessment, 15*, 94–109.

*Biesanz, J. C., & West, S. G. (2004). Towards understanding assessments of the Big Five: Multitrait–multimethod analyses of convergent and discriminant validity across measurement occasion and type of observer. *Journal of Personality, 72*, 845–876.

*Bilalic, M., McLeod, P., & Gobet, F. (2007). Personality profiles of young chess players. *Personality and Individuals Differences, 42*, 901–910.

*Bipp, T., Steinmayr, R., & Spinath, B. (2008). Personality and achievement motivation: Relationship among Big Five domain and facet scales, achievement goals, and intelligence. *Personality and Individual Differences, 44*, 1454–1464.

*Blackburn, R., Logan, C., Renwick, S. J. D., & Donnelly, J. P. (2005). Higher-order dimensions of personality disorder: Hierarchical structure and relationships with the Five-Factor Model, the interpersonal circle, and psychopathy. *Journal of Personality Disorders, 19*, 597–623.

*Blackburn, R., Renwick, S. J. D., Donelly, J. P., & Logan, C. (2004). Big Five or Big Two? Superordinate factors in the NEO Five Factor Inventory and the Antisocial Personality Questionnaire. *Personality and Individual Differences, 37*, 957–970.

*Boswell, W. R., Roehling, M. V., & Boudreau, J. W. (2006). The role of personality, situational, and demographic variables in predicting job search among European managers. *Personality and Individual Differences, 40*, 783–794.

*Bouchard, G., & Arseneault, J. E. (2005). Length of union as a moderator of the relationship between personality and dyadic adjustment. *Personality and Individual Differences, 39*, 1407–1417.

*Boudreau, J. W., Boswell, W. R., Judge, T. A., & Bretz, R. D. Jr., (2001). Personality and cognitive ability as predictors of job search among employed managers. *Personnel Psychology, 54*, 25–50.

*Bratko, D., Chamorro-Premuzic, T., & Saks, Z. (2006). Personality and school performance: Incremental validity of self- and peer-ratings over intelligence. *Personality and Individual Differences, 41*, 131–142.

*Burke, R. J., Matthiesen, S. B., & Pallesen, S. (2006). Personality correlates of workaholism. *Personality and Individual Differences, 40*, 1223–1233.

*Byrne, J. C., Dominick, P. G., Smither, J. W., & Reilly, R. R. (2007). Examination of the discriminant, convergent, and criterion-related validity of self-ratings on the Emotional Competence Inventory. *International Journal of Selection and Assessment, 15*, 341–353.

*Chamorro-Premuzic, T., Ahmetoglu, G., & Furnham, A. (2008). Little more than personality: Dispositional determinants of test anxiety (the Big Five, score self-evaluations, and self-assessed intelligence). *Learning and Individual Differences, 18*, 258–263.

*Chamorro-Premuzic, T., Bennett, E., & Furnham, A. (2007). The happy personality: Mediational role of trait emotional intelligence. *Personality and Individual Differences, 42*, 1633–1639.

*Chamorro-Premuzic, T., & Furnham, A. (2008). Personality, intelligence and approaches to learning as predictors of academic performance. *Personality and Individual Differences, 44*, 1596–1603.

*Chamorro-Premuzic, T., Furnham, A., & Ackerman, P. L. (2006). Ability and personality correlates of general knowledge. *Personality and Individual Differences, 41*, 419–429.

*Chamorro-Premuzic, T., Furnham, A., Dissou, G., & Heaven, P. (2005). Personality and preference for academic assessment: A study with Australian University students. *Learning and Individual Differences, 15*, 247–256.

Chamorro-Premuzic, T., Furnham, A., & Lewis, M. (2007). Personality and approaches to learning predict preference for different teaching methods. *Learning and Individual Differences, 17*, 241–250.

Chan, K. Y., & Drasgow, F. (2001). Towards a theory of individual differences and leadership: Understanding the motivation to lead. *Journal of Applied Psychology, 86*, 481–498.

Chien, L. L., Ko, H. C., & Wu, J. Y. W. (2007). The Five-Factor Model of personality and depressive symptoms: One-year follow-up. *Personality and Individual Differences, 43*, 1013–2023.

Clark, L. A., Kochanska, G., & Ready, R. (2000). Mothers' personality and its interaction with child temperament as predictors of parenting behavior. *Journal of Personality and Social Psychology, 79*, 274–285.

Cole, M. S., Field, H. S., & Giles, W. F. (2003). Using recruiter assessments of applicants' resume content to predict applicant mental ability and Big Five personality dimensions. *International Journal of Selection and Assessment, 11*, 78–88.

Conard, M. A. (2006). Aptitude is not enough: How personality and behavior predict academic performance. *Journal of Research in Psychology, 40*, 339–346.

Converse, P. D., Oswald, F. L., Imus, A., Hedricks, C., Roy, R., & Butera, H. (2008). Comparing personality test formats and warnings: Effects on criterion-related validity and test-taker reactions. *International Journal of Selection and Assessment, 16*, 155–169.

Cook, D. B., Casillas, A., Robbins, S. B., & Dougherty, L. M. (2005). Goal continuity and the 'Big Five' as predictors of older adult martial adjustment. *Personality and Individual Differences, 38*, 519–531.

Costa, P. T., Jr., McCrae, R. R., & Dye, D. A. (1991). Facet scales for agreeableness and conscientiousness: A revision of the NEO Personality Inventory. *Personality and Individual Differences, 12*, 887–898.

Cullen, J. M., Sackett, P. R., & Lievens, F. (2006). Threats to the operational use of situational judgment tests in the college admission process. *International Journal of Selection and Assessment, 14*, 142–155.

Dahlen, E. R., & White, R. P. (2006). The Big Five factors, sensation seeking, and driving anger in the prediction of unsafe driving. *Personality and Individual Differences, 41*, 903–915.

Dean, M. A., Conte, J. M., & Blankenhorn, T. R. (2006). Examination of the predictive validity of Big Five personality dimensions across training performance criteria. *Personality and Individual Differences, 41*, 1229–1239.

Demetriou, A., Kyriakides, L., & Avraamidou, C. (2003). The missing link in the relations between intelligence and personality. *Journal of Research in Personality, 37*, 547–581.

DeYoung, C. G. (2006). Higher-order factors of the Big Five in a multi-informant sample. *Journal of Personality and Social Psychology, 91*, 1138–1151.

DeYoung, C. G., Peterson, J. B., & Higgins, D. M. (2002). Higher-order factors of the Big Five predict conformity: Are there neuroses of health? *Personality and Individual Differences, 33*, 533–552.

DeYoung, C. G., Quilty, L. C., & Peterson, J. B. (2007). Between facets and domains: 10 aspects of the Big Five. *Journal of Personality and Social Psychology, 93*, 880–896.

Di Fabio, A., & Busoni, L. (2007). Fluid intelligence, personality traits and scholastic success: Empirical evidence in a sample of Italian high school students. *Personality and Individual Differences, 43*, 2095–2104.

Digman, J. M. (1997). Higher-order factors of the Big Five. *Journal of Personality and Social Psychology, 73*, 1246–1256.

Donnellan, M. B., Conger, R. D., & Bryant, C. M. (2004). The Big Five and enduring marriages. *Journal of Research in Personality, 38*, 481–504.

Donnellan, M. B., Oswald, F. L., Baird, B. M., & Lucas, R. E. (2006). The Mini-IPIP scales: Tiny-yet-effective measures of the Big Five factors of personality. *Psychological Assessment, 18*, 192–203.

Duff, A., Boyle, E., Dunleavy, K., & Ferguson, J. (2004). The relationship between personality, approach to learning and academic performance. *Personality and Individual Differences, 36*, 190–1920.

Egan, V., Deary, I., & Austin, E. (2000). The NEO-FFI: Emerging British norms and an item-level analysis suggest N, A and C are more reliable than O and E. *Personality and Individual Differences, 29*, 907–920.

Farside, T., & Woodfield, R. (2003). Individual differences and undergraduate academic success: The roles of personality, intelligence, and application. *Personality and Individual Differences, 34*, 1225–1243.

Ferris, G. R., Witt, L. A., & Hochwarter, W. A. (2001). Interaction of social skill and General Mental Ability on job performance and salary. *Journal of Applied Psychology, 86*, 1075–1082.

Fruyt De, F., Aluja, A., Garcia, L. F., Rolland, J. P., & Jung, S. C. (2006). Positive presentation management and intelligence and the personality differentiation by intelligence hypothesis in job applicants. *International Journal of Selection and Assessment, 14*, 101–112.

Furnham, A., Batey, M., Anand, K., & Manfield, J. (2008). Personality, hypomania, intelligence and creativity. *Personality and Individual Differences, 44*, 1060–1069.

Furnham, A., & Chamorro-Premuzic, T. (2004). Personality, intelligence, and art. *Personality and Individual Differences, 36*, 705–715.

Furnham, A., Christopher, A. N., Garwood, J., & Martin, G. N. (2007). Approaches to learning and the acquisition of general knowledge. *Personality and Individual Differences, 43*, 1563–1571.

Furnham, A., Rawles, R., & Iqbal, S. (2006). Personality, intelligence and proof-reading. *Personality and Individual Differences, 41*, 1457–1467.

Gallagher, E. N., & Vella-Brodrick, D. A. (2008). Social support and emotional intelligence as predictors of subjective well-being. *Personality and Individual Differences, 44*, 1551–1561.

Gannon, N., & Ranyijn, R. (2005). Does emotional intelligence predict unique variance in life satisfaction beyond IQ and personality? *Personality and Individual Differences, 38*, 1353–1364.

Goff, M., & Ackerman, P. L. (1992). Personality-intelligence relations: Assessment of typical intellectual engagement. *Journal of Educational Psychology, 84*, 537–552.

Goldberg, L. R. (1992). The development of markers for the Big-Five factor structure. *Psychological Assessment, 4*, 26–42.

Gow, A. J., Whiteman, M. C., Pattie, A., & Deary, I. J. (2005). The personality–intelligence interface: Insights from an ageing cohort. *Personality and Individual Differences, 39*, 751–761.

Gow, A. J., Whiteman, M. C., Pattie, A., & Deary, I. J. (2005). Goldberg's 'IPIP' Big-Five factor markers: Internal consistency and concurrent validation in Scotland. *Personality and Individual Differences, 39*, 317–329.

Gramzow, R. H., Sedikides, C., Panter, A. T., Sathy, V., Harris, J., & Inski, C. A. (2004). Patterns of self-regulation and the Big Five. *European Journal of Personality, 18*, 367–385.

Grant, S., & Langan-Fox, J. (2007). Personality and the occupational stressor–strain relationship: The role of the Big Five. *Journal of Occupational Health Psychology, 12*, 20–33.

Graziano, W. G., & Tobin, R. M. (2002). Agreeableness: Dimension of personality of social desirability artifact? *Journal of Personality, 70*, 695–727.

Greven, C., Chamorro-Premuzic, T., Arteche, A., & Furnham, A. (2008). A hierarchical integration of dispositional determinants of general health in students: The Big Five, trait Emotional Intelligence and humour styles. *Personality and Individual Differences, 44*, 1562–1573.

Grumm, M., & Collani von, G. (2007). Measuring Big-Five personality dimensions with the implicit association test: Implicit personality traits or self-esteem? *Personality and Individual Differences, 43*, 2205–2217.

Hampson, S. E., Andrews, J. A., Barckley, M., & Peterson, M. (2007). Trait stability and continuity in childhood: Relating sociability and hostility to the Five-Factor Model of personality. *Journal of Research in Personality, 41*, 507–523.

Hausenblas, H. A., & Giacobbi, P. R. Jr., (2004). Relationship between exercise dependence symptoms and personality. *Personality and Individual Differences, 36*, 1265–1273.

Heaven, P. C. L., Fitzpatrick, J., Craig, F. L., Kelly, P., & Sebar, G. (2000). Five personality factors and sex: Preliminary findings. *Personality and Individual Differences, 28*, 1133–1141.

Heggestad, E. D., Morrison, M., Reeve, C. L., & McCloy, R. A. (2006). Forced-choice assessments of personality for selection: Evaluating issues of normative assessment and faking resistance. *Journal of Applied Psychology, 91*, 9–24.

Heinsman, H., Hoogh de, A. H. B., Koopman, P. L., & Muijen van, J. J. (2007). Competencies through the eyes of psychologists: A closer look at assessing competencies. *International Journal of Selection and Assessment, 15*, 412–427.

Higgins, D. M., Peterson, J. B., Pihl, R. O., & Lee, A. G. M. (2007). Prefontal cognitive ability, intelligence, Big Five personality, and the prediction of advanced academic and workplace performance. *Journal of Personality and Social Psychology, 93*, 298–319.

Hogan, J., Barrett, P., & Hogan, R. (2007). Personality measurement, faking, and employment selection. *Journal of Applied Psychology, 92*, 1270–1285.

Hong, R. Y., Paunonen, S. V., & Slade, H. P. (2008). Big Five personality factors and the prediction of behavior: A multitrait–multimethod approach. *Personality and Individual Differences, 45*, 160–166.

Hunthausen, J. M., Truxillo, D. M., Bauer, T. N., & Hammer, L. B. (2003). A field study of frame-of-reference effects on personality test validity. *Journal of Applied Psychology, 88*, 545–551.

Ingledew, D. K., Markland, D., & Sheppard, K. E. (2004). Personality and self-determination of exercise behaviour. *Personality and Individual Differences, 36*, 1921–1932.

Jackson, C. L., Colquitt, J. A., Wesson, M. J., & Zapata-Phelan, C. P. (2006). Psychological collectivism: A measurement validation and group member performance. *Journal of Applied Psychology, 91*, 884–899.

Jackson, C. L., & LePine, J. A. (2003). Peer response to team's weakest Link: A test and extension of LePine and Van Dyne's model. *Journal of Applied Psychology, 88*, 459–475.

Jakobwitz, S., & Egan, V. (2006). The dark triad and normal personality traits. *Personality and Individual Difference, 40*, 331–339.

Judge, T. A., & Bono, J. E. (2000). Five-Factor model of personality and transformational leadership. *Journal of Applied Psychology, 85*, 751–765.

Judge, T. A., Heller, D., & Klinger, R. (2008). The dispositional source of job satisfaction: A comparative test. *Applied Psychology: An International Review, 57*, 361–372.

Judge, T. A., Heller, D., & Mount, M. K. (2002). Five-Factor Model of personality and job satisfaction: A meta-analysis. *Journal of Applied Psychology, 87*, 530–541.

Judge, T. A., LePine, J. A., & Rich, B. L. (2006). Loving yourself abundantly: Relationship of the narcissistic personality to self- and other perceptions of workplace deviance, leadership, and task and contextual performance. *Journal of Applied Psychology, 91*, 762–776.

Kim, H. J., Shin, K. H., & Umbreit, W. T. (2007). Hotel job burnout: The role of personality characteristics. *Hospitality Management, 26*, 421–434.

King, K. C., Ryff, C. D., Love, G., & Essex, M. (2003). Exploring the influence of personality on depression symptoms and self-esteem across a significant life transition. *Journal of Personality and Social Psychology, 85*, 932–992.

Knyazev, G. G., Bocharov, A. V., Slobodskaya, H. R., & Ryabichenko, T. I. (2008). Personality-linked biases in perception of emotional facial expressions. *Personality and Individual Differences, 44*, 1093–1104.

* Kwapil, T. R., Wrobel, M. J., & Pope, C. A. (2002). The Five-Factor personality structure of dissociative experience. *Personality and Individual Differences, 32*, 431–443.
* Law, K. S., Wong, C. S., & Song, L. J. (2004). The construct and criterion validity of emotional intelligence and its potential utility for management studies. *Journal of Applied Psychology, 89*, 483–496.
* Lee, K., Ashton, M. C., & Shin, K. H. (2005). Personality correlates of workplace anti-social behavior. *Applied Psychology: An international Review, 54*, 81–89.
* Lee, K., Ogunfowora, B., & Ashton, M. C. (2005). Personality traits beyond the Big Five: Are they within the HEXACON space? *Journal of Personality, 73*, 1437–1463.
* LePine, J. A., & Dyne Van, L. (2001). Voice and cooperative behaviour as contrasting forms of contextual performance: Evidence of differential relationships with Big Five personality characteristics and cognitive ability. *Journal of Applied Psychology, 86*, 326–336.
* Lievens, F., & Coetsier, P. (2002). Situational tests in student selection: An examination of predictive validity, adverse impact, and construct validity. *International Journal of Selection and Assessment, 10*, 245–257.
* Lievens, F., Decaesteker, C., Coetsier, P., & Geirnaert, J. (2001). Organizational attractiveness for prospective applicants: A person–organization fit perspective. *Applied Psychology: An International Review, 50*, 30–51.
* Lieviens, F., Corte De, W., & Schollaert, E. (2008). A closer look at the frame-of-reference effect in personality scale scores and validity. *Journal of Applied Psychology, 93*, 268–279.
* Lieviens, F., Harris, M. M., Keer Van, E., & Bisqueret, C. (2003). Predicting cross-cultural training performance: The validity of personality, cognitive ability, and dimensions measured by an assessment center and a behavior description interview. *Journal of Applied Psychology, 88*, 476–489.
* Lim, B. C., & Ployhart, R. E. (2004). Transformational leadership: Relations to the Five-Factor Model and team performance in typical and maximum context. *Journal of Applied Psychology, 89*, 610–621.
* Loundsbury, J. W., Welsh, D. P., Gibson, L. W., & Sundstorm, E. (2005). Broad and narrow personality traits in relation to cognitive ability in adolescents. *Personality and Individual Differences, 38*, 1009–1019.
* Lounsbury, J. W., Sundstorm, E., Loveland, J. M., & Gibson, L. W. (2002). Intelligence, 'Big Five' personality traits, and work drive as predictors of course grade. *Personality and Individual Differences, 35*, 1231–1239.
* McCrae, R. R., Yamagata, S., Jang, K. L., Riemann, R., Ando, J., Ono, Y., et al. (2008). Substance and artifact in the higher-order factors of the Big Five. *Journal of Personality and Social Psychology, 95*, 442–455.
* McFarland, L. A., & Ryan, A. M. (2000). Variance in faking across noncognitive measures. *Journal of Applied Psychology, 85*, 812–821.
* Metasäpelto, R. L., & Pulkkinen, L. (2003). Personality traits and parenting: Neuroticism, extraversion, and openness to experience as discriminative factors. *European Journal of Personality, 17*, 59–78.
* Meyer, T. D. (2002). The hypomanic personality scale, the Big Five, and their relationship to depression and mania. *Personality and Individual Differences, 32*, 649–660.
* Miller, G. F., & Tal, I. R. (2007). Schizotypy versus openness and intelligence as predictors of creativity. *Schizophrenia Research, 93*, 317–324.
* Mõttus, R., Allik, J., & Pullmann, H. (2007). Does personality vary across ability levels? A study using self and other ratings. *Journal of Research in Personality, 41*, 155–170.
* Mount, M. K., Barrick, M. R., Scullen, S. M., & Rounds, J. (2005). Higher-order dimensions of the Big Five personality traits and the big six vocational interest types. *Personnel Psychology, 58*, 447–478.
* Mount, M., Ilies, R., & Johnson, E. (2006). Relationship of personality traits and counterproductive work behaviors: The Mediating effects of job satisfaction. *Personnel Psychology, 59*, 591–622.
* Mumford, T. V., Iddekinge Van, C. H., Morgeson, F. P., & Campion, M. A. (2008). The Team Role Test: Development and validation of a team role knowledge situational judgment test. *Journal of Applied Psychology, 93*, 250–267.
* Neff, K. D., Rude, S. S., & Kirkpatrick, K. L. (2007). An examination of self-compassion in relation to positive psychological functioning and personality traits. *Journal of Research in Personality, 41*, 908–916.
* Nguyen, N. T., Biderman, M. D., & McDaniel, M. A. (2005). Effects of response instructions on faking a situational judgment test. *International Journal of Selection and Assessment, 13*, 250–260.
* Noftle, E. E., & Shaver, P. R. (2006). Attachment dimensions and the big five personality traits: Associations and comparative ability to predict relationship quality. *Journal of Research in Personality, 40*, 179–208.
* Oltmanns, T. F., Friedman, J. N. W., Fiedler, E. R., & Turkheimer, E. (2004). Perception of people with personality disorders based on thin slices of behavior. *Journal of Research in Personality, 38*, 216–229.
* Parker, J. D. A., Majeski, S. A., & Collin, V. T. (2004). ADHD symptoms and personality: Relationships with the Five-Factor Model. *Personality and Individual Differences, 36*, 977–987.
* Peeters, H., & Lievens, F. (2006). Verbal and nonverbal impression management tactics in behavior description and situational interviews. *International Journal of Selection and Assessment, 14*, 206–222.
* Peeters, M. A. G., Rutte, C. G., Tuijl van, H. F. J. M., & Reymen, I. M. M. J. (2006). The Big Five personality traits and individual satisfaction with the team. *Small Group Research, 37*, 187–211.
* Penely, J. A., & Tomaka, J. (2002). Associations among the Big Five, emotional responses, and coping with acute stress. *Personality and Individual Differences, 32*, 1215–1228.
* Peterson, J. B., Smith, K. W., & Carson, S. (2002). Openness and extraversion are associated with reduced latent inhibition: Replication and commentary. *Personality and Individual Differences, 33*, 1137–1147.
* Ployhart, R. E., Lim, B. C., & Chan, K. Y. (2001). Exploring relations between typical and maximum performance ratings and the Five Factor Model of personality. *Personnel Psychology, 54*, 809–843.
* Pursell, G. R., Laursen, B., Rubin, K. H., Booth-LaForce, C., & Rose-Krasnor, L. (2008). Gender differences in pattern of association between prosocial behavior, personality, and externalizing problems. *Journal of Research in Personality, 42*, 472–481.
* Reeve, C. L., Meyer, R. D., & Bonaccio, S. (2006). Intelligence–personality associations reconsidered: The importance of distinguishing between general and narrow dimensions of intelligence. *Intelligence, 34*, 387–402.
* Robins, R. W., Fraley, R. C., Roberts, B. W., & Trzesniewski, K. H. (2001). A longitudinal study of personality change in young adulthood. *Journal of Personality, 69*, 617–640.
* Rode, J. C., Arthaud-Day, M. L., Mooney, C. H., Near, J. P., & Baldwin, T. T. (2008). Ability and personality predictors of salary, perceived job success, and perceived career success in the initial career stage. *International Journal of Selection and Assessment, 16*, 292–299.
* Rose, C. L., Murphy, L. B., Byard, L., & Nikzad, K. (2002). The role of the Big Five personality factors in vigilance performance and workload. *European Journal of Personality, 16*, 185–200.
* Rubinstein, G., & Strul, S. (2007). The Five Factor Model (FFM) among four groups of male and female professionals. *Journal of Research in Personality, 41*, 931–937.
* Salvaggio, A. N., Schneider, B., Nishii, L. H., Meyer, D. M., Ramesh, A., & Lyon, J. S. (2007). Manager personality, manager service quality orientation, and service climate: Test of a model. *Journal of Applied Psychology, 92*, 1741–1750.
* Schaefer, P. S., Williams, C. C., Goodie, A. S., & Campbell, W. K. (2004). Overconfidence and the Big Five. *Journal of Research in Personality, 38*, 473–480.
* Schmitt, D. P. (2004). The Big Five related to risky sexual behaviour across 10 world regions: Differential personality associations of sexual promiscuity and relationship infidelity. *European Journal of Personality, 18*, 301–319.
* Schulte, M. J., Ree, M. J., & Carretta, T. R. (2004). Emotional intelligence: Not much more than *g* and personality. *Personality and Individual Differences, 37*, 1059–1068.
* Schutte, N. S., Malouff, J. M., Segrera, E., Wolf, A., & Rodgers, L. (2003). States reflecting the Big Five dimensions. *Personality and Individual Differences, 34*, 591–603.
* Shafer, A. B. (2001). The Big Five and sexuality trait terms as predictors of relationship and sex. *Journal of Research in Personality, 35*, 313–338.
* Shaffer, M. A., Harrison, D. A., Gregersen, H., Black, J. S., & Ferzandi, L. A. (2006). You can take it with you: Individual differences and expatriate effectiveness. *Journal of Applied Psychology, 91*, 109–125.
* Slaughter, J. E., Stanton, J. M., Mohr, D. C., & Schoel, W. A. (2005). The interaction of attraction and selection: Implications for college recruitment and Schneider's ASA model. *Applied Psychology: An International Review, 54*, 419–441.
* Smith, D. B., Hanges, P. J., & Dickson, M. W. (2001). Personnel selection and the Five-Factor Model: Reexamining the effects of applicant's frame of reference. *Journal of Applied Psychology, 86*, 304–315.
* Smithikrai, C. (2007). Personality traits and job success: An investigation in a Thai sample. *International Journal of Selection and Assessment, 15*, 134–138.
* Soldz, S., Budman, S., Demby, A., & Merry, J. (1993). Representation of personality disorders in circumplex and Five-Factor space: Explorations with a clinical sample. *Psychological Assessment, 5*, 41–52.
* Steel, P., & Ones, D. S. (2002). Personality and happiness: A national-level analysis. *Journal of Personality and Social Psychology, 83*, 767–781.
* Stewart, G. L., Fulmer, I. S., & Barrick, M. R. (2005). An exploration of member roles as a multilevel linking mechanism for individual traits and team outcomes. *Personnel Psychology, 58*, 343–365.
* Stewart, S. H., Loughlin, H. L., & Rhyno, E. (2001). Internal drinking motives mediate personality domain–drinking relations in young adults. *Personality and Individual Differences, 30*, 271–286.
* Tay, C., Ang, S., & Dyne Van, L. (2006). Personality, biographical characteristics, and job interview success: A longitudinal study of the mediating effects of interviewing self-efficacy and the moderating effects of internal locus of causality. *Journal of Applied Psychology, 91*, 446–454.
* Thoresen, C. J., Bradley, J. C., Bliese, P. D., & Thoresen, J. D. (2004). The Big Five personality traits and individual job performance growth trajectories in maintenance and transitional job stages. *Journal of Applied Psychology, 89*, 835–853.
* Timmerman, T. A. (2006). Predicting turnover with broad and narrow personality traits. *International Journal of Selection and Assessment, 14*, 392–399.
* Truxillo, D. M., Campion, M. A., & Paronto, M. E. (2006). A field study of the role of Big Five personality in applicant perceptions of selection fairness, self and the hiring organization. *International Journal of Selection and Assessment, 14*, 269–277.
* Tsaousis, I., & Nikolaou, I. E. (2001). The stability of the Five-Factor Model of personality in personnel selection and assessment in Greece. *International Journal of Selection and Assessment, 9*, 290–301.
* Wanberg, C. R., & Kammeyer-Mueller, J. D. (2000). Predictors and outcomes of proactivity in the socialization process. *Journal of Applied Psychology, 85*, 337–385.
* Wanberg, C. R., Kanfer, R., & Banas, J. T. (2000). Predictors and outcomes of networking intensity among unemployed job seekers. *Journal of Applied Psychology, 85*, 491–503.

*Wang, M., & Erdheim, J. (2007). *Does the Five-Factor Model of personality relate to goal orientation? Personality and Individual Differences, 43*, 1493–1505.

*Wasylkiw, L., & Fekken, G. C. (2002). Personality and self-reported health matching predictors and criteria. *Personality and Individual Differences, 33*, 607–620.

*Wolfradt, U., & Dalbert, C. (2002). Personality, values and belief in a just world. *Personality and Individual Differences, 35*, 1911–1918.

*Yik, M. S. M., & Russell, J. A. (2001). Predicting the Big Two of affect from the Big Five of personality. *Journal of Research in Personality, 35*, 247–277.

*Zweig, D., & Webster, J. (2004). What are we measuring? An examination of the relationship between the Big-Five personality traits, goal orientation, and performance intentions. *Personality and Individual Differences, 36*, 1693–1708.

*Zyphur, M. J., Islam, G., & Landis, R. S. (2007). Testing 1, 2, 3, 4? The personality of repeat SAT test takers and their testing outcomes. *Journal of Research in Personality, 41*, 715–722.

Anusic, I., Schimmack, U., Pinkus, R. T., & Lockwood, P. (2009). The nature and structure of correlations among Big Five ratings: The Halo-Alpha-Beta model. *Journal of Personality and Social Psychology, 97*, 1142–1156.

Ashton, M. C. (1998). Personality and job performance: The importance of narrow traits. *Journal of Organizational Behavior, 19*, 289–303.

Ashton, M. C., & Lee, K. (2007). Empirical, theoretical, and practical advantages of the HEXACO model of personality structure. *Personality and Social Psychology Review, 11*, 150–166.

Ashton, M. C., Lee, K., Goldberg, L. R., & de Vries, R. E. (2009). Higher order factors of personality: Do they exist? *Personality and Social Psychology Review, 13*, 79–91.

Bäckström, M. (2007). Higher-order factors in Five-Factor personality inventories and its relation to social desirability. *European Journal of Psychological Assessment, 23*, 63–70.

Bäckström, M., Björklund, F., & Larsson, M. R. (2009). Five-factor inventories have a major general factor related to social desirability which can be reduced by framing items neutrally. *Journal of Research in Personality, 43*, 335–344.

Barrick, M. R., & Mount, M. K. (1991). The Big Five personality dimensions and job performance: A meta-analysis. *Personnel Psychology, 44*, 1–26.

Carroll, J. B. (2002). The Five-Factor personality model: How complete and satisfactory is it? In H. Braun, D. Jackson, & D. Wiley (Eds.), *The role of constructs in psychological and educational measurement*. Mahwah, NJ: Lawrence Erlbaum.

Cattell, R. B. (1987). *Intelligence: Its structure, growth and action*. Oxford, England: North-Holland.

Cohen, J. (1977). *Statistical power analysis for the behavioral sciences*. New York: Academic Press.

Digman, J. M. (1990). Personality structure: Emergence of the Five-Factor Model. *Annual Review of Psychology, 41*, 417–440.

Eysenck, H. J. (1947). *Dimensions of Personality*. Oxford, England: K. Paul, Trench, Trubner.

Eysenck, S. B., & Eysenck, H. J. (1970). A factor-analytic study of the Lie Scale of the Junior Eysenck Personality Inventory. *Personality: An International Journal, 1*, 3–10.

Figueredo, A. J., Vasquez, G., Brumbach, B. H., Schneider, S. M. R., Sefcek, J. A., Tal, I. R., et al. (2006). Consilience and life history theory: From genes to brain to reproductive strategy. *Developmental Review, 26*, 243–275.

Goldberg, L. R. (1981). Language and individual differences: The search for universals in personality lexicon. *Journal of Personality and Social Psychology, 59*, 1216–1229.

Goodman, S. A., & Svyantek, D. J. (1999). Person-organization fit and contextual performance: Do shared values matter. *Journal of Vocational Behavior, 55*, 254–275.

Hendriks, A. A. J., Hofstee, W. K. B., & De Raad, B. (1999). The Five-Factor Personality Inventory (FFPI). *Personality and Individual Differences, 27*, 307–325.

Hofstee, W. K. B. (2001). Intelligence and personality: Do they mix? In S. Messick & J. M. Collis (Eds.), *Intelligence and personality: Bridging the gap in theory and measurement* (pp. 43–60). Mahwah, NJ: Lawrence Erlbaum Associates Publishers.

Hofstee, W. K. B., & Hendriks, A. A. J. (1998). The use of scores anchored at the scale midpoint in reporting individuals' traits. *European journal of Personality, 12*, 219–228.

Hofstee, W. K. B., & Ten Berge, J. M. (2004). Personality in proportion: A bipolar proportional scale for personality assessments and its consequences for trait structure. *Journal of Personality Assessment, 83*, 120–127.

Hunter, J. E., & Schmidt, F. L. (2004). *Methods of meta-analysis: Correcting error and bias in research findings*. California: Sage Publications.

McCrae, R. R., & Costa, P. T. Jr., (1999). A Five-Factor theory of personality. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research* (2nd ed., pp. 139–153). New York, NY: Guilford Press.

Musek, J. (2007). A general factor of personality: Evidence for the Big One in the Five-Factor Model. *Journal of Research in Personality, 41*, 1213–1233.

Ones, D. S., & Viswesvaran, C. (1996). Bandwidth-fidelity dilemma in personality measurement for personnel selection. *Journal of Organizational Behavior, 17*, 609–626.

Ones, D. S., & Viswesvaran, C. (2001a). Integrity tests and other Criterion-focused Occupational Personality Scales (COPS) used in personnel selection. *International Journal of Selection and Assessment, 9*, 31–39.

Ones, D. S., & Viswesvaran, C. (2001b). Personality at work: Criterion-focused Occupational Personality Scales used in personnel selection. In R. Hogan & B. W. Roberts (Eds.), *Personality psychology in the workplace* (pp. 63–92). Washington, DC: American Psychological Association.

Ones, D. S., Viswesvaran, C., & Reiss, A. D. (1996). Role of social desirability in personality testing for personnel selection: The red herring. *Journal of Applied Psychology, 81*, 660–679.

Paunonen, S. V., & Ashton, M. C. (2001). Big Five factors and facets and the prediction of behavior. *Journal of Personality and Social Psychology, 81*, 524–539.

Paunonen, S. V., & Jackson, D. N. (2000). What is beyond the Big Five? *Plenty! Journal of Personality, 68*, 821–835.

Rushton, J. P., Bons, T. A., Ando, J., Hur, Y., Irwing, P., Vernon, P. A., et al. (2009). A general factor of personality from multitrait–multimethod data and cross-national twins. *Twin Research and Human Genetics, 12*, 356–365.

Rushton, J. P., Bons, T. A., & Hur, Y. (2008). The genetics and evolution of a general factor of personality. *Journal of Research in Personality, 42*, 1173–1185.

Rushton, J. P., & Irwing, P. (2008). A General Factor of Personality (GFP) from two meta-analyses of the Big Five: Digman (1997) and Mount, Barrick, Scullen, and Rounds (2005). *Personality and Individual Differences, 45*, 679–683.

Rushton, J. P., & Irwing, P. (2009a). A general factor of personality in the Comrey Personality Scales, Minnesota Multiphasic Personality Inventory-2, and the Multicultural Personality Questionnaire. *Personality and Individual Differences, 46*, 437–442.

Rushton, J. P., & Irwing, P. (2009b). A general factor of personality in 16 sets of the Big Five, the Guilford–Zimmerman Temperament Survey, the California Psychological Inventory, and the Temperament and Character Inventory. *Personality and Individual Differences, 47*, 558–564.

Salgado, J. (2002). The Big Five personality dimensions and counterproductive behaviors. *International Journal of Selection and Assessment, 10*, 117–125.

Saucier, G., & Goldberg, L. R. (1998). *What is beyond the Big Five? Journal of Personality, 66*, 495–524.

Stankov, L. (2005). *g* factor: Issues of design and interpretation. In R. W. Engle & O. Wilhelm (Eds.), *Handbook of understanding and measuring intelligence* (pp. 279–293). Thousand Oaks, CA: Sage Publications.

Taris, T. W., Kompier, M. A. J., de Lange, A. H., Schaufeli, W. B., & Schreurs, P. J. G. (2003). Learning new behaviour patterns: A Longitudinal test of Karasek's active learning hypothesis among Dutch Teachers. *Work & Stress, 17*, 1–20.

Van der Linden, D., Scholte, R. H. J., Cillessen, A. H., te Nijenhuis, J., & Segers, E. (submitted for publication). The General Factor of Personality and classroom ratings of likeability and popularity.

Veselka, L., Schermer, J. A., Petrides, K. V., Cherkas, L. F., Spector, T. D., & Vernon, P. A. (2009). A general factor of personality: Evidence from the HEXACO model and a measure of trait emotional intelligence. *Twin Research and Human Genetics, 12*, 420–424.

Viswesvaran, C., Schmidt, F. L., & Ones, D. S. (2005). Is there a general factor in ratings of job performance? A meta-analytic framework for disentangling substantive and error influences. *Journal of Applied Psychology, 90*, 108–131.