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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

J. Philippe Rushton [a,*], Paul Irwing [b]

[a] Department of Psychology, University of Western Ontario, London, Ontario, Canada N6A 5C2
[b] Manchester Business School, University of Manchester, Manchester, M13 9PL, UK

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ABSTRACT

In four studies, we tested the hypothesis that a General Factor of Personality (GFP) occupies the apex of the hierarchy. In Study 1, a GFP was found in 16 sets of Big Five inter-scale correlations ($N = 6412$) which explained 54% of the variance in the two first-order factors. In Study 2, a GFP was found in validation samples from the Guilford–Zimmerman Temperament Survey ($N = 2917$) which explained 36% of the variance in three first-order factors and 21% of the total reliable variance in a model that went from 10 primary traits to 3 higher-order traits to the GFP. In Study 3, a GFP was found in a validation sample of the California Psychological Inventory ($N = 6000$) which explained 35% of the variance in two second-order factors, 17% of the variance in six first-order factors, and 20% of the total reliable variance in 20 primary traits. In Study 4, a GFP was found in two validation samples of the Temperament and Character Inventory ($N = 1285$) which explained 49% of the variance in three first-order factors and 24% of the total reliable variance in a model that went from 7 primary traits to 3 higher-order traits to the GFP.

1. Introduction

In this paper, we use structural equation modeling (SEM) to test the hypothesis that a General Factor of Personality (GFP) occupies the apex of the multifactorial hierarchy of personality in the same way that *g*, the general factor of mental ability, occupies the apex in the organization of cognitive abilities. In previous studies, we have extracted a GFP from the inter-scale correlations observed in the Big Five, the Multidimensional Personality Questionnaire, the Comrey Personality Scales, the Minnesota Multiphasic Personality Inventory-2, the Multicultural Personality Questionnaire, the EAS temperament scales, and an eclectic set of 35 traits measured agnostic as to the factor structure of personality (e.g., Rushton, Bons, & Hur, 2008; Rushton & Irwing, 2008; Rushton & Irwing, 2009a,b). We now examine whether a GFP can be extracted from the inter-scale correlations from 16 additional sets of the Big Five as well as from validation samples of the Guilford–Zimmerman Temperament Survey, the California Psychological Inventory, and the Temperament and Character Inventory.

* Corresponding author. Tel.: +1 519 661 3685.
E-mail address: rushton@uwo.ca (J.P. Rushton).

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2. A meta-analysis of 16 studies of the Big Five

2.1. Method

Table 1 provides 16 sets of inter-scale correlations (Total $N = 6412$) assembled from five published studies by DeYoung and colleagues. They are re-arranged here using the OCEAN mnemonic—Openness (O), Conscientiousness (C), Extraversion (E), Agreeableness (A), and Neuroticism (N), the last being reverse-keyed as Emotional Stability (ES). The 16 samples are as follows:

(1) DeYoung, Peterson, and Higgins (2002). Three sets of inter-scale correlations were found. Sample 1 consisted of 245 university students (69% female) with a mean age of 21. Sample 2 consisted of 222 community members (65% female) with a mean age of 25. Both samples completed a Trait Descriptive Adjective scale (TDA) with responses given on seven-point scales. Sample 1 also completed the Revised NEO Personality Inventory (NEO PI-R).
(2) DeYoung (2006). Eight sets of inter-scale correlations were taken from this multitrait–multimethod study. The 490 core participants consisted of the Eugene–Springfield Community

Sample in Oregon (60% female) with a mean age of 51 who completed questionnaires, delivered by mail. Each completed two sets of assessments and also distributed them to any three people who knew them "very well". These additional 1470 informants (62% male) had a mean age of 48. The ratings were from the Big Five Inventory and Big Five Mini-Markers.

(3) DeYoung, Hasher, Djikic, Criger, and Peterson (2007). Participants were 279 Canadian university students (69% female; mean age = 19 years) who completed the BFI.

(4) DeYoung, Quilty, and Peterson (2007). Four sets of inter-scale correlations were taken from two samples. Sample 1 was the Eugene–Springfield Community Sample. Sample 2 were 489 undergraduates (61% female), with a mean age of 19. Both samples completed the BFI and a Big Five Aspects Scale (BFAS). The 423 members of the Community Sample who completed the BFI in the DeYoung (2006) study were omitted.

(5) DeYoung, Peterson, Séguin, Pihl, and Tremblay (2008). Participants were 140 male 16-year-olds drawn from a longitudinal study of 1037 French-speaking Canadians from lower-socioeconomic high-schools in Montreal with intentional oversampling of boys who scored high in aggression. They completed a French-language version of the NEO PI-R.

2.2. Results and discussion

Table 1 shows the inter-scale correlations for the 16 studies together with the means ($r = 0.21$; $r = 0.27$ corrected for reliability). First, a separate meta-analysis was performed on each of the 10 sets of inter-scale correlations weighted by its inverse variance. Modally, there was substantial heterogeneity among the studies, as indicated by significant values for 8 of the 10 Q statistics. Thus, we estimated the weighted mean of the correlations using a random effects model (see Table 1).

Table 1
Inter-scale correlations from DeYoung's Big Five studies (Decimal points omitted).

	Random effects mean of 16 studies ($N = 6412$; mean $r = 0.21$)				DeYoung et al. (2002) 245 university students, TDA				DeYoung et al. (2002)* 245 university students, NEO PI-R			
	O	C	E	A	O	C	E	A	O	C	E	A
O	–				–				–			
C	16	–			15	–			−07	–		
E	26	17	–		21	19	–		34	17	–	
A	18	29	14	–	18	47	23	–	15	20	15	–
ES	10	31	20	39	−07	27	27	40	04	43	37	29
	DeYoung et al. (2002)* 222 Community adults, TDA				DeYoung (2006) 483 Self-report BFI				DeYoung (2006)* 487 Self-report Mini-Markers			
	O	C	E	A	O	C	E	A	O	C	E	A
O	–				–				–			
C	26	–			09	–			08	–		
E	42	25	–		25	21	–		19	12	–	
A	28	36	21	–	06	24	15	–	09	15	19	–
ES	−06	30	07	24	08	31	16	36	05	17	04	35
	DeYoung (2006) 483 Peer 1 BFI				DeYoung (2006) 487 Peer 1 Mini-Markers				DeYoung (2006) 483 Peer 2, BFI			
	O	C	E	A	O	C	E	A	O	C	E	A
O	–				–				–			
C	18	–			27	–			19	–		
E	28	16	–		15	13	–		35	15	–	
A	25	30	14	–	23	26	08	–	22	35	12	–
ES	16	38	15	54	11	32	08	51	18	41	24	53
	DeYoung (2006) 487 Peer 2, Mini-Markers				DeYoung (2006) 483 Peer 3, BFI				DeYoung (2006) 487 Peer 3, Mini-Markers			
	O	C	E	A	O	C	E	A	O	C	E	A
O	–				–				–			
C	25	–			24	–			26	–		
E	19	14	–		28	21	–		08	06	–	
A	24	23	07	–	23	43	16	–	26	32	06	–
ES	11	28	12	55	19	44	14	59	07	30	−02	59
	DeYoung, Hasher et al. (2007)* 279 university students, BFI				DeYoung, Quilty et al. (2007) 423 Community adults, BFAS				DeYoung, Quilty et al. (2007)* 489 university students, BFI			
	O	C	E	A	O	C	E	A	O	C	E	A
O	–				–				–			
C	16	–			−01	–			11	–		
E	29	14	–		34	25	–		26	18	–	
A	09	19	18	–	12	18	13	–	11	38	15	–
ES	18	23	24	25	12	22	32	20	13	24	33	24
	DeYoung, Quilty et al. (2007) 489 university students, BFAS				DeYoung et al. (2008)* 140 16-year-old boys							
	O	C	E	A	O	C	E	A	O	C	E	A
O	–				–							
C	19	–			15	–						
E	37	24	–		23	25	–					
A	28	22	23	–	01	41	07	–				
ES	20	25	33	14	03	48	36	15				

O = Openness; C = Conscientiousness; E = Extraversion; A = Agreeableness; ES = Emotional Stability.
* Independent samples.

In testing the GFP hypothesis, a model identified by Rushton and Irwing (2008) was estimated in which Agreeableness, Conscientiousness and Emotional Stability were specified to load on Alpha and only Extraversion and Openness on Beta. In a close approximation to the ideal strategy outlined by Jöreskog (1993) designated "strictly confirmatory," we cross-validated this model on the random effects estimates of the mean inter-scale correlations for the 16 studies.

We used maximum likelihood estimation procedures from LISREL 8.72 to test each model (Jöreskog & Sorbom, 2001). For model fit we relied mainly on the standardized root mean square residual (SRMSR), the root mean square error of approximation (RMSEA), and the non-normed fit index (NNFI), as indicated by the simulations of Hu and Bentler (1998), Hu and Bentler (1999). We adopted cut-off points of $\leqslant 0.05$ for the SRMSR, about 0.06 for the RMSEA, and $\geqslant 0.95$ for the NNFI, which also conform to more recent recommendations (Schemelleh-Engel, Moosbrugger, & Muller, 2003). We interpret these guides flexibly as advised by Marsh, Hau, and Grayson (2005).

The model provided a good fit to the data (see Fig. 1, $\chi^2 = 58.58$; $df = 4$; $P < 0.001$; NNFI = 0.93; RMSEA = 0.060; SRMSR = 0.027), although the NNFI value was slightly outside the cut-off criterion for close fit. Strictly, meta-analysis is only appropriate for independent samples, of which there are six in the DeYoung studies (see Table 1). In consequence, we repeated the above analyses on these samples with similar results.

In order to provide an unequivocal test of the existence of a general factor, an alternative version of the model was examined in which the Big Two were specified to be uncorrelated. It is notable that this latter model provided a very poor fit to the data ($\chi^2 = 325.55$; $df = 5$; NNFI = 0.69; RMSEA = 0.13; SRMSR = 0.10). There was no plausible alternative to a model without a general factor. The model explains 54% of the variance in DeYoung's factors of Stability and Plasticity, i.e. 54% of the reliable variance. However, because there is substantial error in most of the indicators, this only translates into 16% of the scale level variance.

3. The Guilford–Zimmerman Temperament Survey

3.1. Method

Guilford (1897–1987) may be regarded as the first to systematically apply factor-nalytic techniques to personality structure and arrive at substantive conclusions. Beginning in the 1930s, his work culminated in the publication of the Guilford–Zimmerman Temperament Survey (GZTS; Guilford & Zimmerman, 1949). The Guilford–Zimmerman Temperament Survey (GZTS) consists of 10 personality and temperament factors: *General Activity* (Energy vs. Inactivity); *Restraint* (Seriousness vs. Impulsiveness); *Ascendance* (Social Boldness vs. Submissiveness); *Sociability* (Social Interest vs. Shyness); *Emotional Stability* (Evenness of Mood vs. Fluctuation of Moods); *Objectivity* (Thick-skinned vs. Hypersensitive); *Friendliness* (Agreeableness vs. Belligerence); *Thoughtfulness* (Reflective vs. Disconnected); *Personal Relations* (Tolerance vs. Hypercritical); and *Masculinity* (Hardboiled vs. Sympathetic). The GZTS is hierarchical

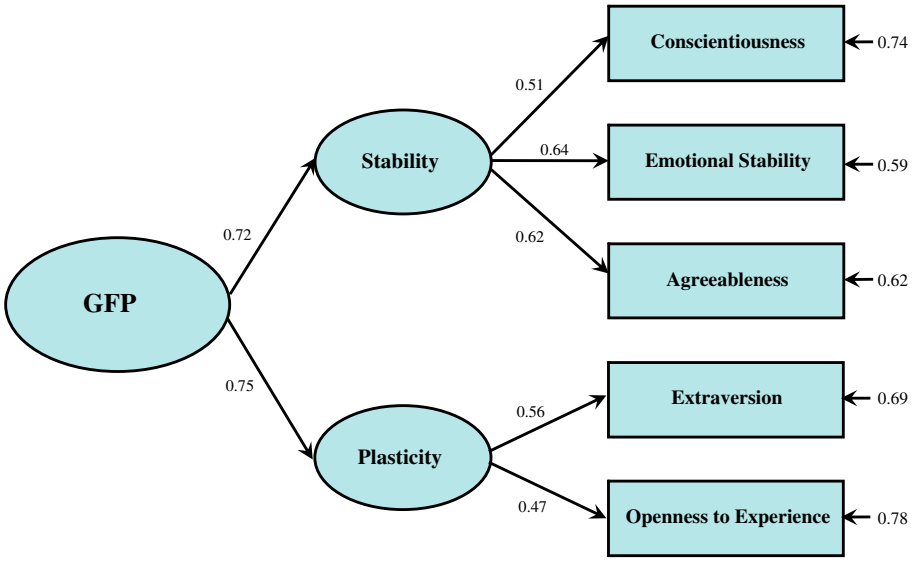

Fig. 1. A second-order confirmatory factor model of the Big Five. Estimates are based on means derived from DeYoung's 16 samples.

Table 2
Inter-scale correlations among the 10 factors of the Guilford–Zimmerman Temperament Survey (Averaged over sex; $N = 2917$; decimal points omitted).

	G	R	A	S	E	O	F	T	P	M
General activity (G)	(79)									
Restraint (R)	−08	(80)								
Ascendance (A)	43	−05	(82)							
Sociability (S)	34	−17	61	(87)						
Emotional stability (E)	19	10	29	31	(84)					
Objectivity (O)	06	12	15	23	61	(75)				
Friendliness (F)	−12	31	−16	02	32	49	(75)			
Thoughtfulness (T)	05	34	12	−03	−18	−16	−04	(80)		
Personal relations (P)	01	14	08	17	34	49	43	−07	(80)	
Masculinity (M)	08	04	11	02	26	33	18	−04	24	(85)

with three main higher-order traits emerging from numerous factor-investigations.

3.2. Results and discussion

Table 2 shows the inter-scale correlations for the 10 GZTS factors, averaged by us from the correlations provided separately for 2465 men and 452 women by Guilford, Zimmerman, and Guilford (1976). The results in Table 2 are based on the overall mean ($N = 2917$). Shown in the diagonal are the alpha coefficients from the original sample (mainly $N = 912$ college students).

As a first step, an exploratory factor analysis of the ten scales was conducted with Mplus using maximum likelihood estimation and promax rotation, testing for factor solutions ranging from two to five factors. While the RMSEA index suggested a four-factor solution provided the most adequate fit (RMSEA = 0.061), an investigation of factor loadings suggested the preferability of a three factor-solution in terms of each factor being defined by at least two item loadings, three to four such loadings being the generally preferred minimum. This three-factor model was subjected to confirmatory factor analysis using LISREL 8.72, starting with a first-order confirmatory factor analysis and then a higher-order factor analysis which included a GFP. With the addition of four additional factor loadings, which ranged from 0.19 to 0.25 in the Mplus solution, and four correlated errors, the former provided an adequate fit with the slight exception of the NNFI ($\chi^2 = 338.8$; $df = 25$; $P < 0.001$; SRMSR = 0.034; RMSEA = 0.065; NNFI = 0.93).

As shown in Fig. 2, the three higher-order-factors were Self-control, Extraversion, and Emotional Health as defined by factor loadings $\geqslant 0.30$. The higher-order factor model (see Fig. 2) also provided a good fit, although the NNFI was again slightly outside the cut-off point ($\chi^2 = 366.40$; $df = 27$; $P < 0.001$; SRMSR = 0.039; RMSEA = 0.065; NNFI = 0.93). All factor loadings were significant at the $P < 0.001$ level. The GFP accounted for 36% of the variance in the three first-order factors and 21% of the total reliable variance.

4. The California Psychological Inventory

4.1. Method

Harrison Gough is another early personality researcher who produced an omnibus inventory for use with normal persons (Gough, 1957). Now in its third edition, the full version of the California Psychological Inventory consists of 434 true–false questions providing scores on 20 "folk concept scales" (Gough & Bradley, 1996). An eclectic approach was taken to item selection and scale construction: 13 scales were developed by empirical methods comparing items against nominations, ratings, and life outcomes; four scales were developed by the internal consistency method; and the remaining three scales by a mixture of the empirical and internal procedures.

The 20 CPI scales are: *Dominance* (High scorers are confident); *Capacity for Status* (High scorers are ambitious); *Sociability* (High scorers are sociable); *Social Presence* (High scorers are self-assured); *Self-acceptance* (High scorers have self-esteem); *Independence* (High scorers are self-sufficient); *Empathy* (High scorers are socially perceptive); *Responsibility* (High scorers are reliable); *Socialization* (High scorers are well-organized); *Self-control* (High scorers are self-disciplined); *Good Impression* (High scorers make a good impression); *Communality* (High scorers fit in easily); *Well-being* (High scorers are optimistic); *Tolerance* (High scorers are fair minded); *Achievement via Conformance* (High scorers like to work in settings where expectations are defined); *Achievement via Independence* (High scorers like to work in settings that encourage initiative); *Intellectual Efficiency* (High scorers keep to a task); *Psychological-Mindedness* (High scorers understand the feelings of others); *Flexibility* (High scorers like variety); *Femininity/Masculinity* (Among males, high scorers tend to be sensitive; among females, sympathetic).

4.2. Results and discussion

The 3rd edition of the CPI was standardized on 6000 people from different socioeconomic backgrounds including high school and college students, blue collar workers, and prisons. Table 3 gives the inter-scale correlations from Gough and Bradley (1996, p. 62). In the diagonal are the alpha coefficients also from the manual (p. 58).

An exploratory factor analysis of the 20 scales was conducted with Mplus using maximum likelihood estimation and promax rotation. A six-factor solution was deemed the best alternative with all factors comprised of at least two loadings greater than 0.30. Consequently, the six-factor solution was subjected to confirmatory factor analysis using LISREL 8.72. This began with a first-order confirmatory analysis, followed by a higher-order analysis with two factors, and finally with the correlation between the two second-order factors replaced by the GFP, identified by assuming equality of factor loadings.

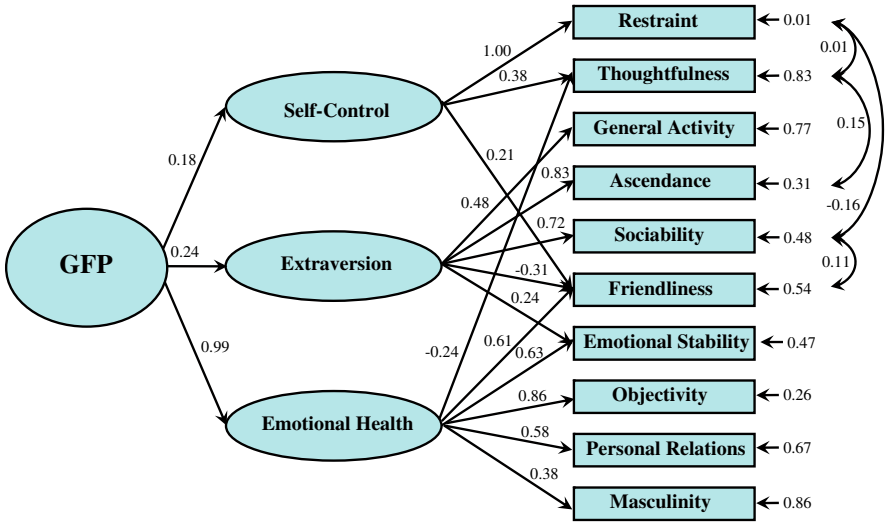

Fig. 2. GZTS third-order confirmatory common factor structure.

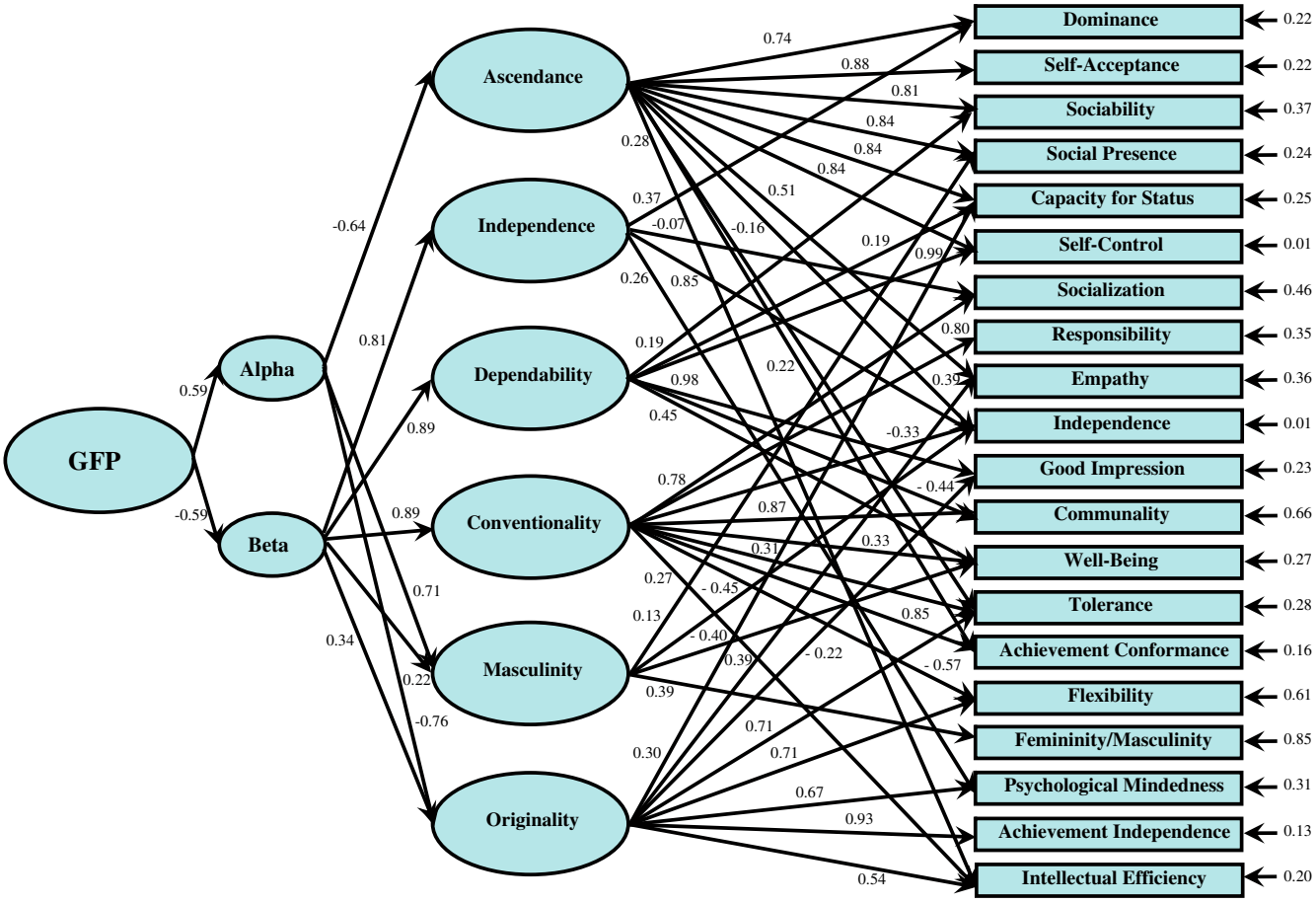

Fig. 3. A third-order confirmatory factor model of the CPI.

Initially, only loadings ⩾0.30 from the Mplus solution were included in the LISREL analysis. In order to provide an adequate fit, it was necessary to include an additional seven factor loadings, which ranged in magnitude from 0.07–0.29 in the original Mplus solution. Eight correlated errors ranging from 0.05 to 0.13 were required to attain an adequate fit. We interpret these correlated errors as indicating one or more additional factors, which could not be reliably modeled, in conformity with findings from the exploratory analysis. The fit indices for the final six-factor solution (see Fig. 3) showed a close fit with the exception of RMSEA (χ^2 = 7232.82; *df* = 132; *P* < 0.001; SRMSR = 0.043; RMSEA = 0.095; NNFI = 0.96).

As shown in Fig. 3, the first-order factors found were: Ascendance, Independence, Originality, Dependability, Femininity/Masculinity, and Conventionality as defined by factor loadings ⩾0.30. To elucidate the second-order factor structure, we subjected the Phi matrix from the first-order solution to a second Mplus analysis. This suggested two second-order factors, in addition to the five first-order factors, which we subjected to confirmatory analysis using LISREL. The resultant model, presented in Fig. 3, again provides close fit to the data according to the SRMSR and NNFI, while the RMSEA falls short (χ^2 = 8972.82; *df* = 133; *P* < 0.001; SRMSR = 0.054; RMSEA = 0.098; NNFI = 0.95). A total of ten correlated errors, ranging from 0.05 to 0.15 in magnitude, were required to attain this level of fit. Although the fit indices show a poorer fit for the second-order factor model, as the differences are small, we conclude that the second-order factors provide an adequate fit to the data and the second-order factor structure is supported. Finally, we replaced the correlation between the second-order factors by a GFP, which was identified by setting the factor loadings equal (see Fig. 3). The resultant model has the same fit as the second-order model shown above. The GFP accounted for 35% of the variance in two second-order factors, 17% of the variance in six first-order factors, and 20% of the total reliable variance.

5. The Temperament and Character Inventory

5.1. Method

Robert Cloninger developed the Temperament and Character Inventory (TCI) to assess seven factors in his psychobiological model of personality (Cloninger, Przybeck, Svrakic, & Wetzel, 1994). The TCI is a 240-item true/false questionnaire measuring four dimensions of temperament (Novelty Seeking, Harm Avoidance, Reward Dependence, Persistence) and three dimensions of character (Self-Directedness, Cooperativeness, Self-Transcendence). Each of the seven dimensions, with the exception of *Persistence*, is defined by facet traits summed to yield a total score. They are: *Novelty Seeking* (Exploratory Excitability, Impulsiveness, Extravagance, Disorderliness); *Harm Avoidance* (Anticipatory Worry, Fear of Uncertainty, Shyness, Fatigability); *Reward Dependence* (Sentimentality, Attachment, Dependence); *Self-Directedness* (Responsibility, Purposefulness, Resourcefulness, Self-Acceptance, Congruent); *Cooperativeness* (Social Acceptance, Empathy, Helfulness, Compassion, Pure-Hearted); and *Self-Transcendence* (Self-Forgetful, Transpersonal Identification, Spiritual Acceptance).

The TCI has been used worldwide. A Revised Version has appeared (TCI-R) with the true/false format being replaced by five-point rating scales (1 = definitively false; 5 = definitively true), with 51 item changes, and an increase and balancing in subscales

Table 3
Inter-scale correlations for California Psychological Inventory (N = 6000; averaged over sex, decimal points omitted). Alpha coefficients in diagonal.

	Do	Cs	Sy	Sp	Sa	In	Em	Re	So	Sc	Gi	Cm	Wb	To	Ac	Ai	Ie	Py	Fx	F/M
Do	(83)																			
Cs	67	(72)																		
Sy	72	72	(77)																	
Sp	60	64	71	(71)																
Sa	76	68	76	70	(67)															
In	74	65	56	60	62	(74)														
Em	63	71	65	64	63	56	(63)													
Re	37	43	31	17	21	28	31	(77)												
So	25	26	25	12	06	18	21	63	(78)											
Sc	05	14	−01	−23	−17	16	04	50	53	(83)										
Gi	21	28	20	−08	−02	25	18	44	43	83	(81)									
Cm	25	22	31	31	22	16	19	44	40	14	10	(71)								
Wb	44	50	44	41	30	56	40	55	58	58	59	47	(84)							
To	36	55	34	35	29	47	47	66	53	47	40	31	66	(79)						
Ac	54	56	50	29	37	46	43	72	63	55	55	45	65	60	(78)					
Ai	49	67	44	50	46	64	64	44	27	30	30	16	54	73	53	(80)				
Ie	65	72	59	60	57	69	63	57	38	27	30	38	65	70	66	79	(79)			
Py	54	63	44	44	41	65	53	49	38	37	37	21	60	64	58	75	71	(62)		
Fx	09	25	12	40	20	25	35	−06	−10	−18	−19	−12	09	28	−13	41	25	26	(64)	
F/M	−23	−18	−23	−28	−24	−30	−19	11	11	13	00	−04	−22	01	03	−12	−20	−16	−08	(73)

Do = Dominance, Cs = Capacity for status, Sy = Sociability, Sp = Social presence, Sa = Self-acceptance, In = Independence, Em = Empathy, Re = Responsibility, So = Socialization, Sc = Self-control, Gi = Good impression, Cm = Communality, Wb = Well-being, To = Tolerance, Ac = Achievement via conformance, Ai = Achievement via independence, Ie = Intellectual efficiency, Py = Psychological-mindedness, Fx = Flexibility, F/M = Femininity/masculinity.

(e.g., several added to the Persistence factor). A full psychometric analysis was done on the French version of the TCI-R with a 482-subject sample from Paris, including clinical and non-clinical subjects (54% male) with a mean age of 41 years (Pelissolo et al., 2005). Principal component analyses showed a more robust factor structure and higher alpha coefficients than with the TCI.

5.2. Results and discussion

Table 4 gives the inter-scale correlations among the TCI factors. Those above the diagonal are from the original sample of 803 college students (54% female) in the 1994 manual (Cloninger et al., 1994, p. 95, Table 10.5). Those below the diagonal are from the

Table 4
Inter-scale correlations for the Temperament and Character Inventory (TCI). (Above the diagonal from the TCI on US undergraduates; N = 803; below the diagonal from the TCI-R on Paris patients, N = 482). Reliabilities in diagonal from TCI-R.

	Novelty Seeking	Harm Avoidance	Reward Dependence	Persistence	Self-Directedness	Cooperativeness	Self-Transcendence
Novelty Seeking	(0.80)	−08	08	−14	−26	−10	20
Harm Avoidance	−30	(0.92)	−16	−27	−47	−28	−08
Reward Dependence	30	−23	(0.84)	03	21	54	28
Persistence	−01	−39	12	(0.92)	28	18	11
Self-Directedness	−06	−60	15	36	(0.88)	57	−10
Cooperativeness	−04	−23	47	20	41	(0.81)	15
Self-Transcendence	19	−12	17	31	−06	19	(0.85)

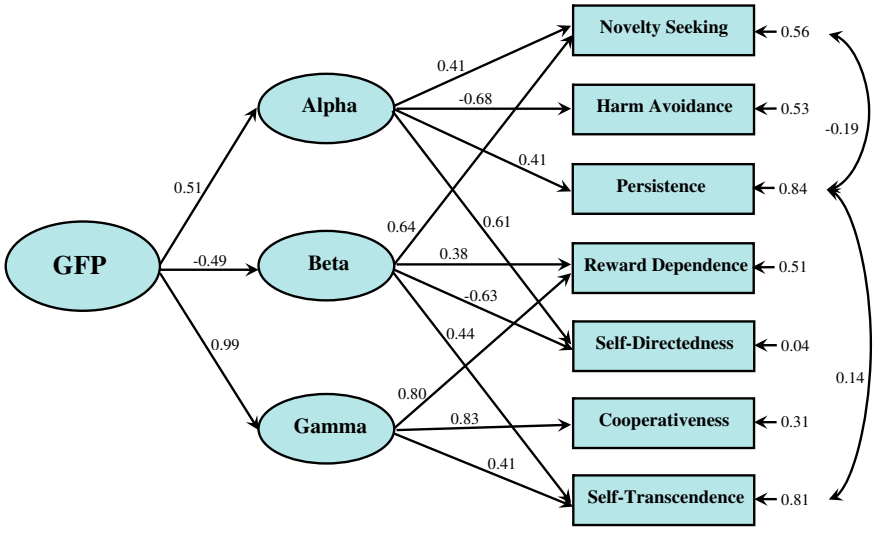

Fig. 4. A third-order confirmatory factor model of the TCI.

482 clinical and non-clinical subjects in the 2005 TCI-R from France (Pelissolo et al., 2005). In the diagonal are alpha coefficients from Pelissolo.

Prior to running the analyses, weighted means of the correlations from the two samples were computed. The resulting intercorrelations among the 18 scales were then subjected to an exploratory factor analysis using Mplus, with maximum likelihood estimation and promax rotation. A three-factor solution was deemed most plausible based on the fit indices and factor loadings. With only loadings $\geqslant 0.30$ from the Mplus output included, the three-factor solution was subsequently subjected to confirmatory analysis using LISREL 8.72. In order to provide an adequate fit, it was necessary to add in three factor loadings, which ranged in magnitude from 0.04–0.27 in the original Mplus solution. Furthermore, two correlated errors (0.12–0.17) were required to attain adequate fit.

The fit indices for the resultant model (see Fig. 4) showed a close fit with the exception of NNFI being low ($\chi^2 = 33.69$; $df = 5$; $P < 0.001$; SRMSR = 0.024; RMSEA = 0.067; NNFI = 0.93). First-order factors were: Alpha (Harm Avoidance, Persistence, Self-Directedness); Beta (Novelty Seeking, Self-Directedness, Self-Transcendence); and Gamma (Reward Dependence, Cooperativeness, Self-Transcendence) as defined by major factor loadings $\geqslant 0.30$. With the removal of a non-significant factor loading and an additional factor loading included, the higher-order GFP model provided an excellent fit to the data ($\chi^2 = 22.12$; $df = 6$; $P < 0.001$; SRMSR = 0.018; RMSEA = 0.046; NNFI = 0.97). The GFP accounted for 49% of the variance in the three first-order factors and 24% of the total reliable variance.

6. Discussion

Our analyses provide robust evidence for the existence of a General Factor of Personality in a meta-analysis of 16 sets of inter-scale correlations from the Big Five, as well as from validation samples of the Guilford–Zimmerman Temperament Survey, the California Psychological Inventory, and the Temperament and Character Inventory. The current paper raises to nine the number of personality scales in which we have found a GFP, counting all measures of the Big Five just once. There are many factors which may attenuate the magnitude of higher-order factor loadings, including inadequate measures, sampling variability, range restriction, the presence of moderator variables, and a lack of reliability, to name but a few.

We have hypothesized that the GFP is analogous to *g* and predicts social efficiency in the way *g* predicts cognitive efficiency (Rushton et al., 2008). However, in any particular study, the GFP picks up whatever content is most represented in the item pool – such as Emotional Stability and Extraversion in the Big Five, Emotional Health in the Guilford–Zimmerman Temperament Survey, Socialization and Conventional Responsibility in the California Psychological Inventory, and Cooperativeness and Reward Dependence in the Temperament and Character Inventory. Demonstrating that the same latent dimension underlies all personality questionnaires will require data from different tests on the same people.

One objection that might be made to our conclusion is that many of our tests of the GFP were incomplete since correlated errors were present, thereby indicating the existence of one or more additional unmeasured factors. This argument has merit. In the case of the GZTS, CPI, and TCI, both our Mplus exploratory factor analysis and our confirmatory analyses suggest there are additional factors underlying these scales, although these factors could not be reliably modeled. This is a general problem with personality scales, so the choice is to test for the GFP broadly following our procedures, or not to test for it at all. We conclude that the current analyses further broaden the array of assessment contexts in which a GFP has been identified.

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