5

The General Factor of Personality

Normal and Abnormal

J. Philippe Rushton and Paul Irwing

1 Introduction

A recent hypothesis is that a general factor of personality (GFP) occupies the apex of the hierarchy of personality as well as the apex of the personality disorders in the same way in which *g*, the general factor of mental ability, occupies the apex in the organization of cognitive abilities (Rushton, Bons, & Hur, 2008). High scores on the GFP indicate what is meant by someone having a "good" personality; low scores indicate what is meant by a "difficult" personality, in other words someone who is hard to get along with. Individuals high on the GFP are altruistic, agreeable, relaxed, conscientious, sociable, and open, with high levels of well-being and self-esteem. Because the GFP defines clear positive and negative poles, it provides potential for understanding the socially "advantaged" (those with high levels of emotional intelligence) as well as the socially "challenged" (those more likely to suffer a personality disorder). The GFP can be viewed as a dimension of social effectiveness.

The explanation we favor for the GFP is that it arose through evolutionary selection for socially desirable traits that facilitate performance across a wide range of contexts (Rushton et al., 2008). This follows a proposal by Darwin (1871) that natural selection acted directionally, to endow people with more cooperative and less contentious personalities than their archaic ancestors or nearest living relatives, the chimpanzees. Rushton et al. (2008) conjectured that individuals high on the GFP left more progeny, since people prefer as mates, fellow workers, and leaders those who are altruistic, conscientious, and emotionally stable. People able to cooperate in groups were also more likely to win competitions and wars. The alternative to the GFP being substantive is that it results from artifacts of scale construction and from evaluative bias such as responding in a socially desirable manner.

The main empirical impetus for identifying a GFP comes from the observation that the Big-Five factors typically intercorrelate, despite claims that they are

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orthogonal. For example, Digman (1997) found a mean correlation of .26 in 14 sets of Big-Five correlations, from which he extracted two uncorrelated higher-order factors: Alpha (agreeableness, conscientiousness, emotional stability) and Beta (extraversion, openness), which he associated with socialization and personal growth, respectively. Carroll (2002) confirmed Digman's (1997) two-factor solution, but he did not report whether Alpha and Beta were correlated. DeYoung, Peterson, and Higgins (2002) also replicated Digman's solution, re-labeled Alpha as "stability" and Beta as "plasticity," found they *were* correlated (about .24), but did not test for a GFP.

Rushton and Irwing (2008) found remarkable evidence for a GFP in two meta-analyses of Big-Five inter-scale correlations, which included the 14 sets that Digman (1997) had used to establish the Big Two (N = 4,496; see Table 5.1).[1] Rushton and Irwing's (2008) model explained 45 percent of the variance in stability and plasticity and 14 percent of the total reliable variance in the Big Five (Figure 5.1). Rushton and Irwing's (2008) second meta-analysis cross-validated the model by using four alternative Big-Five measures (N = 4,000) compiled by Mount, Barrick, Scullen, and Rounds (2005). To provide unequivocal evidence for the GFP, they also examined a model specifying that the Big Two were uncorrelated. Since this provided a very poor fit, there was no plausible alternative to a model with a GFP.

Rushton and Irwing (2009b) further cross-validated the model in Figure 5.1 with a meta-analysis of 16 sets of inter-scale correlations (including six fully independent samples) compiled by DeYoung and colleagues (N = 6,412). The largest cross-validation of the model came from 628,640 Internet respondents (Erdle, Irwing, Rushton, & Park, 2010). Together, these four analyses approximate the ideal strategy outlined by Jöreskog (1993). Designated "strictly confirmatory," prior theory and research point to the correctness of a single model, which is then tested in a representative sample and, if confirmed, shows the model is generalizable. Subsequently, a meta-analysis of 212 published sets of Big-Five inter-scale correlations (N = 144,117), carried out completely independently of ourselves, further corroborated the model (Van der Linden, te Nijenhuis, & Bakker, 2010). In a review of the Big-Five literature, Block (2010) favorably cited the model, suggesting that a "solitary, apical general factor signifying only something like *fitness for collective living*" sat above both the Big Two and the Big Five (p. 17, footnote 18).

Table 5.1 Mean inter-scale correlations from Digman's (1997) 14 studies of Big Five factors. N = 4,496; decimal points omitted. Source: Rushton & Irwing, 2008, Table 1

	Openness	*Conscientiousness*	*Extraversion*	*Agreeableness*	*Emotional Stability*
Openness	—				
Conscientiousness	20	—			
Extraversion	43	12	—		
Agreeableness	10	39	05	—	
Emotional Stability	18	43	23	44	—

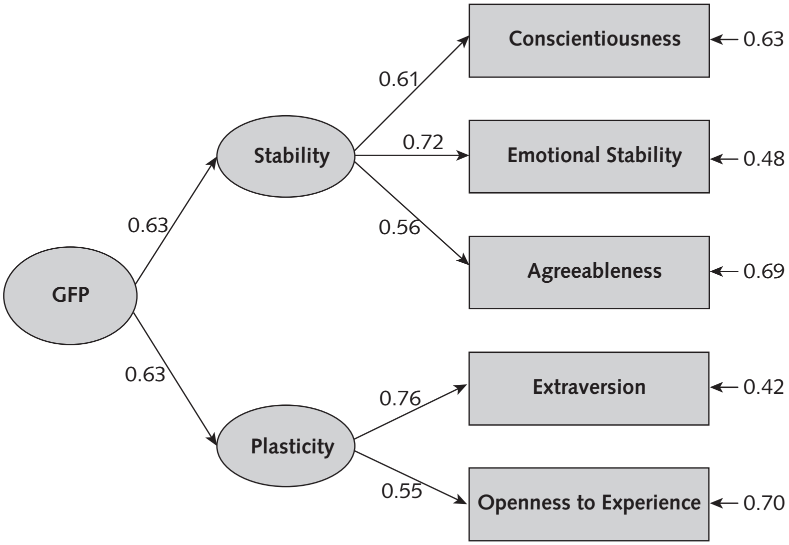

Figure 5.1 The GFP going to the Big Two to the Big Five using the medians from Digman's (1997) 14 samples. From Rushton & Irwing, 2008, Figure 1B

2 Historical Background, Including Charles Darwin and Francis Galton

Charles Darwin (1809–1882) was at first extremely reticent about extending his evolutionary theory to humankind. In the fourth last paragraph of *The Origin of Species* (1859), he wrote only this: "Light will be thrown on the origin of man and his history" (p. 458). Within 13 years, however, it had become crucial for Darwin to generalize his theory to people in order to save it from alternatives that had arisen. For example, fellow evolutionist Alfred Russel Wallace (1823–1913) argued that evolution had stopped for people because their large brains freed them from the lower instincts. Philosopher John Stuart Mill (1806–1873) proposed that human morality should be based on making informed choices about the greatest good for the greatest number. Darwin took exception to these alternatives because they emphasized rationality to the exclusion of instinct and applied only to people.

Darwin (1871, 1872) maintained that evolution worked through natural selection by small gradations that required continuity between humans and other animals, even for moral and intellectual qualities. Darwin wrote, "the difference in mind between man and the higher animals, great as it is, is certainly one of degree, and not of kind" (1871, p. 105). He pointed out how all animals are altruistic in some circumstances and fight in others, and that the human expression of emotion is similar to that in cats, dogs, and chimpanzees. In regard to personality, Darwin viewed people as being more cooperative and less contentious than "primeval man and his ape-like progenitors" (1871, p. 159). He described human qualities such as "courage, sympathy, and faithfulness," and the "need for approval by others," as well as the concomitant decrease in the number of "selfish and contentious people." The latter, he wrote, "will not cohere, and without coherence nothing can be effected" (1871, p. 159).

Darwin's cousin, Francis Galton (1822–1911), was so inspired by the theory of evolution that he dedicated the remainder of his life to applying it to human differences. Galton (1869) was the first to extend the normal distribution to psychological characteristics and the first to use questionnaires to systematically assess individual differences. He devised correlations, regressions, and percentiles to measure trait relationships and he pioneered twin, family, and adoption methods to examine heritable and social transmission. It was Galton (1884) who formulated the "lexical hypothesis," that the most important differences in human transactions come to be encoded as single terms in some or all of the world's languages. He counted 1,000 words to express character in Roget's *Thesaurus* and noted the overlap in meaning.

Galton (1887) was also the first to describe a general factor of personality, just as he had earlier (1869) been the first to identify a general factor of cognitive ability. In his paper "Good and bad temper in English families," Galton used ratings from 1,981 family members across four generations to group 15 desirable adjectives and 46 undesirable ones along a single dimension. He described "temper" as a strongly marked characteristic of all animals and suggested its human meaning be inferred from the adjectives used by his respondents, adjectives which, he thought, expressed one or other of its qualities or degrees.[2]

Galton (1887) identified three times as many adjectives denoting bad temper by comparison with good temper and noted their arrangement in a bell-shaped distribution, with neutral scores in the middle, in the ratio of 2 : 1 to both extremes. He reported that females averaged a milder personality than males and that temperament ran in families. When both parents were good-tempered, 30 percent of the children were good-tempered and 10 percent bad-tempered, the remaining 60 percent being neutral. When both parents were bad-tempered, 52 percent of the children were bad-tempered and 4 percent good-tempered, the remainder being neutral. Conversely, good-tempered brothers and sisters had 26 percent of their parents, uncles, and aunts as good-tempered (8 percent bad-tempered), whereas bad-tempered brothers and sisters had 29 percent of their parents, uncles, and aunts as bad-tempered (18 percent good-tempered). From these results Galton postulated that desirable traits went together because of mate preferences and assortative mating.

Follow-up studies were conducted by statistician Karl Pearson (1857–1936) at the University of London, in a laboratory that Galton endowed in 1904, and by Harvard zoologist Charles B. Davenport (1866–1944) at the Cold Spring Harbor Laboratory in New York. Davenport (1911) collated data from hundreds of families on normal traits, criminality, insanity, pauperism, and feeble-mindedness and explained them by using a version of Wilhelm Griesinger's (1817–1868) unitary concept of *insanity* (*Einheitpsychose*) and J. C. Pritchard's (1786–1848) concept of *moral insanity*, which included traits such as excessive shyness, gloominess, alcoholism, sexual promiscuity, theft, hostility, and violent temper.

The common denominator to moral insanity, which Pritchard (1835) described as "eccentricity of conduct [...] observed in connection with a wayward and intractable temper, with a decay of social affections, an aversion to the nearest relatives and friends formerly beloved" (p. 23), was self-control ("will-power"), a lack of which could cause harm to others or self. Davenport (1911) proposed that, while personality pathology could be exaggerated by stress, injury, or disease, it ultimately rested on an inherited "general nervous weakness—a neuropathic taint—showing itself now in one form of psychosis and now in another" (p. 93). "Thus in the same family may be found cases of manic depressive insanity, of senile dementia, of alcoholism and of feeble-mindedness" (p. 77).[3]

Edward Webb (1915) extended the will-power concept into the normal range with the help of a general factor of personality, which he designated *w* (for will-power). His monograph *Character and intelligence* made the first use of factor analysis in the non-intellectual field (Spearman, 1927). College teachers and peers rated 200 21-year-old students they knew well on 39 7-point scales. The heterogeneous set of traits included: "steadiness," "perseverance," "kindness on principle," "trustworthiness," "conscientiousness," and (on the negative side) "quickness to anger," "eagerness for admiration," and "bodily activity in pursuit of pleasure such as games." Tests of intelligence correlated with components of *w* (e.g. .34 with steadiness, .28 with perseverance, .23 with kindness on principle, .28 with trustworthiness, and .22 with conscientiousness). Subsequently, when calculating *w*, Webb (1915) partialed *g* out.[4]

By the 1930s, a proliferation of disease categories and traits had moved the field far away from a unitary dimension. The diversification began with Emil Kraepelin's (1856–1926) separation of *manic-depression* from *dementia praecox* (schizophrenia). Some, including Sigmund Freud (1856–1939), continued to argue for a single continuum, running from normality through the neurotic disorders and out to the psychoses. Others, however, disagreed; and these included Aaron Rosanoff (1878–1943), who by the 1930s had a seven-dimensional model of normal and abnormal personality, and Hans Eysenck (1916–1997), who proposed two sharply separate continua: one from normality to psychosis; the other from normality to neurosis (Eysenck, 1970).

Thus the debate over the structure of personality and its disorders went in a very different direction from the one over cognitive ability. While the *g* factor of intelligence rose to be of central importance, a single factor was virtually non-existent in the personality domain, where debates were mainly over two-, three-, and five-factor models. Eysenck (1970) long championed his three super-factors of extraversion, neuroticism, and psychoticism, while Costa and McCrae (1992) proposed the OCEAN Big Five, to which Eysenck (1992) countered that conscientiousness and agreeableness were sub-factors of psychoticism, while openness was too poorly defined to be of equal importance. Others proposed a Big Six and a Big Seven, as well as omnibus inventories of 16 or more factors. As in the case of cognitive ability, an integration of broad and narrow traits can be achieved by combining them hierarchically, with behavioral acts at the item level, multidimensional inventories covering the first-order factors, the Big Three and Big Five comprising second- or third-order factors, and the GFP occupying the apex.

At the 1997 Spearman Symposium on Intelligence and Personality, Willem Hofstee introduced a general "*p*-factor" (personality factor) analogous to *g* (Hofstee, 2001). He speculated on the heritability and evolutionary significance of *p*, suggesting it had arisen as a result of natural selection, for individuals with more socially desirable traits such as competence, emotional steadiness, and reality orientation. In his analysis, social desirability was much more than a mere artifact of social perception. Hofstee (2003) even dubbed *p* "the Primordial One" (p. 249).

It was Janek Musek (2007) who brought what he dubbed "the Big One" to theoretical center stage. He identified a GFP in three differently aged samples by using Slovenian language translations of extant tests such as the Big-Five Inventory, Big-Five Observer, Positive and Negative Affect Schedule, Satisfaction with Life Scale, and the International Personality Item Pool. Musek's analyses yielded Digman's (1997) Big Two; these were followed by a higher-order GFP, which explained 60 percent of the source variance in the Big Two and from 18 percent to 45 percent of the total reliable variance. Musek described the Big One as an optimum blend of all socially valued personality dimensions of personality. Like Hofstee, Musek conjectured that the general factor would be "deeply embedded in our evolutionary, genetic and neurological endowment" (p. 1228).

3 Life History Theory

Although Hofstee (2001) and Musek (2007) suggested that the GFP originated in the natural selection for desirable traits, they did not cite work on life history theory, which provides a theoretical base for understanding the GFP. Unlike conventional personality psychology, life history theory predicts hierarchically organized traits, culminating in a single, heritable, super-factor. Traits need to be harmonized, not to work independently of each other.

Rushton (1985, 1990) conjectured that "one basic dimension—*K*—underlies much of the field of personality" (1985, p. 445). Rushton (1985) proposed that human differences could be understood as part of a life history, a suite of traits genetically organized to meet the trials of life—survival, growth, and reproduction. This built on Wilson's (1975) analysis of "fast–slow" *r*–*K* reproductive strategies, which explains how animals reach population equilibrium through birth rate, developmental speed, and mortality. Animals adopt a strategy between two extremes: they produce a large number of fast-maturing offspring, but they devote little parental care to ensure their survival (the *r*-strategy); or they invest in a few higher-quality, slower-maturing offspring and devote much care to ensuring that a larger proportion survive (the *K*-strategy). Rushton (1985) postulated that personality traits co-evolved with altruism, intelligence, attachment styles, growth, longevity, sexuality, and fecundity to form a coherent whole. Research has confirmed many of these hypotheses (Bogaert & Rushton, 1989; Figueredo, Vásquez, Brumbach, & Schneider, 2004, 2007; Figueredo et al., 2005; Templer, 2008).

Among university students, Bogaert and Rushton (1989) found correlations between intelligence, altruism, delinquency, sexual restraint, mating effort (e.g. number of sex partners), and an aggregate of items assessing family size, maturational speed, and longevity. Although the average correlation between single indices of *K* was low, aggregate measures were predictive of a general factor, on which single items loaded an average of .31. These results held true when three separate measures of family background were statistically controlled.

In a study of 642 pairs of 25- to 74-year-old twins from the National Survey of Midlife Development in the US (MIDUS), a representative sample of 50,000 households that included twins, Figueredo et al. (2004) found a substantially heritable dimension, which they termed "Super-*K*" and which comprised three lower-order (also heritable) factors (a general personality factor, a "co-vitality" health factor, and a lower-order *K* factor). Subsequently, Figueredo et al. (2007) used a different subset of the MIDUS sample and replicated these results with 2,095 non-twin parents who by middle-age had chosen their life niches to marry (or not), to bear and raise offspring (or not), and to create social networks. In both samples, "social privilege" was controlled by regressing out the level of education, race, and family income, which accounted for less than 10 percent of the variance and did not change the pattern of factor loadings.

In a study of 222 university students, a latent *K* factor was found to load positively on retrospective self-reports of childhood attachment to the biological father and of adult attachment to romantic partners, and negatively with mating effort, Machiavellianism, and risk-taking propensity (Figueredo et al., 2005). Moreover, the *K* factor correlated with several traditional higher-order personality composites derived from three different personality inventories measuring "big neuroticism" (– .24), "big psychoticism" (– .67), and (marginally) "big extraversion" (.12).

4 The GFP in the EAS Temperament Survey

The EAS Temperament Survey for Children (Parental Ratings) was developed by Arnold Buss and Robert Plomin (1984) to assess emotionality, activity, and sociability. Rushton et al. (2008) examined data on 575 pairs of 2- to 9-year-old South Korean twins, in which mothers rated their children on the EAS scales along with a prosocial dimension measuring sharing, helping, and kindness. The GFP accounted for 30 percent of the source variance in the four scales (42 percent of the reliable variance) and was observable by 2 years of age.

5 The GFP in the Guilford–Zimmerman Temperament Survey

The Guilford–Zimmerman Temperament Survey (GZTS; Guilford & Zimmerman, 1949) was the culmination of work begun in the 1930s by Joy Paul Guilford (1897–1987), who may be regarded as the first to systematically apply factor-analytic techniques to personality structure and to arrive at an omnibus inventory. Rushton and Irwing (2009b) aggregated across the correlations for the 10 GZTS factors of personality and temperament for the 2,465 men and the 452 women in Guilford, Zimmerman, and Guilford (1976). The GFP accounted for 36 percent of the variance in three first-order factors and for 21 percent of the total reliable variance (Figure 5.2).

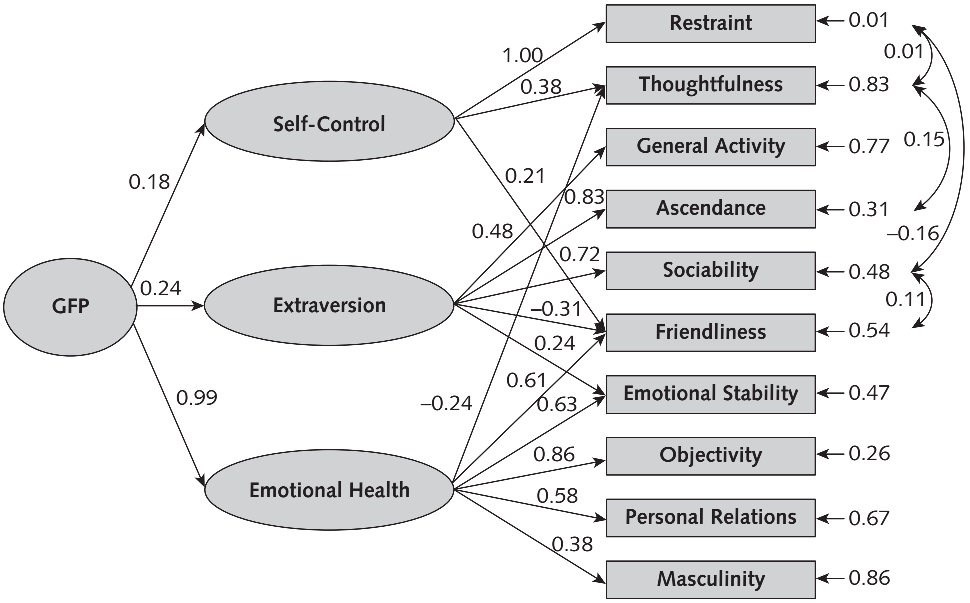
Restraint
Thoughtfulness
General Activity
Ascendance
Sociability
Friendliness
Emotional Stability
Objectivity
Personal Relations
Masculinity
GFP
Self-Control
Extraversion
Emotional Health
0.18
0.24
0.99
1.00
0.38
0.21
0.48
0.83
0.72
–0.31
0.24
–0.24
0.61
0.63
0.86
0.58
0.38
0.01
0.83
0.77
0.31
0.48
0.54
0.47
0.26
0.67
0.86
0.01
0.15
–0.16
0.11

Figure 5.2 The GFP in the Guilford–Zimmerman Temperament Survey going from the GFP to three higher-order factors to the 10 primary traits. From Rushton & Irwing, 2009b, Figure 2

6 The GFP in the California Psychological Inventory

The California Psychological Inventory was originated by Harrison Gough (1957), another early personality researcher who produced an omnibus inventory for use with normal people, providing scores on 20 "folk concept scales." The third edition was standardized on 6,000 people from different socioeconomic backgrounds including college students, blue-collar workers, and prisoners (Gough & Bradley, 1996, p. 62). Rushton and Irwing (2009b) extracted a GFP from the inter-scale correlations given in the manual. The GFP accounted for 35 percent of the variance in two second-order factors, 17 percent of the variance in six first-order factors, and 20 percent of the total reliable variance (Figure 5.3).

7 The GFP in the Temperament and Character Inventory

The Temperament and Character Inventory (TCI) was developed by Robert Cloninger to assess the seven factors in his psychobiological model of personality (Cloninger, Przybeck, Svrakic, & Wetzel, 1994). The four dimensions of temperament and three dimensions of character were standardized on 803 undergraduates. A full psychometric analysis was done on a French version of the revised TCI (TCI–R), with a 482-subject sample (54 percent male; mean age = 41 years) including clinical and

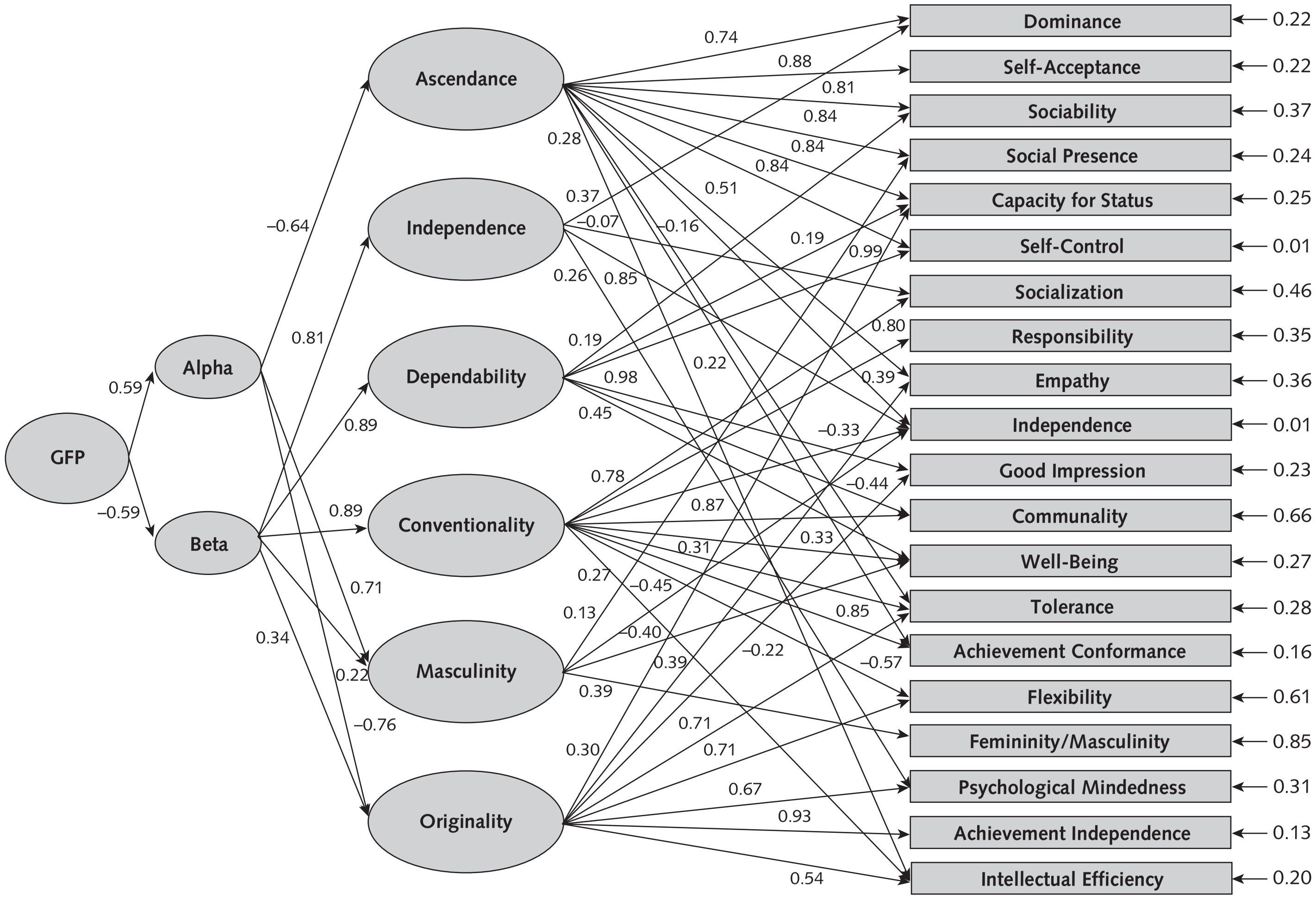
GFP
0.59
−0.59
Alpha
Beta
−0.64
0.81
0.89
0.89
0.71
0.22
−0.76
0.34
Ascendance
Independence
Dependability
Conventionality
Masculinity
Originality
0.74
0.88
0.81
0.84
0.84
0.84
0.51
0.28
0.37
−0.07
−0.16
0.19
0.99
0.26
0.85
0.80
0.19
0.22
0.98
0.39
0.45
−0.33
0.78
−0.44
0.87
0.33
0.31
0.27
−0.45
0.85
0.13
−0.40
−0.22
0.39
−0.57
0.39
0.71
0.71
0.30
0.67
0.93
0.54
Dominance
Self-Acceptance
Sociability
Social Presence
Capacity for Status
Self-Control
Socialization
Responsibility
Empathy
Independence
Good Impression
Communality
Well-Being
Tolerance
Achievement Conformance
Flexibility
Femininity/Masculinity
Psychological Mindedness
Achievement Independence
Intellectual Efficiency
0.22
0.22
0.37
0.24
0.25
0.01
0.46
0.35
0.36
0.01
0.23
0.66
0.27
0.28
0.16
0.61
0.85
0.31
0.13
0.20

Figure 5.3 The GFP in the California Psychological Inventory going from the GFP to the Big Two to six higher-order factors to the 20 primary traits. From Rushton & Irwing, 2009b, Figure 3

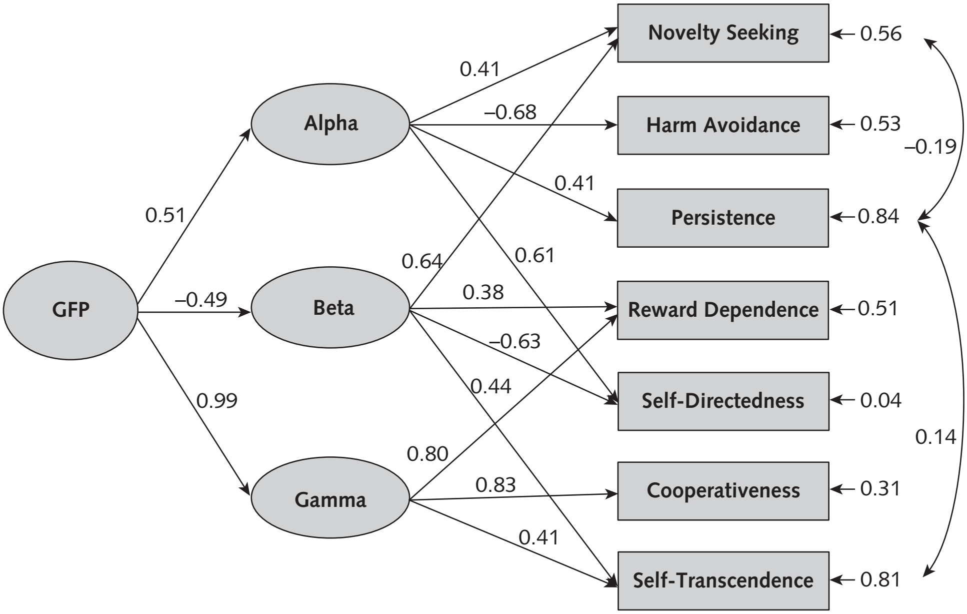
GFP
Alpha
Beta
Gamma
0.51
–0.49
0.99
0.41
–0.68
0.41
0.61
0.64
0.38
–0.63
0.44
0.80
0.83
0.41
Novelty Seeking
Harm Avoidance
Persistence
Reward Dependence
Self-Directedness
Cooperativeness
Self-Transcendence
0.56
0.53
0.84
0.51
0.04
0.31
0.81
–0.19
0.14

Figure 5.4 The GFP in the Temperament and Character Inventory going from the GFP to three higher-order factors to the seven primary traits. From Rushton & Irwing, 2009b, Figure 4

non-clinical subjects (Pelissolo et al., 2005). Rushton and Irwing (2009b) combined the two validation samples by using weighted means (N = 1,285) and found that the GFP explained 49 percent of the variance in three first-order factors and 24 percent of the total reliable variance in a model that went from the GFP to three higher-order traits to the seven primary traits (Figure 5.4). Furthermore, a GFP was extracted from the Japanese version of the TCI in 651 pairs of 14- to 30-year-old twins, who also completed the NEO–PI–R (Rushton et al., 2009). A principal components analysis found that the GFP–TCI explained 22 percent of the variance and correlated .76 with the GFP extracted from the NEO–PI–R.

8 The GFP in the Comrey Personality Scales

The Comrey Personality Scales (CPS), developed by Andrew L. Comrey and now in its third edition (Comrey, 1995), has eight major dimensions, each containing several facets. Rushton and Irwing (2009c) carried out a cross-validation study of the CPS using the original validation sample of 746 mostly university students from 1970, and the updated validation sample of 2,097 mostly university students, which also included police officers and outpatients. The GFP explained 41 percent of the variance in three first-order factors, extraversion demonstrating an exceptionally high loading (Figure 5.5).

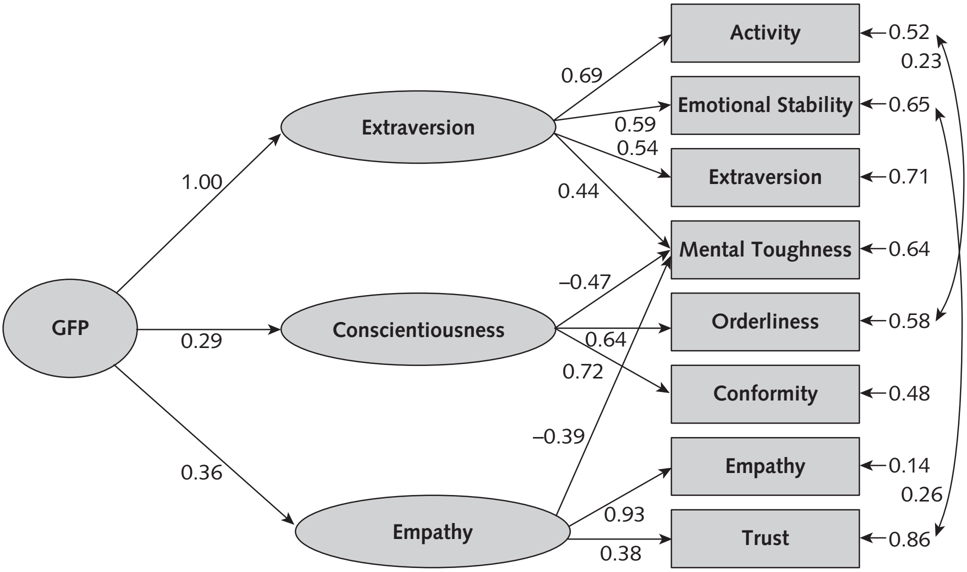
GFP
Extraversion
Conscientiousness
Empathy
1.00
0.29
0.36
0.69
0.59
0.54
0.44
–0.47
0.64
0.72
–0.39
0.93
0.38
Activity
Emotional Stability
Extraversion
Mental Toughness
Orderliness
Conformity
Empathy
Trust
0.52
0.23
0.65
0.71
0.64
0.58
0.48
0.14
0.26
0.86

Figure 5.5 The GFP in the Comrey Personality Scales going from the GFP to three higher-order factors to the eight primary traits. From Rushton & Irwing, 2009c, Figure 1

9 The GFP in the Multidimensional Personality Questionnaire

The Multidimensional Personality Questionnaire (MPQ) is a factor-analytically developed self-report instrument that measures 11 primary factors (Tellegen, 1982; Tellegen & Waller, 2008). Three, four, and five alternative higher-order solutions have been specified, especially including positive emotionality; negative emotionality; and constraint. Rushton and Irwing (2009a) tested the three- and four-factor models on the correlations among the 11 primary traits given in the test manual for the validation sample of 500 college females and 300 college males (Tellegen, 1982), but they found a very poor fit. The best-fitting GFP explained 25 percent of the variance in two second-order factors in a model that went from the GFP to a Big Two to Big Five higher-order traits to the 11 primary traits (Figure 5.6).

10 The GFP in the Minnesota Multiphasic Personality Inventory–2

The Minnesota Multiphasic Personality Inventory–2 (MMPI–2) is an extensively updated and re-standardized version of one of the earliest self-report questionnaires designed to help clinical diagnosis (Hathaway & McKinley, 1943). The revision contains 10 clinical and three validity scales (Butcher, Dahlstrom, Graham, Tellegen,

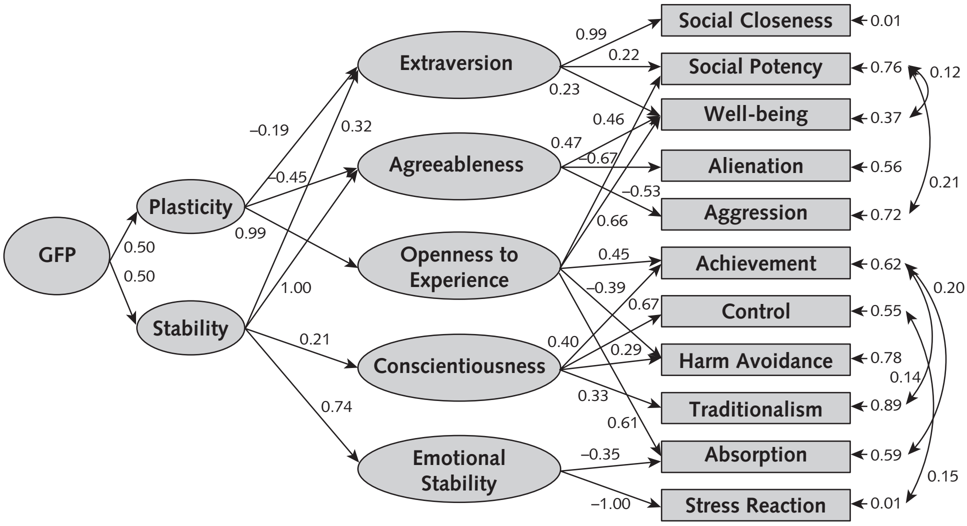
GFP
0.50
0.50
Plasticity
Stability
–0.19
–0.45
0.99
0.32
1.00
0.21
0.74
Extraversion
Agreeableness
Openness to Experience
Conscientiousness
Emotional Stability
0.99
0.22
0.23
0.46
0.47
–0.67
–0.53
0.66
0.45
–0.39
0.67
0.40
0.29
0.33
0.61
–0.35
–1.00
Social Closeness
Social Potency
Well-being
Alienation
Aggression
Achievement
Control
Harm Avoidance
Traditionalism
Absorption
Stress Reaction
0.01
0.76
0.37
0.56
0.72
0.62
0.55
0.78
0.89
0.59
0.01
0.12
0.21
0.20
0.14
0.15

Figure 5.6 The GFP in the Multidimensional Personality Questionnaire going from the GFP to the Big Two to five higher-order factors to the 11 primary traits. From Rushton & Irwing, 2009a, Figure 1

& Kaemmer, 1989). A nationwide sampling yielded norms based on 2,600 18- to 80-year-olds matched to the 1980 US Census. Rushton and Irwing (2009c) averaged the values given in the test manual for the 1,056+ males and 1,342+ females. The GFP accounted for 49 percent of the variance in two second-order factors and for 20 percent of the total reliable variance (Figure 5.7). Alpha was loosely interpreted as social introversion, Beta as anxiety, Gamma as asocial, and Delta as antisocial, with Alpha and Gamma giving rise to a higher-order factor that could be (negative) plasticity or externalizing behavior, and Beta and Delta giving rise to a higher-order factor that could be (negative) stability or internalizing behavior; and both of these then gave rise to the GFP. However, the high levels of co-morbidity make it prudent not to overinterpret these results.

11 The GFP in the Millon Clinical Multiaxial Inventory

The third edition of the Millon Clinical Multiaxial Inventory (MCMI–III) is designed to aid in the assessment of both DSM–IV Axis II personality disorders and Axis I clinical syndromes (Millon, 2006). The 175 questions directly reflect the DSM's diagnostic criteria. The MCMI–III consists of 24 clinical scales comprising 14 personality disorder scales and 10 clinical syndrome scales. Rushton and Irwing (2009d) extracted a GFP from the 24 scales for the 998 individuals of the normative sample, including males and females with a wide variety of diagnoses. The GFP accounted for 41 percent of the variance in two second-order factors, 31 percent of the variance

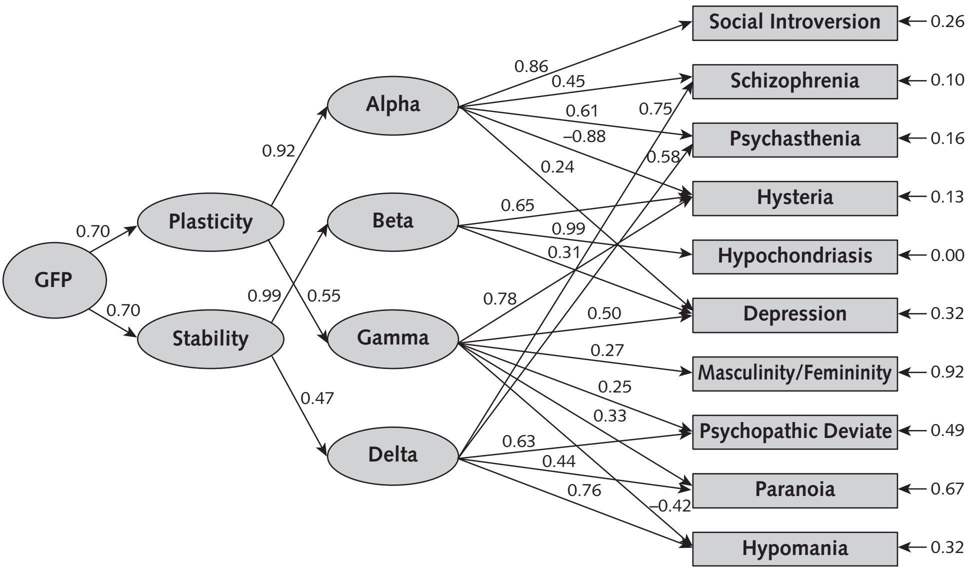
Social Introversion
0.26
Schizophrenia
0.10
Psychasthenia
0.16
Hysteria
0.13
Hypochondriasis
0.00
Depression
0.32
Masculinity/Femininity
0.92
Psychopathic Deviate
0.49
Paranoia
0.67
Hypomania
0.32
GFP
Plasticity
Stability
Alpha
Beta
Gamma
Delta
0.70
0.70
0.92
0.55
0.99
0.47
0.86
0.45
0.61
–0.88
0.24
0.75
0.58
0.65
0.99
0.31
0.78
0.50
0.27
0.25
0.33
0.63
0.44
0.76
–0.42

Figure 5.7 The GFP in the Minnesota Multiphasic Personality Inventory–2 going from the GFP to the Big Two to four higher-order factors to the 10 primary traits. From Rushton & Irwing, 2009c, Figure 2

in five first-order factors, and 26 percent of the total reliable variance in all 24 scales (Figure 5.8).

12 The GFP in the Personality Assessment Inventory

The Personality Assessment Inventory (PAI) is a self-administered test of the personality disorders designed for the clinical assessment of adults aged 18 years and older. The PAI has 22 scales comprising 4 validity scales, 11 clinical scales, 5 treatment consideration scales, and 2 interpersonal scales (Morey, 2007). Individuals respond to 344 items by using a four-point range from *false* to *very true*. The 11 clinical scales cover the neurotic, psychotic, and behavior disorders; the five treatment scales indicate the respondent's environmental circumstances, motivation for treatment, and potential to harm others and self; and the two interpersonal dimensions are affiliative versus rejecting and dominating versus submissive. Rushton and Irwing (2009d) carried out a quasi-cross-validation study of the PAI for two samples: a clinical sample of 1,246 patients and a normative sample of 1,000 adults matched to the US Census. A five-factor solution was the best alternative for the normative sample, which was then validated on the clinical sample. The GFP accounted for 65 percent of the variance in two second-order factors, 47 percent of the variance in five first-order factors, and 27 percent of the total reliable variance in all 18 scales (Figure 5.9).

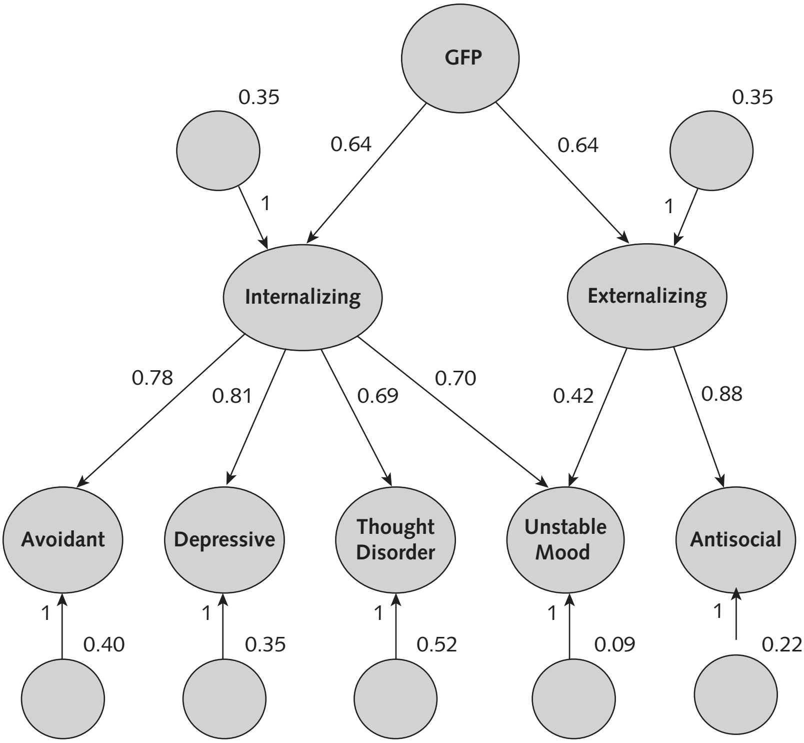
GFP
0.35
0.35
0.64
0.64
1
1
Internalizing
Externalizing
0.78
0.81
0.69
0.70
0.42
0.88
Avoidant
Depressive
Thought Disorder
Unstable Mood
Antisocial
1
1
1
1
1
0.40
0.35
0.52
0.09
0.22

Figure 5.8 The GFP in the Millon Clinical Multiaxial Inventory going from the GFP to five higher-order factors to the Big Two, of internalizing and externalizing, to the 24 primary traits (not shown). From Rushton & Irwing, 2009d, Figure 1

13 The GFP in the Dimensional Assessment of Personality Pathology

The Dimensional Assessment of Personality Pathology–Basic Questionnaire (DAPP–BQ) has 290 items with five response categories ranging from 1 ("strongly disagree") to 5 ("strongly agree"). It measures 18 factors, estimated to capture between 29 percent and 63 percent of the variance in the DSM personality disorders (Livesley & Jackson, 2009; Livesley & Larstone, 2008). In a first study, Rushton and Irwing (2009d) analyzed data from the combined clinical and general population sample (N = 455) of the Spanish validation of the DAPP–BQ (Gutiérrez-Zotes et al., 2008). The GFP accounted for 61 percent of the variance in six first-order factors and for 36 percent of the total reliable variance in all 18 scales.

With the publication of the DAPP–BQ manual (Livesley & Jackson, 2009), a more thorough examination was undertaken in a "strictly confirmatory" test of three validation samples. Rushton, Irwing, and Booth (2010) took for calibration the inter-scale correlations (N = 942) provided for the general population sample and,

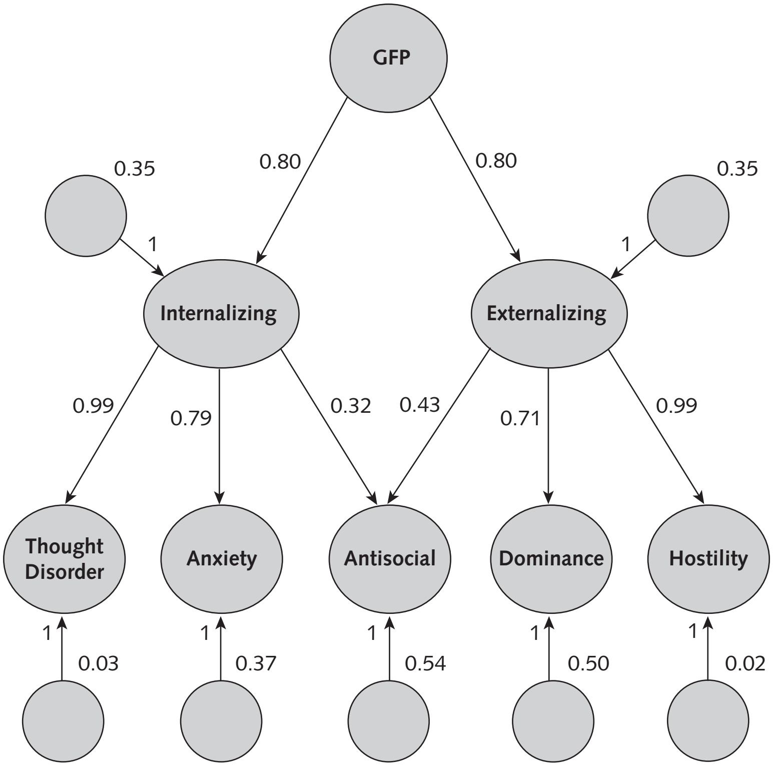
GFP
0.80
0.80
0.35
0.35
1
1
Internalizing
Externalizing
0.99
0.79
0.32
0.43
0.71
0.99
Thought Disorder
Anxiety
Antisocial
Dominance
Hostility
1
1
1
1
1
0.03
0.37
0.54
0.50
0.02

Figure 5.9 The GFP in the Personality Assessment Inventory going from the GFP to five higher-order factors to the 18 primary scales (not shown). From Rushton & Irwing, 2009d, Figure 3

for validation, those from twin and clinical samples (*N* = 1,346 and 656). The six-factor solution from the Spanish version did not fit the US data, where four factors worked best (Figure 5.10). For the general population sample, the GFP explained 34 percent of the variance in four first-order factors and 33 percent of the variance in all 18 scales. The model fits were very similar for the twin and the clinical samples, with the GFP explaining 35 percent and 34 percent of the variance in four first-order factors and 34 percent and 30 percent of the variance in all 18 scales, respectively.

14 The GFP in Emotional Intelligence (and HEXACO)

The high end of the GFP is emotional intelligence (EI), which pertains to the perception and control of emotions in the self (intra-personal focus) and in others (interpersonal focus). The Trait Emotional Intelligence Questionnaire (TEIQue; Petrides, 2009) assesses 15 facets of EI, such as emotional regulation, social

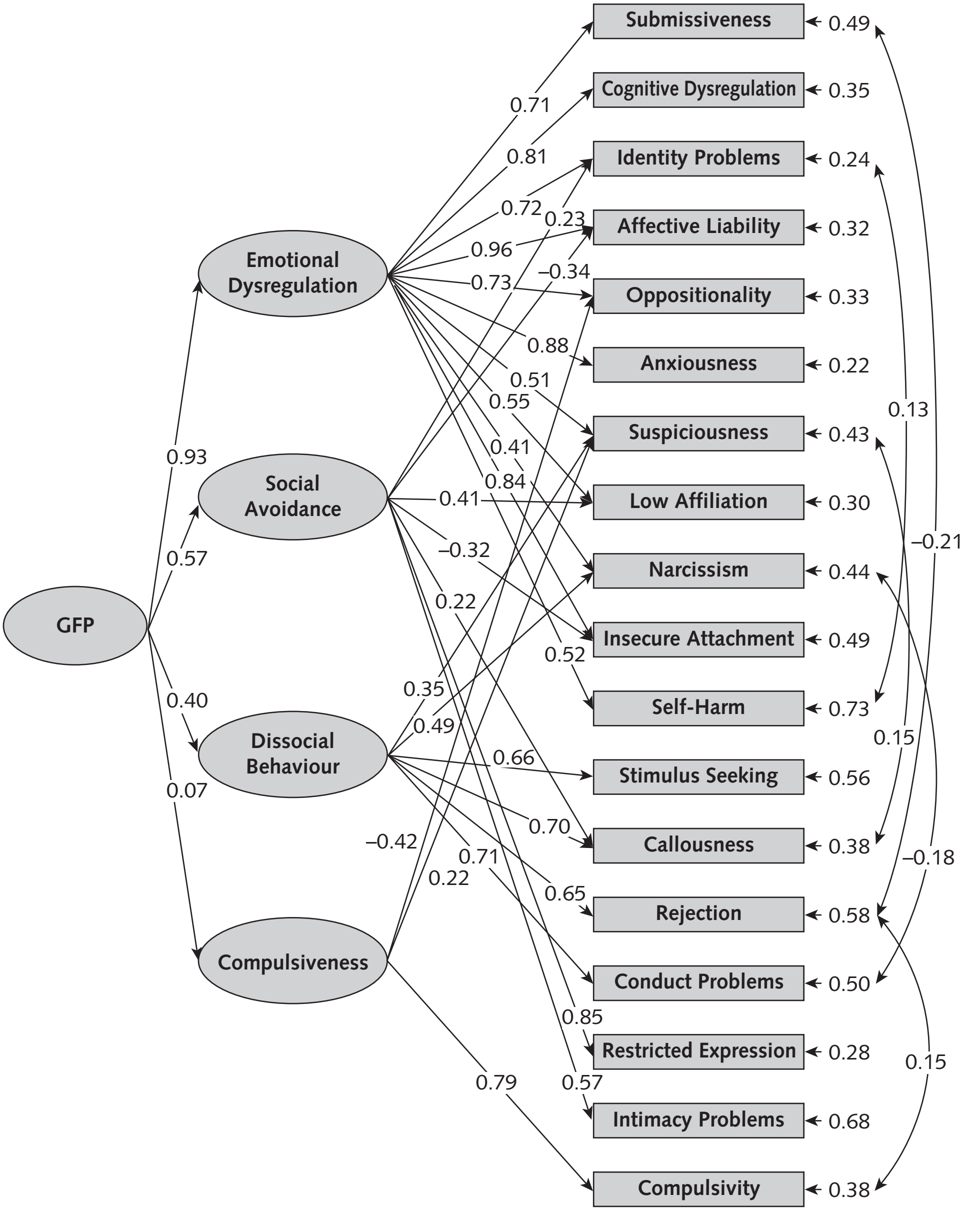
GFP
Emotional Dysregulation
Social Avoidance
Dissocial Behaviour
Compulsiveness
0.93
0.57
0.40
0.07
Submissiveness
Cognitive Dysregulation
Identity Problems
Affective Liability
Oppositionality
Anxiousness
Suspiciousness
Low Affiliation
Narcissism
Insecure Attachment
Self-Harm
Stimulus Seeking
Callousness
Rejection
Conduct Problems
Restricted Expression
Intimacy Problems
Compulsivity
0.49
0.35
0.24
0.32
0.33
0.22
0.43
0.30
0.44
0.49
0.73
0.56
0.38
0.58
0.50
0.28
0.68
0.38
0.71
0.81
0.72
0.23
0.96
–0.34
0.73
0.88
0.51
0.55
0.41
0.84
0.41
–0.32
0.22
0.52
0.35
0.49
0.66
0.70
–0.42
0.71
0.22
0.65
0.85
0.79
0.57
0.13
–0.21
0.15
–0.18
0.15

Figure 5.10 The GFP in the Dimensional Assessment of Personality Pathology going from the GFP to four higher-order factors to the 18 primary scales. After Rushton, Irwing, & Booth, 2010, Figure 1

awareness, stress management, self-esteem, and optimism, which combine into four higher-order factors (well-being, self-control, emotionality, and sociability) and a global score. A GFP was extracted from the TEIQue facets and NEO Big Five in 316 pairs of twins by Veselka, Shermer, Petrides, and Vernon (2009), who divided their sample into twin-1 and twin-2 halves. They found that a GFP accounted for 39 percent and 35 percent of the variance in the 20 variables in the two samples, with loadings of .32 to .77. These data were subsequently re-analyzed by Rushton et al. (2009), who extracted a GFP from the four higher-order factors, along with the NEO and the four humor styles. The GFP accounted for 33 percent and 31 percent of the variance in each sample of 13 variables.

A GFP was also extracted from the four higher-order factors of the TEIQue Short Form in combination with the 60-item HEXACO Inventory in 1,192 19- to 86-year-old twin pairs (Veselka, Schermer, Petrides, Cherkas, Spence, & Vernon, 2009). The HEXACO–60 consists of five dimensions similar to the Big Five plus a sixth, honesty–humility, which emphasizes trustworthiness, modesty, and a lack of greed. The GFP accounted for 33 percent of the variance in both sets of 10 scales, with loadings of .19 to .79.

The GFP has also been extracted from two other EI inventories: the Mayer–Salovey–Caruso Emotional Intelligence Test (MSCEIT), which measures the four domains of identifying emotions, utilizing emotions, understanding emotions, and managing emotions; and the Emotional Quotient Inventory (EQi), which measures the five domains of intra-personal functioning, interpersonal skills, adaptability, stress management, and general mood. McIntyre (2010) gave these measures to 215 female and 205 male college students in combination with the Big Five from the Adjective Self-Description Questionnaire and a verbal ability scale. The GFP explained 40 percent and 38 percent of the variance in all 15 scales in the two samples, with loadings of .14 to .84.

15 The GFP and Subjective Well-Being

The GFP is strongly related to dispositional affect and happiness. Musek (2007) extracted a GFP from several Big-Five indicators and found it shared 60 percent of the variance with measures of subjective well-being such as the Satisfaction with Life Scale, the Positive and Negative Affect Schedule, and the Self-Liking and Competence Scale. Subsequently, Rushton and Irwing (2009a) found the well-being scale of the Multidimensional Personality Questionnaire linked to the GFP through loadings on the second-order factors of extraversion, agreeableness, and openness and on the third-order factors of stability and plasticity (see Figure 5.6). Erdle et al. (2010) found that a GFP from the Big Five shared 67 percent common variance with self-esteem in a study of 628,640 Internet respondents. Those high on the GFP experience positive affect and have expectations of future reward, while those low on the GFP experience negative affect and have expectations of future punishment. Subsequently, Rushton and Erdle (2010) found that those who score high on the GFP were not only high in self-esteem and positive affect, but low in depression as measured by the Beck Depression Inventory.

16 Evolutionary Genetics

Several cross-national twin studies have found that 50 percent of the GFP variance is due to genetic influence and 50 percent to non-shared environmental influence. These include studies of 322 pairs of adult twins from the UK, 575 pairs of 2- to 9-year-old twins from South Korea, 651 pairs of 14- to 30-year-old twins from Japan, and 316 pairs of 18- to 74-year-old twins from Canada and the US (Figueredo et al., 2004; Rushton et al., 2008, 2009; Veselka, Schermer, Petrides, Cherkas et al., 2009). The 50 percent GFP variance that is environmental is of the non-shared variety (e.g. due to an illness or chance friendship that happens to one sibling and not to the other). This genetic and environmental architecture is similar to that derived from numerous other studies of personality (Bouchard & McGue, 2003).

The GFP is largely a *genetic* factor, that is, individuals who are *genetically* disposed to have high scores on agreeableness, conscientiousness, and emotional stability are *genetically* disposed to have high scores on openness, sociability, self-esteem, and so on. This conclusion derives from the observation that cross-twin–cross-trait correlations for monozygotic (MZ) twins are considerably higher than those for dizygotic (DZ) twins. For example, in 642 pairs of 25- to 74-year-old twins, Figueredo et al. (2004) found that the *genetic* loadings on the GFP from the Big Five were: openness, .67; conscientiousness, .70; extraversion, .91; agreeableness, .83; and neuroticism, –.38. In a study of 575 pairs of South Korean twins, Rushton et al. (2008) extracted a higher-order GFP from a *genetic* matrix calculated from the bivariate heritabilities between the prosocial and EAS scales and found it explained 32 percent of the source variance from the four lower-order scales (47 percent of the reliable variance).

Of theoretical interest is that some of the genetic variance in the GFP is of the *non-additive* variety (dominance and epistasis). Non-additive genetic (D) variance is inferred when the correlations for MZ twins are more than twice those for DZ twins. In Rushton et al.'s (2008) study of 575 pairs of 2- to 9-year-old South Korean twins, after a GFP was extracted from a Prosocial Questionnaire and from the EAS Temperament Scales, 53 percent of the variance was found to be of the non-additive variety (Figure 5.11).

Other studies have also indicated D effects. A study by Rushton et al. (2008) extracted the GFP from 29 self-ratings in 322 pairs of British twins and found that the correlation for MZ pairs (.55) was more than twice that for DZ pairs (.14). Model-fitting gave the DE model the best fit, with D = 55 percent and E = 45 percent. A study by Rushton et al. (2009) extracted the GFP from 13 scales comprising the Big Five, four factors of emotional intelligence, and four factors of humor style in 316 Canadian and US twin pairs. The correlation for MZ twins (.41) was more than twice that for DZ twins (.05). Model-fitting gave the DE model the best fit, with D = 42 percent and E = 58 percent. A twin study by Figueredo and Rushton (2009) found that D effects could not be ruled out as a contributor to the shared variance between the GFP, a general health factor, and a lower-order life history factor, implying the GFP and good health co-evolved as mutually adapted traits through directional selection for a slow (*K*-selected) life history strategy.

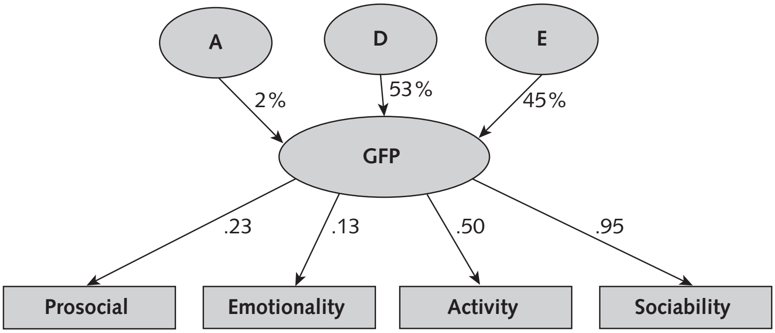

Figure 5.11 The genetic and environmental architecture of the GFP in the prosocial and EAS temperament scales from South Korean 2- to 9-year-olds. Note: A = additive genetic variance; D = dominance genetic variance; E = non-shared environmental variance. From data in Rushton et al., 2008

Non-additive genetic variance implies the GFP has been under recent directional selection, as expected for a Darwinian fitness character—that is, one that leads to greater reproductive success (Falconer, 1989; Fisher, 1954). The well-defined positive and negative poles of the GFP (the positive pole being cooperative and prosocial) suggest how and why unidirectional selection for personality might have occurred from “primeval man and his ape-like progenitors,” as Darwin (1871, p. 159) phrased it. Those at the high end of the GFP—prosocial, open, conscientious, outgoing, agreeable, and emotionally stable—can be expected to enjoy better social relationships, and hence greater reproductive success, since people prefer as mates, fellow workers, and leaders those who are agreeable, cooperative, and emotionally stable (Figueredo, Sefcek, & Jones, 2006; Miller, 2007). Moreover, people able to cooperate in groups are more likely to win competitions and wars (Darwin, 1871).

Genetic dominance is also suggested by evidence of inbreeding depression on components of the GFP (just as there is inbreeding depression on the *g* factor of mental ability: Jensen, 1998). Inbreeding depression occurs on a trait when deleterious recessive alleles combine to lower the scores of offspring relative to parents. An Italian study found evidence that inbred families were lower on extraversion and openness (Camperio Ciani, Capiluppi, Veronese, & Sartori, 2007). A Dutch study revealed that the offspring of parents who came from the same region in the Netherlands (and so were more likely to be inbred) scored lower on sensation-seeking than those whose parents came from different regions (Rebello & Boomsma, 2007).

17 Neurobiology

The strategy of searching for the conceptual (and real) nervous system underlying personality will differ depending on whether the apex is viewed as consisting of a

GFP, a Big Two, a Big Three, or a Big Five. The Pavlovian concept of strength of the nervous system has often been proposed for theories of temperament, including the ancient Hippocratic–Galenic model of the four humors (Strelau, 2008). A strong nervous system (high GFP) is one that is slower to arouse and more tolerant of intense stimulation for a longer time period. A weak nervous system (low GFP) is quicker to arouse, but tires sooner.

Gray (1970) linked a strong nervous system to stable extraversion and a weak nervous system to neurotic introversion following his 45-degree rotation of Eysenck's two orthogonal dimensions. Consequently, Rushton et al. (2009) suggested that Gray and McNaughton's (2000) reinforcement sensitivity theory might constitute the core of the GFP, because it integrates the fundamental process of approach–avoidance, starting at the genes, working up through brain anatomy and physiology, and culminating in learning and experiential outcomes, including positive and negative emotionality and motivation. Three independent biological systems are postulated: a behavioral inhibition system (BIS), a behavioral activation system (BAS), and a fight–flight–freezing system (FFFS). BIS is the aversive system that controls anxiety and negative feelings such as fear, frustration, and sadness, and it is sensitive to signals of punishment, non-reward, and novelty. BAS is the approach system that results in feelings of hope, elation, and happiness and is sensitive to signals of reward. FFFS is related to extremes of negative emotion, such as panic and rage, and responds to unconditioned punishment.

The relation between the GFP and BIS–BAS was examined by Erdle and Rushton (2010) in two studies of university students ($N = 128$ and 88). The GFP was measured by summing over the scales of the Big-Five Inventory (BFI) after reverse keying neuroticism to reflect emotional stability. The GFP correlated significantly and positively with the behavioral activation system (.42, .34), generalized expectancy of reward (.57, .56), self-esteem (.45, .33), and positive affect (.62, .49), and negatively with the behavioral inhibition system (–.27, –.30), generalized expectancy of punishment (–.31, –.14 *ns*), and negative affect (–.50, –.63). In both studies, a principal components analysis found that all measures loaded on a single factor, the GFP explaining 42 percent of the variance.

The temperamental basis of the GFP was also examined by Zawadzki and Strelau (2010) by using self- and peer ratings from 32 Polish-language scales measuring the Big Five and strength of the nervous system. Zawadzki and Strelau extracted a GFP from two separate samples of 2,000+ 16- to 77-year-olds, using both self-ratings and peer ratings ($r = .89$). Since the highest loadings on the GFP were consistently from neuroticism and extraversion, they proposed that nervous system *arousal* was the core mechanism. However, since neuroticism and extraversion had different arousal systems, Zawadzki and Strelau argued that temperament should not be reduced to a single factor.

A full neurobiological system also has to include the neurotransmitters of serotonin and dopamine, which act broadly in the brain and are widely implicated in the regulation of mood. High levels of dopamine are often said to activate approach behavior and the reward system, while high levels of serotonin inhibit signals of pain and the punishment system. People at the high end of the GFP can be expected to have higher levels of serotonin and dopamine; people at the low end, lower levels.

18 Construct Validity

A first step regarding construct validity is to demonstrate that different procedures give rise to the same GFP. If the GFP exists, it should do so regardless of the particular inventory, extraction method, or sample. In Section 7, a GFP extracted from the Temperament and Character Inventory correlated .72 with a GFP extracted from the NEO–PI–R in 651 pairs of Japanese twins (Rushton et al., 2009). In Section 17, a GFP extracted from 32 scales using 1,000+ self-ratings showed Tucker factor similarity coefficients of .89 and .99, derived from different estimates of the factor structure, with a GFP extracted from 2,000+ peer ratings (Zawadzki & Strelau, 2010).

Irwing and Rushton (2010) carried out a large confirmatory factor model (Figure 5.12) and found separate GFPs correlated with a mean of .87 across the Jackson Personality Inventory (JPI), the Hogan Personality Inventory (HPI), the Big-Five Inventory (BFI), and the Mini-Markers, all administered to the same individuals ($N = 725$) from the Eugene-Springfield Community Sample in Oregon. Irwing and Rushton (2010) confirmed their results using pair-wise factor models, principal components analyses, principal axis factoring, and unit-weighting (mean $r = .80$). Although the inventories emphasize different aspects of personality and different philosophies of scale construction, the GFP was extracted from the HPI and the JPI just as readily as it was from the BFI and the Mini-Markers.

The main alternative explanation for the GFP is that it arises from artifacts of evaluative bias and scale construction (Anusic, Schimmack, Pinkus, & Lockwood, 2009; Ashton, Lee, Goldberg, & de Vries, 2009; Bäckström, Björklund, & Larsson, 2009). However, the GFP is extracted just as robustly from other-reports as it is from self-reports, thereby suggesting that evaluative biases are of limited importance (Rushton et al., 2008; Van der Linden, te Nijenhuis, et al., 2010; Zawadzki & Strelau, 2010). Furthermore, Rushton et al. (2009) carried out a multi-trait–multi-method (MTMM) study that found a GFP in self-, teacher-, and parent-ratings in 391 13- to 14-year-olds using the Big-Five Questionnaire—Children (BFQ–C; Barbaranelli, Fida, Paciello, Di Giunta, & Caprara, 2008). As shown in Figure 5.13, the GFP sits atop the Big Two and the Big Five, with a substantial fit to the empirical data that accounted for 22 to 54 percent of the variance in the lower-order traits.

Although measures of evaluative bias do correlate with the higher-order personality factors similar to the way they do with lower-order dimensions, they have not been found to undermine the robustness of the GFP. For example, while Bäckström et al. (2009) found that social desirability contributed to higher-order factors above the Big Five, they also found that the higher-order factors were recovered after re-writing the items to control for social desirability. Other research has found that, while social desirability scales correlated with components of the GFP, the GFP remained intact after partialing out their effects (Erdle & Rushton, 2010; Rushton & Erdle, 2010; Schermer & Vernon, 2010). Although Anusic et al. (2009) reported that self-esteem could constitute a "halo effect," and Erdle, Gosling, and Potter (2009) confirmed that higher-order factors above the Big Five were related to self-esteem, Erdle et al. (2010) also found that controlling for self-esteem left the GFP intact.

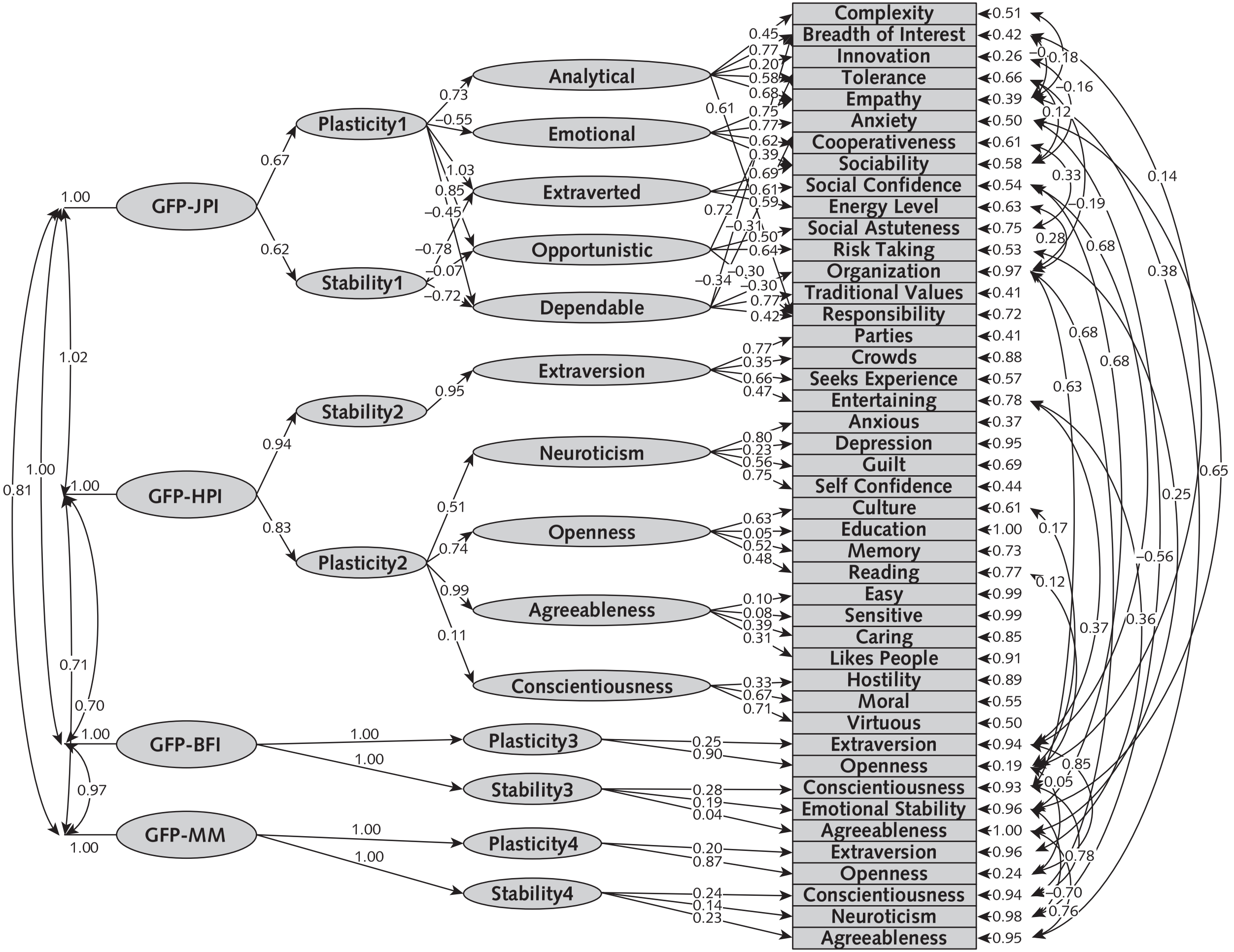
GFP-JPI
GFP-HPI
GFP-BFI
GFP-MM
Plasticity1
Stability1
Stability2
Plasticity2
Plasticity3
Stability3
Plasticity4
Stability4
Analytical
Emotional
Extraverted
Opportunistic
Dependable
Extraversion
Neuroticism
Openness
Agreeableness
Conscientiousness
Complexity 0.51
Breadth of Interest 0.42
Innovation 0.26
Tolerance 0.66
Empathy 0.39
Anxiety 0.50
Cooperativeness 0.61
Sociability 0.58
Social Confidence 0.54
Energy Level 0.63
Social Astuteness 0.75
Risk Taking 0.53
Organization 0.97
Traditional Values 0.41
Responsibility 0.72
Parties 0.41
Crowds 0.88
Seeks Experience 0.57
Entertaining 0.78
Anxious 0.37
Depression 0.95
Guilt 0.69
Self Confidence 0.44
Culture 0.61
Education 1.00
Memory 0.73
Reading 0.77
Easy 0.99
Sensitive 0.99
Caring 0.85
Likes People 0.91
Hostility 0.89
Moral 0.55
Virtuous 0.50
Extraversion 0.94
Openness 0.19
Conscientiousness 0.93
Emotional Stability 0.96
Agreeableness 1.00
Extraversion 0.96
Openness 0.24
Conscientiousness 0.94
Neuroticism 0.98
Agreeableness 0.95
1.00
1.02
1.00
0.81
1.00
0.71
0.70
1.00
0.97
1.00
0.67
0.62
0.94
0.83
1.00
1.00
1.00
1.00
0.73
–0.55
1.03
0.85
–0.45
–0.78
–0.07
–0.72
0.95
0.51
0.74
0.99
0.11

Figure 5.12 Hierarchical factor structure of four inventories taken together (JPI, HPI, Mini-Markers, BFI) showing the correlations between the GFPs. From Irwing & Rushton, 2010, Figure 5

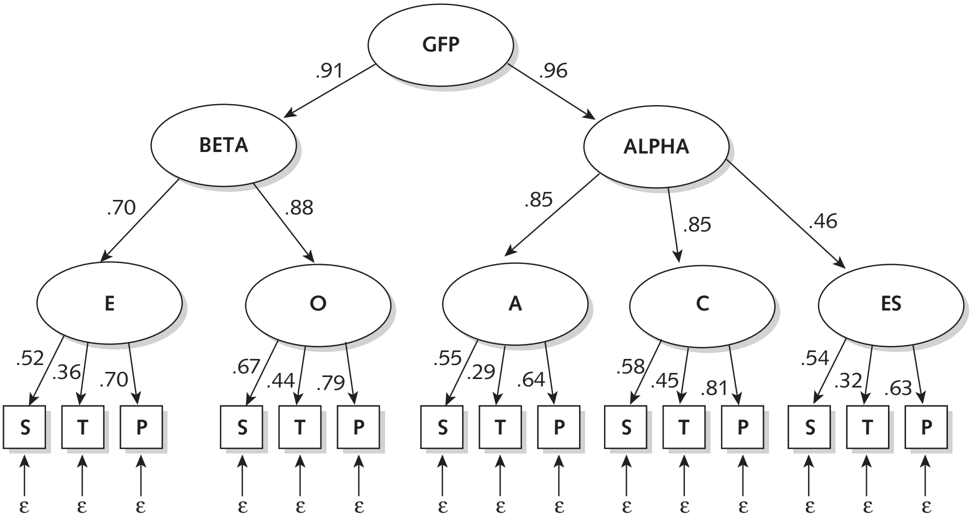

Figure 5.13 A multi-trait–multi-method model of the GFP from self-, teacher-, and parent-ratings going from the GFP to the Big Two to the Big Five from a re-analysis of Barbaranelli et al.'s (2008) data. Note: S = self-report, T = teacher report, P = parent report. Uniquenesses of the same informant are correlated. E = extraversion, O = openness, A = agreeableness, C = conscientiousness, ES = emotional stability. From Rushton et al., 2009, Figure 2

Four multi-method construct validity studies have been carried out in the Netherlands and found that a GFP measured through self-reports predicted external criteria. One study found that a GFP extracted from self-ratings in employees with an average job experience of nine years predicted job performance rated by supervisors (Van der Linden, te Nijenhuis, et al., 2010). Another found that a GFP extracted from self-reports in adolescents predicted likeability rated by peers (Van der Linden, Scholte, Cillessen, te Nijenhuis, & Segers, 2010). A third found that a GFP extracted from personality questionnaires used by the Dutch military predicted turnover in training as well as work performance rated by supervisors (te Nijenhuis, Cremers, Van der Linden, & van de Ven, 2010). The fourth found that a GFP extracted from self-ratings predicted suitability for jobs rated by professional assessors (Van der Linden, Bakker, & Serlie, 2010).

A critique by Ashton et al. (2009) argued that the GFP is an artifact of scale construction due to lower-order facets loading on more than one factor (e.g. originality, enthusiasm, and leadership resulting in a same-signed blend on extraversion and openness). In three samples, Ashton et al. reported that models taking these blends into account fit the data better than models based on higher-order factors. They argued that, since blended models were more parsimonious, higher-order factors were not required. However, in the studies we have reported here, we could find no distinction between the GFPs extracted from the "blended" Big-Five factors (e.g. Figure 5.1) and those extracted from latent variables computed from univocal primary factors (e.g. Figure 5.6 on the MPQ; Figure 5.12 on the JPI). Moreover, Ashton et al. (2009) inadvertently biased their outcomes by (1) constructing models with only two indicators per factor, a practice that likely increased the parsimony of blended models; and (2) fitting the blended models to data before comparing them to a pre-existing hierarchical model. In any case, their model fit indices were so poor that no sensible conclusion could be drawn. More generally, advocating blended models goes against the whole history of factor analysis, which favors one-dimensional scales and factors approximating simple structure. Without univocal variables, factors tend to be indeterminate.

19 Discussion

The results presented here show that a higher-order general factor of personality (GFP) reliably occupies the apex of the hierarchy of personality and its disorders, and it does so regardless of whether self- or other-reports are used. A GFP has now been extracted from over 24 different personality inventories, including several sets of the Big Five, the California Psychological Inventory (CPI), the Comrey Personality Scales (CPS), the Dimensional Assessment of Personality Pathology–Basic Questionnaire (DAPP–BQ), the EAS Temperament Scales (EAS), the Guilford–Zimmerman Temperament Survey (GZTS), the HEXACO Personality Inventory (HEXACO), the Hogan Personality Inventory (HPI), the Jackson Personality Inventory (JPI), the Millon Clinical Multiaxial Inventory–III (MCMI–III), the Minnesota Multiphasic Personality Inventory–2 (MMPI–2), the Multidimensional Personality Questionnaire (MPQ), the Personality Assessment Inventory (PAI), the Personality Research Form (PRF), the Temperament and Character Inventory (TCI), and the Trait Emotional Intelligence Questionnaire (TEIQue).

The robustness of the GFP is attested to by the diversity of the inventories from which it has been extracted. A GFP emerged regardless of whether the inventory covered the domain of normal personality (the NEO–PI, FFI) or the domain of the personality disorders (the DAPP–BQ, MMPI–2, PAI, MMCI–III). A GFP emerged regardless of whether the inventory was based on theoretical criteria (the PRF, PAI) or aimed to be eclectic (the CPI, JPI). It emerged whether the inventory distinguished between scales of “temperament” and “personality” (the TCI), or between those of “personality disorders,” “social conditions,” and “attitudes toward therapy” (the PAI). A GFP also emerged regardless of whether the inventory used an *empirical* approach to scale construction and selected items based on the frequency of endorsement by criterion groups (the CPI, MMPI), an *inductive* approach and selected items based on their relation to each other (the PAI), or a *rational* approach based on writing items to fit traits defined in advance (the DAPP–BQ). A GFP similarly emerged when the inventory was constructed to minimize the effects of social desirability by selecting neutral items (the JPI, PRF).

There is nothing vague about the GFP. Quite the contrary; it is by definition the most internally consistent linear combination of all traits. Its location at the apex of the hierarchy should be almost completely fixed in any large data set. Nonetheless, we should make it clear that we are not at all implying that only one dimension will explain all manifestations of the rich and complex tapestry of the human personality. Nor does a general factor invalidate the utility or theoretical importance of lower-order factors. It is an empirical question as to which level provides the best predictor for a given criterion. The personality facets that exist *below* the Big Five, and so are closer to the behavior expressed, are sometimes better predictors than higher-order traits. If a person is experiencing anxiety over public speaking, it may be more beneficial to focus on his or her specific problem than on his or her general adjustment. But focusing on one specific lower-order trait should not obscure the existence of the hierarchical structure any more than it should obscure other relevant traits at the same level.

In conclusion, the theory and evidence presented here agrees with and extends the viewpoint of Darwin (1871), Wilson (1975), and others, that social competition and reproductive dynamics have helped direct human evolution. In particular, the evidence confirms a theoretical suggestion made by Rushton (1985, 1990) to the effect that much of the field of individual differences can be organized under a hierarchy of broad, heritable dimensions that, taken together, comprise a fast–slow (r–K) life history. This perspective provides increased coherence to the study of human behavior and makes unique predictions, not easily derivable from other approaches.

Notes

1 Our results contradict Digman (1997), who reported that the Big Two were *uncorrelated*. We were surprised to find so many discrepancies between the values Digman reported in his Appendix B and those we found in the sources he cited in Appendix A (Rushton & Irwing, 2008, pp. 680–681). We surmised that Digman must have worked from subsets of raw data from which the original papers had been published. Regardless, Digman's published data do give rise to a *correlated* Alpha and Beta, which give rise to the GFP.

2 Galton (1887) listed the traits alphabetically: *Good temper* (amiable, buoyant, calm, cool, equable, forbearing, gentle, good, mild, placid, self-controlled, submissive, sunny, timid); *Bad temper* (acrimonious, aggressive, arbitrary, bickering, capricious, captious, choleric, contentious, crotchety, decisive, despotic, domineering, easily offended, fiery, fits of anger, gloomy, grumpy, harsh, hasty, headstrong, huffy, impatient, imperative, impetuous, insane temper, irritable, morose, nagging, obstinate, odd-tempered, passionate, peevish, peppery, proud, pugnacious, quarrelsome, quick-tempered, scolding, short, sharp, sulky, sullen, surly, uncertain, vicious, vindictive).

3 The Appendix in Menninger, Wayman, and Pruyser (1963) documents a unitary construct over centuries of evolving concepts in psychiatric nosology.

4 Decades later, Deary (1996) discovered a latent Big Five in Webb's (1915) data, thereby "pre-confirming" the hierarchical structure we present in the current chapter, albeit using an opposite procedure from ours by decomposing Webb's higher-order GFP into the lower-order Big Five.

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