CHAPTER 8

Dimensional Structure of Personality and Beyond

TWO BROAD DOMAINS OF PERSONALITY

Cognitive Abilities and Noncognitive Traits

The entire human personality can be roughly divided into two domains, the noncognitive (or conative) and the cognitive. The first domain includes the personality traits (personality in the narrower sense of meaning), self-concept, self-esteem, well-being, emotionality or affect, motivation, and coping; the second domain includes intelligence and other cognitive abilities. Empirical psychological research has a long tradition in both domains resulting in a variety of different theories, models, and conceptions.

From the beginning, the problems concerned with the structure of both domains and their subdomains have been a focus of psychological research. The crucial aim of this structural research was the identification of the most general basic dimensions underlying the variables included in different research models. Consequently, in both cognitive and noncognitive domains, a number of hierarchical structural models were developed with the basic dimensions at the apex and the more specific subdimensions at the lower levels of generality.

G-Factor and GFP

The hierarchical structural models were established especially for intelligence and related cognitive abilities. The concept of a general factor of intelligence (g), based on positive intercorrelations among tests, was promoted as early as in the beginning of the 20th century (Spearman, 1904, 1923, 1927). Since that time, it was preserved as a prominent concept in structural models of intelligence (Burt, 1949; Carroll, 1993; Geary, 2005; Horn, 1988; Jensen, 1998; Rindermann, 2007; Vernon, 1940, 1950).

Several structural models were also developed in the noncognitive fields of personality. In these models, a variety of psychological variables have been considered including the personality traits, well-being, emotionality, motivation, coping, self-concept, self-esteem, and values. Until

The General Factor of Personality
ISBN 978-0-12-811209-0
http://dx.doi.org/10.1016/B978-0-12-811209-0.00008-X

very recently, the hierarchical models in almost all of the aforementioned noncognitive areas included two or more basic dimensions at the apex. The clear exceptions are the fields of well-being, self-concept, and self-esteem, where the existence of a general or global factor is undeniable (Musek, 2010a, 2010b, 2011).

Personality theorists and researchers almost consensually believed that there are more than one basic dimension in the structure of personality. As a rule, the best known models recognized at least two independent basic dimensions: 16, 4-8, or 3 (Cattell, 1956, 1957), 7 (Tellegen & Waller, 1987), 6 (HEXACO model: Ashton, Lee, & Son, 2000), 5 (Five-Factors Model, FFM; Digman, 1990; Goldberg, 1990; John, 1990; McCrae & Costa, 1987, 1998), 3 (Eysenck, 1970), 2 (Digman, 1997). The possibility of the general factor in personality domain has been explicitly or at least tacitly denied. There are very few exceptions (Hofstee, 2001, 2003; Saucier & Goldberg, 2003; Spearman, 1927; Stankov, 2005; Webb, 1915). Yet, the accumulating research evidence demonstrated that at least in the leading structural model of personality, the FFM, so-called Big Five, substantially correlate (Digman, 1997; Markon, Krueger, & Watson, 2005; Musek, 2007; Rushton, Bons, & Hur, 2008; Rushton & Irwing, 2008). In the rule, the first factor was extracted from the Big Five, their facets or items fairly exceeded the following factors and essentially loaded all lower-order variables.

The existence of the general factor of personality (GFP) was first proposed by Musek (2007) and was soon corroborated by several other authors (Erdle & Rushton, 2010; Hirschi, 2008; Musek, 2007, 2009, 2010a, 2010b, 2010c, 2011; Rushton et al., 2009, 2008; Rushton & Erdle, 2010; Rushton & Irwing, 2008, 2009a, 2009b, 2011; Van der Linden, Nijenhuis, & Bakker, 2010; Veselka, Schermer, Petrides, & Vernon, 2009). Consequently, a new structural paradigm in personality theory could be proposed with the GFP or the Big One at the top of the structural hierarchy of personality and the Big Two, Big Five, facets, and specific items on the following levels of generality (pyramidal paradigm of personality structure; Musek, 2010a, 2010b, 2010c). In the past 5 years, more than 100 scientific articles throughout the world addressed the issues concerning the GFP (for reviews and critiques, see Ferguson, Chamorro-Premuzic, Pickering, & Weiss, 2011; Just, 2011; Musek, 2010a, 2011; Revelle & Wilt, 2013; Rushton & Irwing, 2011). In the literature focusing on GFP, several important issues have been discussed, including the nature of GFP and its possible psychological interpretations (Musek, 2007, 2010a, 2011; Rushton et al., 2009, 2008; Rushton & Irwing,

2008;Van der Linden, Nijenhuis, et al., 2010;Van der Linden, Scholte, et al., 2010), the heritability and other bioevolutionary aspects of GFP (Loehlin, 2011a, 2011b; Loehlin & Martin, 2011; Rushton et al., 2009, 2008;Veselka et al., 2009), the generality of GFP and eventual extensions beyond the scope of FFM (Erdle & Rushton, 2010; Erdle, Irwing, Rusthon, & Park, 2010; Musek, 2010a, 2011; Rushton & Irwing, 2008), the connections of GFP to other prominent psychosocial and demographic variables (Erdle & Rushton, 2010; Musek, 2007, 2010a, 2010b, 2010c, 2011, 2012a, 2012b; Schermer & Vernon, 2010; Vecchione, Alessandri, Barbaranelli, & Caprara, 2011), the cross-cultural stability and consistency of GFP (Musek, 2010a), not to mention others.

Apart from the correlations between the Big Five, the basic dimensions of personality considerably correlate with other major fields in the noncognitive domain of personality. The associations between dimensions of personality, well-being, affect, and motivation are well established in the research literature, as well as the connections between personality, self-concept, and self-esteem (Just, 2011; Musek, 2007, 2010a; Rushton & Irwing, 2011). GFP itself is correlated with the higher-order dimensions of well-being, affect, and self-esteem (Erdle, Irwing, et al., 2010; Erdle & Rushton, 2010; Musek, 2007), motivation and coping (Erdle & Rushton, 2010; Musek, 2010a, 2011), quality of life (Musek, 2012b), generativity or wisdom (Musek, 2010a), values (Musek, 2010b), interests, work values, and self-evaluations (Hirschi, 2008), social desirability (Musek, 2010a; Rushton & Erdle, 2010; Schermer & Vernon, 2010), and even general intelligence (Schermer & Vernon, 2010). There is also empirical evidence for the cross-cultural stability of GFP (Musek, 2010a) and for the heritability of GFP (Loehlin, 2011a, 2011b; Loehlin & Martin, 2011; Rushton et al., 2008, 2009). Also, a shared genetic basis for the noncognitive dimensions of personality has been reported; for example, Figueredo and Rushton (2009) found shared genetic dominance for mental health, physical health, and life history traits.

According to the empirically demonstrated interconnectedness between the major noncognitive areas of personality, it seems plausible to hypothesize that a very large common factor is underlying all major noncognitive fields of psychology. In this case, the GFP may be seen as representing the comprehensive noncognitive general factor of personality. Moreover, the existence of this superdimension could contribute to the recent debate concerning the nature of the GFP reinforcing the interpretation that the GFP is based on substantial behavioral correlations.

The Comprehensive Factor of Personality: A Study on 32 Variables

A special study can be designed therefore to explore the hierarchical structure of the noncognitive domain of personality and, more specially, to possibly identify the higher-order factors of this structure with the comprehensive general latent dimension at the top (the comprehensive factor of personality or CFP). Thus, the additional aim of this study was to test the hypothesis that the GFP obtained on the basis of the Big Five intercorrelations is in fact only a part of the very broad and comprehensive general factor residing in the noncognitive domain of human personality. It is necessary to include a large set of noncognitive psychological variables in this research. The existence of such a very broad general dimension is also in concordance with the "differential K theory" (Figueredo & Rushton, 2009; Rushton, 1985, 1990), derived on the basis of Wilson's (1975) r-K evolutionary model.

However, it is not so simple to collect the data representing the very broad area of noncognitive domains of personality. Fortunately, exactly such kind of data collection already exists. In the well-known Midlife in the United States II (MIDUS II) project (Ryff et al., 2007), a variety of variables representing the noncognitive personality domains were measured on a large sample of almost 5000 subjects. The measures used in the MIDUS II sample, which is representative of the US adult population from age 35 on, encompass the Big Five and other personality dimensions, the dimensions of well-being, emotionality, control, coping, self-concept, self-esteem, spirituality, and others. In this study, 32 variables representing the previously mentioned psychological domains were selected from MIDUS II data for further multivariate analyses (see the list in Table 8.1).

Method

Data, Participants and Procedure

The data being analyzed in this study was collected from the MIDUS II survey, conducted in 2004–06 (Ryff et al., 2007; Ryff & Davidson, 2011). The survey was performed on a large US national representative sample and the analyzed data was obtained from 4963 participants from both sexes (2316 males and 2647 females) in the age range from 28 to 84 years ($M = 55.43$ years, $SD = 12.45$). The MIDUS II data is available for free research purposes and can be publicly accessed via the Interuniversity

Table 8.1 Variable names, codes, the names of the respective scales, document pages, and references of the source data

Variable	Code	Name of the scale in MIDUS II	Pages in Ryff et al. (2007)[a]	Source references
Life satisfaction	b1ssatis	Life satisfaction scale	10–11	Prenda and Lachman (2001)
Negative affect	b1snegpa	PANAS negative adjectives	16–20	Mroczek and Kolarz (1998)
Positive affect	b1spospa	PANAS positive adjectives	16–20	
Self-esteem	b1sestee	Self-esteem	37–38	Rosenberg (1965)
Neuroticism	b1sneuro	Neuroticism	41–45	Rossi (2001)
Extraversion	b1sextra	Extraversion	41–45	
Agreeableness	b1sagree	Agreeableness	41–45	
Openness to experience	b1sopen	Openness to experience	41–45	
Conscientiousness	b1scons2	Conscientiousness	41–45	
Autonomy	b1spwba2	Autonomy	28–32	Ryff (1989), Ryff and Keyes (1995)
Environmental mastery	b1spwbe2	Environmental mastery	28–32	
Personal growth	b1spwbg2	Personal growth	28–32	
Positive relations with others	b1spwbr2	Positive relations with others	28–32	
Purpose in life	b1spwbu2	Purpose in life	28–32	
Self-acceptance	b1spwbs2	Self-acceptance	28–32	
Agency	b1sagenc	Agency	41–45	Rossi (2001)
Perceived control	b1sctrl	Perceived control	33–36	Lachman and Weaver (1997)
Interdependence	b1sinter	Interdependence	39–40	Singelis (1994)
Independence	b1sindep	Independence	39–40	

Continued

Table 8.1 Variable names, codes, the names of the respective scales, document pages, and references of the source data—cont'd

Variable	Code	Name of the scale in MIDUS II	Pages in Ryff et al. (2007)[a]	Source references
Well-being	b1smpqwb	Well-being MPQ	46–51	Tellegen (1985)
Social potency	b1smpqsc	Social potency MPQ	46–51	
Aggression	b1smpqag	Aggression MPQ	46–51	
Constraint control	b1smpqcn	Control MPQ	46–51	
Traditionalism	b1smpqtr	Traditionalism MPQ	46–51	
Harm avoidance	b1mpqha	Harm avoidance MPQ	46–51	
Personality in intellectual aging	b1sintag	Personality in intellectual aging contexts scale	21–22	Lachman (1986), Lachman, Baltes, Nesselroade, and Willis (1982)
Generativity	b1sgener	Loyola generativity scale	80–81	McAdams and de St. Aubin (1992)
Problem-focused coping	b1sprcop	Problem-focused coping	64–69	Carver, Scheier, and Weintraub (1989)
Emotion-focused coping	b1semcop	Emotion-focused coping	64–69	
Optimism	b1sorien	Optimism overall	52–53	Scheier and Carver (1985)
Spirituality	b1sspiri	Spirituality	105–110	Garfield, Ryff, and Singer (2001)
Mindfulness	b1smndfu	Mindfulness	105–110	Langer and Moldoveanu (2000)

[a]Main documentation source for all scales included in MIDUS II. It represents a basic reference for the MIDUS-II datasets and provides essential information concerning scale construction and treatment of the scales. Each scale is described in terms of scale construction, coding, missing data treatment, psychometric characteristics (especially reliability), and source articles.

Consortium for Political and Social Research (ICPSR) Website (ICPSR Web Site, 2011).

MIDUS II represents a second phase of the longitudinal project labeled Midlife in the United States (MIDUS), a survey that was done in 1995–96. It recruited a national US sample of adults of both sexes ages 25 to 75 years. As a follow-up study, MIDUS II was conducted about 10 years later on the same respondents, with data collected from 2004 to 2006.

In this study, the data for 32 variables was analyzed by a number of statistic methods including the various multivariate analyses. All statistical analyses were conducted using the relevant packages in R program language (R Core Team, 2015) as well as the statistical package IBM SPSS Statistics for Macintosh, Version 23 (2015).

Variables, Measures and Design

The MIDUS II data was selected for the analyses in the present study for several reasons. First, the data was drawn from a large and highly representative sample contributing thus to the high degree of external validity and generalizability of the results. Yet the most important advantage of the MIDUS II data is a very wide range of included scales that clearly represent the most important noncognitive psychological variables. From the MIDUS II data, 32 variables were selected for our present research model on the basis of their relevance in relation to the research problem and their psychometric viability.

More detailed insight into the variables included in the research model and the scales measuring these variables is provided in Table 8.1. Table 8.1 displays the names of the variables, their codes used in MIDUS II documentation and in this study, the names of the respective scales, the respective pages in the main MIDUS II documentation reference (Ryff et al., 2007), and additional referential sources. All listed variables were included in the research model, which was designed as a correlational and multivariate study.

Results and Discussion

The results of the data analyses are divided into four parts. In the first part, the indices of the factorizability of the 32 variables correlation matrix are demonstrated with the special focus on the strength of the first extracted component or factor. The results of the exploratory factor analyses are shown next. In the third subsection, the results of the multiple factor

analysis (MFA) of 32 variables are provided. Finally, the fourth subsection includes the results that reveal the dimensional structure of the 32 variables at different levels of the generality and provide the confirmatory tests of these structural models.

The Strength of the First Extracted Dimension

The correlations between the 32 variables representing the noncognitive domain of personality extended from −.539 to .762. The vast majority of the correlations were significant and about a half of them were greater than ±.30. Thus, the correlation matrix is far from an identity pattern and the question is, how appropriate is it for further factoring procedures? The indices of factorizability indicated a high viability of factor analysis (Kaiser–Meyer–Olkin or KMO = .941; Bartlett Chi = 56,559.16 with df = 496 and $P = .000$). The saturation of the variables with the common factors was high, and partial correlations among them were small after removing the linear effects of other variables. Therefore, the factor or component analyses of the variables were highly recommended.

The tentative number of the extracted factors, suggested by different criteria displayed in Fig. 8.1, varies from only one (Parallel Analysis Test, Optimal Coordinates Test, Acceleration Factor Test) to three (Scree Test) and seven (Kaiser Criterion). It is obvious that the first component or factor explains a vast amount of the variance in 32 variables with an eigenvalue

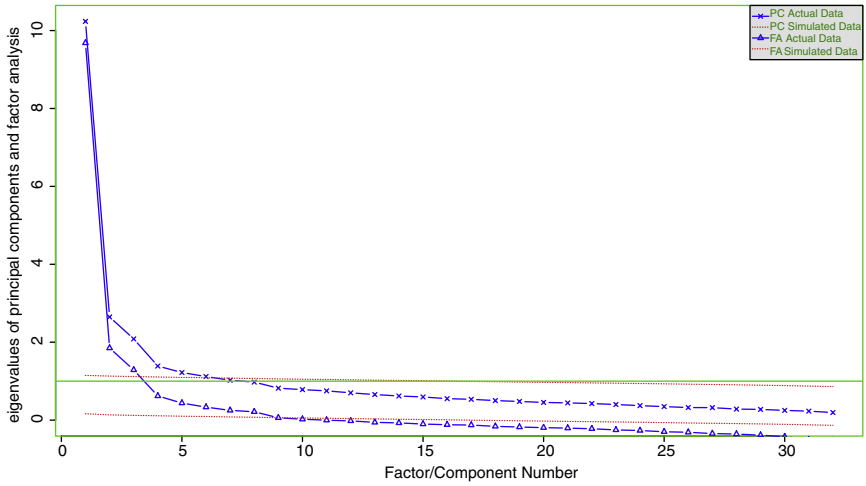

Figure 8.1 Suggested number of factors to be extracted from 32 variables according to different test criteria.

exceeding by far the eigenvalues of the following latent dimensions. The first dimension explains 32% of the total variance in the correlation matrix using the principal components (PC) algorithm and 30% of the variance using the minimal residual method (MINRES) algorithm. Special attention should be paid to the indices of reliability and saturation with the general factor. All indices were obtained by using omega function in the package *psych* (Revelle, 2015) of R program language (R Core Team, 2015). Cronbach alpha, Guttman's lambda 6 and McDonald's omega total coefficients, all measures of internal consistency, indicate a very high degree of internal reliability in the 32 variables model. Moreover, McDonald's omega hierarchical coefficient (*omega h*), which is probably the most efficient measure of the general factor saturation, is also fairly high (.64 for three primary factors solution and .73 for seven primary factors solution). In sum, the indices convincingly demonstrate the strength of the first latent dimension in the 32 variables model. The dimension could be interpreted as a very comprehensive general factor underlying the entire scope of the noncognitive domains of personality represented by 32 variables. It may be labeled as the CFP.

Exploratory Factor Analyses of 32 Variables

In the next step, exploratory and confirmatory component and factor analyses were performed on 32 variables. According to the preliminary consideration, one-factor, three-factor, and seven-factor solutions were selected for exploratory analyses. Several algorithms including component and factor multivariate analyses were used. All of them yielded very congruent latent dimensions. For example, the factor congruence coefficient for the latent dimensions in one-factor PC and MINRES solution yielded perfect congruence (1), while the congruent factors and components in three-factor solution ranged from .99 to .97. Thus, for the sake of space, I will focus on the results of MINRES factor analyses, which also include the information of fit indices and are therefore more comparable with the results of confirmatory analyses.

Table 8.2 provides the loadings or saturations of all 32 variables on the MINRES factors extracted from one-factor, three-factor, and seven-factor solutions. In addition, the eigenvalues and the percentages of the explained variance are also displayed in the table (last two rows). Practically all variables have loadings above .10 on the extracted factor in one-factor solution except tradition (b1smpqtr), harm-avoidance (b1mpqha), and interdependent self (b1sinter). Only six variables have saturations lower than .30. Thus, the existence of a very strong common denominator in the realm of variables representing the conative sphere of personality is corroborated again.

Table 8.2 Loadings of 32 variables on MINRES factors: 1-factor, 3-factor and 7-factor solution

	1-factor	3-factor solution			7-factor solution						
Variables	*MR1*	*MR1*	*MR2*	*MR3*	*MR1*	*MR2*	*MR3*	*MR4*	*MR5*	*MR6*	*MR7*
b1ssatis	.48	.51	−.10	.09	.35	−.16	.02	.08	−.01	.05	−.15
b1snegpa	−.55	−.72	.20	.06	−.12	.63	.00	−.05	.08	−.05	.12
b1spospa	.68	.55	.13	.14	.28	−.27	.22	.16	.03	.09	−.09
b1sestee	.82	.81	.09	−.06	.54	−.29	.18	−.01	−.04	.07	−.05
b1sneuro	−.55	−.68	.13	.06	.05	.83	.04	−.01	−.05	.02	−.05
b1sextra	.57	.11	.46	.41	.06	−.04	.44	.58	.04	−.04	.04
b1sagree	.34	−.04	.08	.72	−.08	.00	−.09	.67	.13	.21	.07
b1sopen	.53	.06	.71	.10	−.05	−.10	.40	.18	.04	.16	.46
b1scons2	.48	.32	.17	.14	.16	.01	.07	.02	−.08	.62	.05
b1spwba2	.58	.44	.35	−.13	.23	−.20	.36	−.10	−.01	.15	.06
b1spwbe2	.83	.87	−.01	−.01	.60	−.28	.10	.05	−.07	.09	−.11
b1spwbg2	.77	.55	.28	.13	.67	.04	.01	.07	.11	.02	.32
b1spwbr2	.72	.59	−.07	.43	.61	−.02	−.10	.42	.04	.02	−.06
b1spwbu2	.77	.68	.09	.11	.81	.10	−.02	.00	.06	.12	.05
b1spwbs2	.86	.83	.06	.05	.71	−.17	.15	.03	.04	.01	−.12
b1sagenc	.45	.07	.72	−.09	.09	.07	.76	−.01	−.01	.05	.04
b1sctrl	.78	.75	.14	−.09	.64	−.14	.10	−.05	−0.04	0.06	0.09
b1sinter	−.09	−.18	−.06	.26	−.11	.08	−.04	.21	.03	.05	−.09
b1sindep	.31	.07	.29	.14	−.06	−.10	.31	.06	.12	.16	−.04
b1smpqwb	.66	.33	.42	.16	.20	−.18	.35	.13	.17	.01	.13
b1smpqsc	.38	.16	−.01	.50	.16	−.04	−.01	.59	.04	−.11	−.06
b1smpqag	−.34	−.41	.31	−.28	−.12	.30	.39	−.18	−.09	−.15	−.09
b1smpqcn	.17	.05	−.01	.26	−.09	.04	−.05	−.02	.06	.65	−.10
b1smpqtr	−.01	−.03	−.27	.39	−.08	−.01	−.02	.02	.37	.14	−.44

b1mpqha	−.03	.03	−.33	.30	.03	.07	−.21	.16	.01	.22	−.27
b1sintag	.46	.41	.16	−.10	.32	−.13	−.04	−.11	.02	.08	.31
b1sgener	.48	.10	.42	.28	.21	.07	.20	.15	.21	.07	.22
b1sprcop	.60	.25	.41	.22	.16	−.06	.23	.00	.22	.33	.19
b1semcop	−.48	−.63	.07	.20	−.25	.43	.14	.18	.05	−.11	−.21
b1sorien	.72	.66	.09	.05	.45	−.29	.06	.00	.15	−.04	.10
b1sspiri	.18	−.07	.01	.51	.06	.03	−.03	−.04	.77	−.05	−.06
b1smndfu	.23	−.09	.11	.52	−.06	−.05	.02	.06	.65	.03	.04
Eigenvalue	10.27	10.27	2.59	2.09	10.27	2.59	2.09	1.40	1.23	1.11	1.02
% of variance[a]	30	24	9	8	16	8	7	6	5	5	4

[a]The percentage of the explained variance of the first unrotated factor was naturally diminished after rotations being utilized in 3-factor and 7-factor solutions.

While the only extracted dimension in one-factor solution can be freely interpreted as a general noncognitive factor of personality or CFP, other less integrative personality dimensions are expressed in the three-factor and seven-factor solutions. First, we shall concentrate on three factors. The first factor is an approximation of the general factor being extracted in one-factor solution ($r = .98$) and very substantially loads measures of environmental mastery, self-acceptance, self-esteem, perceived control, negative affect, purpose in life, neuroticism, optimism, and emotional coping. It is obviously closely associated with the variables in the well-being, emotionality, and control domains. The second factor is connected with agency, openness to experience, and extraversion and closely resembles the plasticity dimension (DeYoung, Peterson, & Higgins, 2001). The third factor most strongly saturates agreeableness, mindfulness, spirituality, and social potency, yet is also linked with relatedness to others and extraversion. It may be reasonably interpreted as a broad dimension of sociality. In the seven-factor solution, the first factor remained very general (correlation .96 with the first factor in one-factor solution) while the next dimensions could be interpreted consequently as emotional lability (high loadings of neuroticism and negative affect), plasticity (agency, extraversion, openness), social potential (agreeableness, extraversion, social potency), spirituality (spirituality, mindfulness), control (constraint control, conscientiousness), and open-mindedness (openness to experience versus traditionalism).

Multiple Factor Analysis for 32 Variables

According to the previous analyses, the existence of a very strong common dimension underlying the universe of 32 variables seems very probable. So far, the results confirmed the hypothesized CFP encompassing a very wide range of variables from the noncognitive domains of personality. Our next main hypothesis stated that the GFP in fact could be representative of the still more general factor, which clearly extends beyond the scope of the Big Five dimensions. First confirmation of this hypothesis could be obtained from the herein reported factor analyses of 32 variables. The correlation between the factor scores of the CFP and the factor scores of the GFP based on the Big Five dimensions is high, .80 for the PC solution and .70 for MINRES. Yet these important correlations are contaminated to some extent by the fact that the Big Five dimensions are included into the variables being in the model.

Thus, it is impossible to definitely delineate the scope of the GFP from the scope of the CFP by means of the normal factor analysis containing the

noncognitive variables where the Big Five dimensions are nested within. Yet, it is also unnecessary because the Big Five are included into the CFP by definition. Nevertheless, we can compare the GFP with "the rest" of the CFP. The first unrotated factor underlying the remaining 27 variables of our model (the Big Five excluded) correlates .721 with the GFP and .993 with the CFP. These findings can be further corroborated by the results of canonical correlation analysis performed between the Big Five set and the set of remaining 27 variables. The first canonical root (variate) of the Big Five set is practically identical with the GFP (corresponding $r = .943$), while the first variate of the 27 variables set is practically identical with the first unrotated factor of this set ($r = .926$). Canonical correlation between both first variates is .833, which means about 69.5% of shared variance across the first pair of variates. Thus it is clear that GFP is a very essential component of CFP. In fact, GFP represents CFP in the realm of the Big Five domain.

More detailed insight into the relationships between latent dimensions across different sets of variables could be obtained by the MFA approach, which allows inspection of the latent dimensions for the separate groups of variables (Husson, Josse, Le, & Mazet, 2011, 2015). The Big Five dimensions form one such group, named B5 with five variables (neuroticism, extraversion, agreeableness, conscientiousness, and openness). The remaining 27 variables could be sorted further into the following variable sets: well-being (WB, with eight variables: life satisfaction, autonomy, environmental mastery, personal growth, positive relations with others, purpose in life, self-acceptance, optimism), affect (AF, with two variables: negative affect, positive affect), self-concept (SELF, with five variables: self-esteem, agency, perceived control, interdependence, independence), personality dimensions from the Multidimensional Personality Questionnaire (MPQ, with six variables: well-being, social potency, aggression, constraint control, traditionalism, harm avoidance), generativity (GEN, with two variables: personality in intellectual aging, generativity), coping (COP, with two variables: problem focus coping, emotion focus coping) and spirituality (SPI, with two variables: spirituality, mindfulness).

MFA algorithm performs PC analysis on each group or set of variables, normalizes the datasets and merges them into a common matrix, which is then factorized again by PC analysis (Escofier & Pagès, 1990, 1994). In normal factor analysis the larger variable sets dominate in the resulting dimensional structure, while MFA equalizes the influence of different variable sets on factor solutions and makes it possible to simultaneously analyze and compare the dimensionality of all variable sets.

Table 8.3 MFA results: loadings, eigenvalues, percentages of explained variance, and inertia ratios in variable sets

Variable sets	Dim 1	Dim 2	Dim 3	Dim 4	Dim 5
B5	.845	.589	.637	.517	.418
WB	.903	.247	.261	.268	.188
AF	.743	.334	.351	.315	.066
SELF	.850	.426	.540	.205	.238
MPQ	.785	.568	.798	.625	.729
GEN	.686	.456	.313	.413	.241
COP	.773	.567	.364	.324	.289
SPI	.347	.683	.169	.266	.414
Eigenvalue	4.501	1.519	1.157	.814	.733
% of variance	28.250	9.536	7.260	5.109	4.601
Inertia ratio	.5754088	.2402596	.2011474	.1338871	.1283096

AF, affect variable set with two variables: negative affect, positive affect; *B5*, Big Five variable set including extraversion, agreeableness, conscientiousness, neuroticism, and openness; *COP*, coping set with two variables: problem focus coping, emotion focus coping; *GEN*, generativity set with two variables: personality in intellectual aging, generativity; *MPQ*, personality set with six MPQ variables: well-being, social potency, aggression, constraint control, traditionalism, harm avoidance; *SELF*, self-concept set with five variables: self-esteem, agency, perceived control, interdependence, independence; *SPI*, spirituality set with two variables: spirituality and mindfulness; *WB*, well-being set including life satisfaction, autonomy, environmental mastery, personal growth, positive relations with others, purpose in life, self-acceptance, optimism.

Although many dimensions can be extracted in MFA (five by default), our attention should be devoted to the first one, which corresponds to the tentative general dimension in the universe of 32 variables divided into several variable sets. Table 8.3 provides the values of component loadings, eigenvalues, percentages of the explained variance, and inertia ratios for five extracted latent dimensions or components (inertia ratios are roughly equiproportional to eigenvalues and to the percentage of explained variance). All clearly confirmed the strength of the first dimension. Moreover, the first global MFA component is strongly related to all first components in separate variable sets with exception of the spirituality set (see the second column in Table 8.3). The first component also strongly correlates with the first dimensions in previously extracted PC and MINRES analyses of 32 variables: r = .817 and r = .779, respectively.

The next rather interesting results of MFA are related to the correlations of the separate first component scores across all variable sets (Table 8.4). For our study, the most important is the first component of the B5 set or group, which is identical with the GFP. It has the following correlations with the correspondent first components of other variable sets: .651 with well-being set (WB), .509 with affectivity set (AF; provided reverse coding for negative affect), .619 with self-concept set (SELF), .498 with MPQ set, .518 with generativity set (GEN), .520 with coping set (COP; provided reverse

Table 8.4 Correlations of first components extracted for respective variable sets

	B5	WB	AF	SELF	MPQ	GEN	COP
WB	.651						
AF	.509	.671					
SELF	.619	.800	.587				
MPQ	.498	.461	.377	.294			
GEN	.518	.555	.353	.502	.243		
COP	.520	.640	.457	.587	.348	.489	
SPI	.318	.219	.104	.125	.378	.234	.181

coding of emotional focus coping), and .318 with spirituality set (SPI). Thus, on the basis of MFA results, it is possible to appraise more directly the relatedness of the GFP (the general component of B5 variable set) to the general components of other variable sets, and it may be concluded that the relationships between all these components are substantial.

The results of MFA are very useful to interpret the overall proximity of different noncognitive domains of personality being represented by eight variable sets. It is informative to see the locations of all sets, so-called group representations, in the two-dimensional space of both largest extracted MFA components (Fig. 8.2). All sets are positioned quite close together except SPI, which also has the lowest loadings with the first global MFA

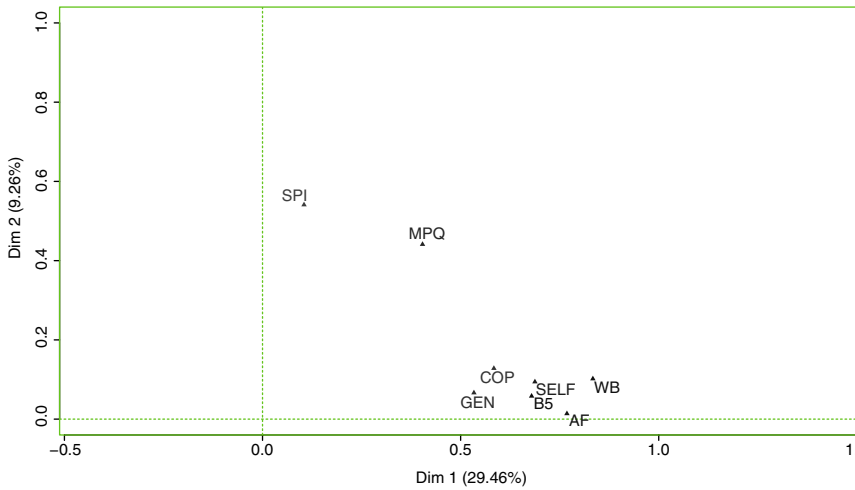

Figure 8.2 Representation of the eight sets of variables in the space of two largest MFA components. All sets are positioned quite close together except the spirituality set (SPI), which also has the lowest loadings with the first global MFA component (for explanation of the variable sets, see the text; see also Tables 8.4 and 8.5).

component and the lowest correlations with the first components respective to other variable sets (see Tables 8.3 and 8.4).

Comparison of the Structural Models for 32 Variables

The results of our exploratory factor analyses as well as the results of MFA strongly support the hypothesis that a general latent dimension underlies all noncognitive areas of personality represented by the 32 variables in our research model. This very general dimension is highly correlated with the GFP, although it explains even more variance of the noncognitive personality domain. Consequently, the hypothesis that GFP is a representative of still more general personality superdimension seems acceptable. According to the psychological content of this dimension, which pervades all personality areas in the model, this dimension really can be interpreted as the comprehensive (general) factor of personality (CFP). Besides the Big Five domain, CFP embraces the areas of other personality dimensions (e.g., MPQ dimensions), well-being, affect, self-esteem and self-concept, coping, generativity, and—to a lesser extent—spirituality.

In the dimensional structure of the noncognitive personality sphere, CFP occupies the apex, the top position in the structural hierarchy. Yet, the question is, how is it related to the other dimensions occupying lower levels of this hierarchy? In order to clarify this issue, different models of possible dimensional structuration were examined by confirmatory structural equation model (SEM) analyses. In these models, the number of primary factors has been varied from two to seven. The structural solutions with seven primary factors yielded best-fit indices and therefore only these models will be considered here. In summary, the following five structural models will be analyzed and compared:

1. g factor model (32 variables with one general factor)
2. uncorrelated primary factors model (32 variables with seven uncorrelated primary factors)
3. correlated primary factors model (32 variables with seven correlated primary factors)
4. hierarchical model (32 variables with seven primaries and g-factor in hierarchical order)
5. bifactor model (32 variables separately loaded on g-factor and seven primaries)

Table 8.5 provides fit indices for all five tested unmodified models. Although less parsimonious, the bifactor model is significantly better than

Table 8.5 Fit indices for different confirmatory models

Model	Variables	Chi square (df)	*P*	SRMR	RMSEA	BIC	TLI (NNFI)
g	32	18,196 (464)	.000	.085	.101	14,381	.663
Uncorrelated primaries	32	24,405 (464)	.000	.256	.118	20,590	.545
Correlated primaries	32	12,892 (444)	.000	.083	.087	9241.6	.753
Hierarchical	32	14,285 (457)	.000	.083	.090	10,527	.733
Bifactor	32	11,029 (432)	.000	.068	.081	7477.2	.784
omegaSem	32	2785.89 (293)	.000	.003	.048	376.76	.896

other models (including the second-best model, the hierarchical model: comparative chi square between both models is 3255.6, $P < .001$). According to the *omegaSem* algorithm (Revelle, 2015), the bifactor model obtained even better characteristics (RMSEA = .048; rmsr = .01; TLI = .89; BIC = 376.76).

Nevertheless, the primary factors correlate substantially and it can be reasonably assumed that the real relationships between the variable levels in the model (general factor, seven primary factors and 32 source variables) are somehow in the middle between bifactor (Fig. 8.3 above) and hierarchical solution (Fig. 8.3 below). We can conclude therefore that the confirmatory analyses confirmed the importance of both general factor and primary factors in the noncognitive structure of personality.

The psychological meaning of seven primary factors is pretty clear and resembles the content of the factors from exploratory analyses mentioned before. The first factor (F1) saturates self-acceptance, environmental mastery, self-esteem, control, purpose in life, personal growth, optimism, and satisfaction with life. It is obviously a wide factor of well-being including self-esteem and control. The second factor (F2) could be interpreted as a wide factor of autonomous and agentic personality, for it correlates with the personal well-being, autonomy, agency, independent self, and (negatively) with aggression. The third factor (F3) can be interpreted as a sociality dimension loading positive relations, extraversion, social potency, agreeableness and interdependent self (in bifactor, not in the hierarchical solution). The fourth factor (F4) is obviously a higher-order dimension of spirituality saturating mindfulness and spirituality. The fifth factor (F5) could be labeled as a broad control dimensions loading problem focused on coping, conscientiousness, and constraint control. The sixth factor (F6) is a broad emotionality dimension connected with negative affect, neuroticism, emotion focused coping, and low positive affect. The last, the seventh dimension (F7), could be interpreted as an open-mindedness factor represented by generativity, openness, personality in intellectual aging context, low traditionalism, and low harm avoidance.

General Discussion and Conclusions

The results of the study confirmed the existence of a strong common dimension in the noncognitive domain of personality represented by 32 variables including the Big Five and MPQ dimensions, dimensions of well-being, self-esteem, self-construal, control, coping, generativity, and spirituality. The first unrotated factor accounted for about 30% of the total variance of 32 variables, and different statistical indices including the McDonald's omega

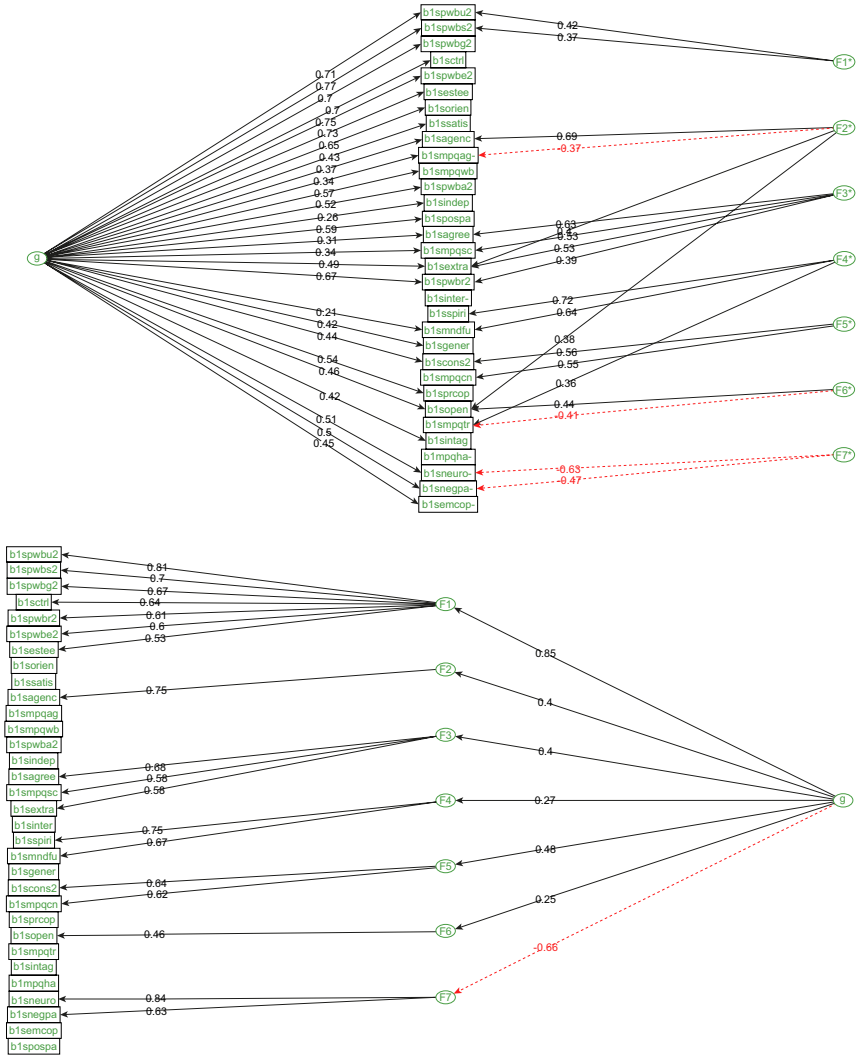

Figure 8.3 Bifactor solution (above) and classical hierarchical solution (below) for the dimensional structure of noncognitive domain of personality. The solutions were obtained by means of *omega* algorithm in the R package *psych*. Both solutions comprise dimensions on three levels of generality: general factor, seven primary factors, and 32 source variables. The paths from the primary factors to the variables with the loadings lower than .35 (bifactor solution) or .45 (hierarchical solution) are omitted.

hierarchical coefficient confirmed its strength and generality. According to further analyses, this factor could be very reasonably interpreted as a CFP subsuming the general dimensions in a variety of personality domains that include the GFP as well. As the psychological content of the CFP is concerned, it is undoubtedly associated with the personally favored and socially approved behavior in almost all domains included into the research model. High versus low scoring in CPF can be described as high versus low scoring in GFP, generativity, control, independent self-construal, life satisfaction and well-being, high versus low positive affect and problem focused coping, and, vice versa, low versus high negative affect, and emotion focused coping.

According to its extremely wide scope of the connections to the most important noncognitive psychological variables, CFP can be interpreted as the broadest dimension of the personality adjustment ever discovered. CFP is a common denominator of all major noncognitive aspects of personality, and it seems very plausible to believe that it has strong evolutionary roots. Indeed, it is hard to believe that the personally and socially adapted behavioral characteristics underlying the CFP were not shaped under the pressure of the evolutionary forces, very much alike as in the case of GFP. CFP unifies the socially desired behavior throughout the conative sphere of personality and represents one of the strongest single predictors of such important psychological phenomena as well-being, coping with the stress, self-esteem, and consequently also our mental health and mental quality of life. Similarly to GFP, and maybe even more, CFP predicts almost all prominent outcomes in our lives including our successfulness in academic and job career, family life, and interpersonal relations.

Beyond doubt, a thorough dimensional analysis of the noncognitive domains of personality should refer to the levels of the generality below the CFP. Moreover, some of the subsequent levels of the entire noncognitive field of personality are crucially important for the proper understanding of our personality and our psychological functioning, especially if we wish to consider the full variety of different psychological contents of resulting variables. Yet, we must keep in the mind that they have much in common and that very important outcomes in our lives are predictable from the most general factors such as CFP.

SUPER-DOMINANT GENERAL FACTOR IN PERSONALITY AND BEYOND: A STUDY ON 63 VARIABLES

The existence of the general factor has been demonstrated in different psychological domains. The most known example is certainly g-factor, the general factor of intelligence (Spearman, 1904, 1923, 1927). It is quite

obvious, however, that the general factors appear on other psychological domains too. For example, general factors have been identified in the domains of well-being (Musek, 2008, 2010a; Wissing, Wissing, du Toit, & Temane, 2006), self-concept including self-esteem (Marsh & Hocevar, 1985), and psychopathology (Caspi et al., 2014; Lahey et al., 2012). According to recent psychological research, the debate over the GFP has become very real (Musek, 2007). There is vast research evidence concerning the psychological nature of GFP (Anusic, Schimmack, Pinkus, & Lockwood, 2009; Ashton et al., 2009; Bäckström, Björklund, & Larsson, 2009; Davies, Connelly, Ones, & Birkland, 2015; Ferguson et al., 2011; Irwing, 2013; Just, 2011; Loehlin, 2011a, 2011b; Loehlin & Martin, 2011; Musek, 2010a, 2011; Revelle & Wilt, 2013; Rushton et al., 2009, 2008; Rushton & Irwing, 2008, 2009a, 2009b, 2011; Van der Linden, Nijenhuis, et al., 2010; Van der Linden, Scholte, et al., 2010; Van der Linden, Te Nijenhuis, Cremers, & Van de Ven, 2011; Zhu & Yan, 2015), the connections of the GFP with other important psychological variables (Erdle et al., 2010; Erdle & Rushton, 2010; Hirschi, 2008; Musek, 2007, 2010a, 2010b, 2010c; Rushton et al., 2009, 2008; Rushton & Irwing, 2008, 2009a, 2009b; Van der Linden, Nijenhuis, et al., 2010; Van der Linden, Scholte, et al., 2010; Van der Linden et al., 2011; Vecchione et al., 2011; Veselka et al., 2009), and the biological bases of GFP including genetic (Figueredo, Vásquez, Brumbach, & Schneider, 2004; Loehlin, 2011a, 2011b; Loehlin & Martin, 2011; Rushton et al., 2008), evolutionary (Figueredo & Rushton, 2009; Figueredo, Woodley of Menie, & Jake Jacobs, 2016; Musek, 2007; Rushton et al., 2008; Veselka et al., 2009), and neurophysiological aspects (DeYoung & Gray, 2009; Musek, 2007).

Dominant General Factors in Psychology

Even more recently, Ree, Carretta, and Teachout (2015) introduced the concept of dominant general factor (DGF) that pervades the variables in many psychological domains including personality (where the GFP represents DGF), cognitive abilities, emotional intelligence, beliefs and attitudes, psychomotor ability, job performance, entrepreneurship, organizational citizenship, leadership, and others.

The question is, however, whether these different DGFs represent mutually independent dimensions or dimensions that are correlated and therefore share the common variance. It is probable that at least some of the DGFs are interrelated, especially in the noncognitive domains of psychological variables. It may be assumed that a very general dominant general factor (can be labeled as Super-g) is underlying a number of noncognitive

DGFs. In the research of the GFP, many connections with other psychological domains have been reported. Musek (2007, 2010a) suggested that GFP is associated with the broader domains of emotionality, motivation and coping, self-esteem, and well-being. In the study, mentioned in the previous section, the comprehensive dominant general factor (CFP) has been clearly released from the analyses of 32 prominent psychological variables.

Thus, it is plausible to hypothesize that the DGFs in some important psychological domains substantially correlate with the GFP. It is quite possible that the common variance of different DGFs can be explained by one or two higher-order factors. It seems probable that the first higher-order dimension will highly correlate with the GFP. In this case, the GFP should be interpreted as a representative of the Super-g that explains the variance extended beyond the mere personality domain. It seems, however, that cognitive abilities are subsumed under a special DGF, the well-known Spearman g-factor, which is almost unrelated to the DGFs in the noncognitive domains of personality and other psychological variables. For example, the correlations between the cognitive abilities and personality traits amount to only between −.12 and .14 (Musek, 2012a).

There are many ways to test the aforementioned hypotheses. The most valid solution should be the proper multivariate analysis of the relevant variable domains. Which domains of psychological variables should be included in the analysis? In the first step, the analysis must comprise the most important psychological variables outside the domain of cognitive abilities. Again, we have the possibility to conduct the multivariate analyses on the US representative adult sample MIDUS II (Ryff et al., 2007), where the data were assembled from a wide number of psychologically important variables. The variables used in MIDUS II include personality, emotionality (affect), well-being, self-esteem, coping, religious (spiritual) attitudes, generativity, spirituality, empathy, adjustment to home, family and job, and others. In comparison to the previously reported study on 32 variables, new analyses will comprise practically all domains included in the MIDUS II scales, for a total of 63 variables.

Method

Data, Participants and Procedure

The data being analyzed in this study was collected from the MIDUS II survey, conducted in 2004–06 (Ryff et al., 2007; Ryff & Davidson, 2011).

The survey was performed on a large US national representative sample and the analyzed data were obtained from 4963 participants from both sexes (2316 males and 2647 females), ages 28 to 84 years (M = 55.43 years, SD = 12.45). The MIDUS II data is available for free research purposes and can be publicly accessed via the ICPSR Website (ICPSR Web Site, 2011). MIDUS II represents a second phase of the longitudinal MIDUS project, which was accomplished in 1995–96. It recruited a national US sample of adults of both sexes ages 25 and 75 years. As a follow-up study, MIDUS II was conducted about 10 years later on the same respondents, with data collected from 2004 to 2006.

In this study, the data for 63 variables was analyzed by a number of statistical methods including the various multivariate analyses. All statistical analyses were conducted using the relevant packages in R program language (R Core Team, 2015) as well as the statistical package IBM SPSS 23 (IBM SPSS Statistics for Macintosh, Version 23, 2015).

Variables, Measures and Design

The MIDUS II data was selected for the analyses in the present study for several reasons. First, the data was drawn from a large and highly representative sample contributing thus to the high degree of external validity and generalizability of the results. Yet the most important advantage of the MIDUS II data is a very wide range of included scales that clearly represent most important noncognitive psychological variables. From the MIDUS II data, 63 variables were selected into our present research model on the basis of their relevance in relation to the research problem and their psychometric viability. The selection was based on the theoretical and methodological grounds focused on the variables that are generally accepted as representative for the important psychological domains including personality, well-being, optimism, affect, self-esteem, self-construal, coping, generativity, control, spirituality, empathy, adjustment to work, adjustment to family, and adjustment to home.

More detailed insight into the variables included in the research model and the scales measuring these variables is provided in Table 8.6, which displays the names of the variables, their codes used in MIDUS II documentation and in this study, the names of the respective scales, the respective pages in the main MIDUS II documentation reference (Ryff et al., 2007), and additional reference sources. All listed variables were included in the research model, which was designed as a correlational and multivariate study.

Table 8.6 Variables, variable codes, the scales, the pages in the documentation reference (Ryff et al., 2007), and respective source references

Variable	Code	Name of the scale in MIDUS II	Pages in Ryff et al. (2007)[a]	Source references
Life satisfaction	b1ssatis	Life satisfaction scale	10–11	Prenda and Lachman (2001)
Negative affect	b1snegpa	PANAS negative adjectives	16–20	Mroczek and Kolarz (1998)
Positive affect	b1spospa	PANAS positive adjectives	16–20	
Self-esteem	b1sestee	Self-esteem	37–38	Rosenberg (1965)
Neuroticism	b1sneuro	Neuroticism	41–45	Rossi (2001)
Extraversion	b1sextra	Extraversion	41–45	
Agreeableness	b1sagree	Agreeableness	41–45	
Openness to experience	b1sopen	Openness to experience	41–45	
Conscientiousness	b1scons2	Conscientiousness	41–45	
Autonomy	b1spwba2	Autonomy	28–32	Ryff (1989), Ryff and Keyes (1995)
Environmental mastery	b1spwbe2	Environmental mastery	28–32	
Personal growth	b1spwbg2	Personal growth	28–32	
Positive relations with others	b1spwbr2	Positive relations with others	28–32	
Purpose in life	b1spwbu2	Purpose in life	28–32	
Self-acceptance	b1spwbs2	Self-acceptance	28–32	
Agency	b1sagenc	Agency	41–45	Rossi (2001)
Perceived control	b1sctrl	Perceived control	33–36	Lachman and Weaver (1997)
Interdependence	b1sinter	Interdependence	39–40	Singelis (1994)
Independence	b1sindep	Independence	39–40	

Well-being	b1smpqwb	Well-being MPQ	46–51	Tellegen (1985)
Social potency	b1smpqsc	Social potency MPQ	46–51	
Aggression	b1smpqag	Aggression MPQ	46–51	
Constraint control	b1smpqcn	Control MPQ	46–51	
Traditionalism	b1smpqtr	Traditionalism MPQ	46–51	
Harm avoidance	b1smpqha	Harm avoidance MPQ	46–51	
Personality in intellectual aging	b1sintag	Personality in intellectual aging contexts scale	21–22	Lachman (1986), Lachman et al. (1982)
Generativity	b1sgener	Loyola generativity scale	80–81	McAdams and de St. Aubin (1992)
Problem-focused coping	b1sprcop	Problem-focused coping	64–69	Carver et al. (1989)
Emotion-focused coping	b1semcop	Emotion-focused coping	64–69	
Optimism	b1sorien	Optimism overall	52–53	Scheier and Carver (1985)
Spirituality	b1sspiri	Spirituality	105–110	Garfield et al. (2001)
Mindfulness	b1smndfu	Mindfulness	105–110	Langer and Moldoveanu (2000)
Work to family spillover positive	b1sposwf	Work to family spillover positive	69–71	Grzywacz (2000)
Work to family spillover negative	b1snegwf	Work to family spillover negative	69–71	
Family to work spillover positive	b1sposfw	Family to work spillover positive	69–71	
Work to family spillover negative	b1snegfw	Work to family spillover negative	69–71	

Continued

Table 8.6 Variables, variable codes, the scales, the pages in the documentation reference (Ryff et al., 2007), and respective source references—cont'd

Variable	Code	Name of the scale in MIDUS II	Pages in Ryff et al. (2007)[a]	Source references
Skill discretion	b1sjcds	Skill discretion	72–74	Bosma and Marmot (1997), Karasek and Theorell (1990)
Decision authority	b1sjcda	Decision authority	72–74	
Coworker support	b1sjccs	Coworker support	72–74	
Supervisor support	b1sjcss	Supervisor support	72–74	
Chronic job discrimination	b1sjobdi	Chronic job discrimination	76	Ryff et al. (2007)
Perceived inequality in work	b1spiwor	Perceived inequality in work	78–79	Ryff et al. (2007)
Perceived neighborhood quality/health	b1shomet	Perceived neighborhood quality/health	87	Keyes (1998)
Perceived inequality in home	b1spihom	Perceived inequality in home	88–89	Ryff, Magee, Kling, and Wing (1999)
Family support	b1skinpo	Family support	90–91	Whalen and Lachman (2000)
Family strain	b1skinne	Family strain	90–91	
Family affectual solidarity	b1sfamso	Family affectual solidarity	90–91	
Providing family support	b1spkins	Providing family support	93	Ryff et al. (2007)
Friend support	b1sfdspo	Friend support	94–95	Whalen and Lachman (2000)
Friend strain	b1sfdsne	Friend strain	94–95	
Perceived inequality in family	b1spifam	Perceived inequality in family	96–97	Ryff et al. (1999)
Marital risk scale	b1smarrs	Marital risk scale	98–99	Ryff et al. (2007)
Spouse/partner disagreement	b1sspdis	Spouse/partner disagreement	100–101	Grzywacz and Marks (2000)

Marital empathy scale	b1sspemp	Marital empathy scale	101–104	Whalen and Lachman (2000)
Spouse/partner strain	b1sspcri	Spouse/partner strain	101–104	
Spouse/partner affectual solidarity	b1sspsol	Spouse/partner affectual solidarity	101–104	
Spouse/partner decision-making	b1sspdec	Spouse/partner decision-making	101–104	Ryff et al. (2007)
Social coherence	b1sswbms	Social coherence	82–84	Keyes (1998)
Social integration	b1sswbsi	Social integration	82–84	
Social acceptance	b1sswbao	Social acceptance	82–84	
Social contribution	b1sswbsc	Social contribution	82–84	
Social actualization	b1sswbsa	Social actualization	82–84	
Sympathy	b1ssymp	Sympathy scale	85–86	Uchida and Kitayama (2001)

[a]Main documentation source for all scales included in MIDUS II. It represents a basic reference for the MIDUS-II datasets and provides essential information concerning scale construction and treatment of the scales. Each scale is described in terms of scale construction, coding, missing data treatment, psychometric characteristics (especially reliability), and source articles.

Results and Discussion

Several major data analyses were performed in order to test the hypothesized relationships between the variables included in the research model. They comprised the direct factor analysis of all 63 variables with subsequent Schmid–Leiman transformation, the ordinary and multiple factor analysis of all variables grouped into 14 psychological domains and the SEM analyses. The majority of the analyses were conducted using the R program language packages *psych* (Revelle, 2015), *FactoMineR* (Husson et al., 2015), *lavaan* (Rosseel, 2012), and the corresponding algorithms in IBM SPSS 23 (IBM SPSS Statistics for Macintosh, Version 23.0, 2015), if available.

Although several multivariate analyses of 63 variables were performed, including factor analyses (with principal axes, PA; maximum likelihood, ML; and MINRES algorithms) and component analysis (PC), we will report the results of the Schmid–Leiman transformation procedure (Schmid & Leiman, 1957), which is especially focused on the analysis of the strength and other characteristics of the tentative general or second-order latent dimension and their relations to the primary or group factors. Schmid–Leiman transformation was calculated by the omega algorithm using the R package *psych* (Revelle, 2015).

In the Schmid–Leiman procedure, the factor analysis using the ML algorithm was performed. The first extracted factor with the eigenvalue 14.36 explains 22% of the shared variance, much more than the next factor (see Fig. 8.4). According to the parallel test as the criterion for the number of the factors to be extracted, the Schmid–Leiman solution for g-factor and 10 primary factors was applied. After the finalization of the Schmid–Leiman procedure, the second-order factor (g) and 10 primary factors accounted together for 77% of the common variance in the matrix of the variables (g accounting for 31% and primary factors for 46%). Tables 8.7 and 8.8 present the Schmid–Leiman solution for all 63 variables entered into the research model, the first table for the three primary factors (default number of primary factors) and the second table for the 10 primary factors (number of factors suggested by extraction number criteria).

The majority of the variables have moderate to high loadings on the second-order factor (g), despite the fact that the measured variables considerably differ in the psychological content and in the assessment methods. The variables that obviously do not represent the general factor include the

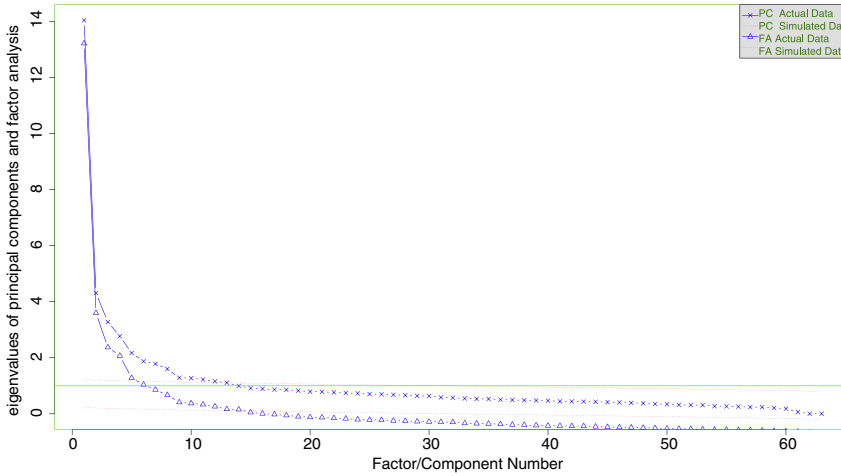

Figure 8.4 Suggested number of factors to be extracted from 63 variables according to different test criteria.

social cohesion (b1sswbsc), harm avoidance (b1smpqha), interdependence (b1sinter), sympathy (b1ssymp), and traditionalism (b1smpqtr). The Schmid–Leiman solution also yielded valuable measures of the strength of the shared variance between the variables. The amounts of the Cronbach alpha coefficient, the Guttman's G.6 (or λ 6) coefficient, and the McDonald's omega total are .93, .96, and .96, respectively. More important, the McDonald's omega hierarchical coefficient (Omega h), which is probably the best estimate of the strength of the general factor (Zinbarg, Revelle, Yovel, & Li, 2005), has a quite substantial value of .52. Omega h simply indicates the extent to which all of the variables in a variable set measure the same latent variable; it gives the proportion of the total variance accounted for by a general factor.

Thus, in every respect, the obtained second-order factor can be interpreted as a dominant first factor (DGF) in the realm of the variables in the research model. Obviously, it extends over the domain-specific DGFs of well-being, affect, coping, self-concept, Big Five, and others. It probably represents the DGF of domain-specific DGFs, a superdimension that embraces practically all major psychological variables outside the space of cognitive abilities. With every reason, this superdimension can be called Super-g and can be set aside the g-factor of intelligence, the DGF in the area of cognitive abilities. In that case, we can speak of two highest-order DGFs in psychology, the Spearman's g-factor in the field of cognitive

Table 8.7 Schmid–Leiman factor loadings on three primary factors

	g	F1	F2	F3	h2	u2	p2
b1sfamso	.66	−.08	−.02	.74	1.00	.00	.44
b1spwbe2	.64	.54	.06	.03	.70	.30	.58
b1spwbs2	.63	.60	.03	−.01	.76	.24	.53
b1sestee	.58	.56	.00	−.01	.65	.35	.52
b1spwbr2	.57	.45	.03	.07	.54	.46	.61
b1sctrl	.57	.52	.06	−.01	.61	.39	.54
b1skinpo	.56	.01	−.06	.58	.65	.35	.48
b1sspsol	.56	−.03	.83	−.01	1.00	.00	.31
b1spwbu2	.55	.55	.00	−.02	.61	.39	.50
b1skinne-	.52	−.13	.02	.62	.67	.33	.40
b1ssatis	.51	.31	.19	.05	.40	.60	.66
b1sspemp	.51	−.01	.73	.00	.80	.20	.33
b1sorien	.50	.49	.00	.00	.50	.50	.52
b1spwbg2	.49	.59	−.05	−.09	.60	.40	.40
b1sspcri-	.49	−.04	.76	−.01	.83	.17	.29
b1spospa	.47	.45	.02	.00	.42	.58	.53
b1smarrs-	.46	.06	.60	−.03	.58	.42	.37
b1snegpa-	.45	.33	.05	.07	.32	.68	.64
b1spiwor-	.45	.40	.00	.03	.36	.64	.56
b1sneuro-	.42	.36	.00	.04	.31	.69	.57
b1smpqwb	.42	.50	−.04	−.07	.43	.57	.41
b1spkins	.42	.07	−.05	.38	.33	.67	.54
b1spwba2	.40	.43	−.04	−.03	.35	.65	.45
b1sprcop	.40	.46	−.06	−.04	.38	.62	.42
b1snegfw-	.39	.20	.15	.08	.22	.78	.70
b1sspdis-	.39	.07	.48	−.03	.39	.61	.39
b1sspdec	.39	.05	.54	−.05	.45	.55	.34
b1spifam-	.37	.22	.06	.09	.20	.80	.69
b1sjobdi-	.36	.19	.07	.11	.18	.82	.71
b1semcop-	.35	.33	−.02	.02	.23	.77	.53
b1spihom-	.35	.22	.06	.07	.18	.82	.68
b1sfdspo	.35	.24	−.01	.11	.19	.81	.64
b1sextra	.34	.42	−.07	−.04	.30	.70	.39
b1snegwf-	.34	.23	.05	.07	.17	.83	.67
b1smpqag-	.32	.23	.00	.08	.16	.84	.64
b1sposfw	.32	.17	.28	−.06	.21	.79	.47
b1sopen	.31	.42	−.07	−.08	.28	.72	.34
b1shomet	.31	.16	.09	.08	.14	.86	.71
b1scons2	.30	.34	−.03	−.03	.21	.79	.44
b1sgener	.29	.39	−.09	−.05	.25	.75	.34
b1smpqsc	.28	.29	−.02	.00	.16	.84	.49
b1sfdsne-	.28	.00	.07	.23	.14	.86	.59
b1sagree	.26	.26	−.05	.02	.14	.86	.49

Table 8.7 Schmid–Leiman factor loadings on three primary factors—cont'd

	g	F1	F2	F3	h2	u2	p2
b1sintag	.26	.36	−.10	−.05	.21	.79	.32
b1sagenc	.24	.36	−.02	−.11	.20	.80	.30
b1sindep	.24	.27	−.04	−.01	.13	.87	.44
b1sjcds-	.22	.07	.09	.08	.07	.93	.71
b1sjccs	.22	.17	−.06	.09	.09	.91	.56
b1sjcss	.20	.13	−.02	.07	.06	.94	.63
b1sjcda	.19	.24	−.02	−.04	.10	.90	.39
b1sswbms-	.19	.20	−.01	−.02	.08	.92	.46
b1sposwf	.15	.24	−.04	−.07	.09	.91	.26
b1smndfu	.14	.16	−.07	.02	.05	.95	.37
b1smpqcn	.13	.11	−.04	.05	.03	.97	.54
b1sspiri	.13	.15	−.03	.00	.04	.96	.42
b1sswbsi-	.13	.11	.01	.01	.03	.97	.59
b1sswbsa-	.13	.11	.07	−.04	.04	.96	.47
b1sswbao-	.10	.08	−.01	.01	.02	.98	.56
b1ssymp	.05	.04	−.03	.03	.01	.99	.47
b1sinter-	.04	.09	−.04	−.02	.01	.99	.18
b1smpqtr	.03	−.01	−.01	.05	.00	1.00	.32
b1sswbsc	.01	−.06	.05	.03	.01	.99	.01
b1mpqha	.00	−.02	.01	.01	.00	1.00	.00

F1, F2, and F3 represent first-order or primary factors; *g*, second-order factor, presumably general factor; *h2*, communality; *p2*, percent of general factor variance in the common variance of a variable; *u2*, uniqueness.
A diagnostic tool for testing the appropriateness of a hierarchical model is p2 represents a diagnostics indicating the percent of the common variance for each variable, which is explained by general factor. The variables with the appended minus sign (−) were reversely coded during the Schmid–Leiman procedure.

abilities and Super-g in the field of personality in a wider sense, including self-concept, emotionality, motivation, and well-being.

According to the topic of this study, the attention is devoted to the second-order factor, representing a super-DGF, yet some information concerning the primary factors is certainly also of interest. The primary factors are clearly connected to the major psychological domains covering the variables in the model. Consecutively, the first-order factors deal with the general well-being, self-esteem, control, affect, coping and optimism (first primary factor), marital empathy, decision-making and affective solidarity (second factor), agency, extraversion, openness and personal well-being (third factor), agreeableness, mindfulness, spirituality, social potency and positive relations with others (fourth factor), negative work to family spillover and skill discretion (fifth factor), family support, providing family

Table 8.8 Schmid–Leiman factor loadings of 63 variables on g and 10 primary factors

Variables	g	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	h2	u2	p2
b1sspsol	.82	.00	.35	−.01	−.01	.00	.01	−.01	−.03	−.04	−.38	1.00	.00	.67
b1sspcri-	.75	−.01	−.02	.00	.01	.00	.01	−.01	−.01	−.03	−.64	.99	.01	.57
b1smarrs-	.74	.00	.13	−.03	.01	−.02	.00	−.01	.00	−.57	−.03	.92	.08	.60
b1sspemp	.72	.01	.68	−.01	−.03	−.01	.01	.00	−.03	−.04	−.02	.99	.01	.53
b1sspdis-	.65	−.03	−.04	.03	−.02	.00	.01	−.01	.00	−.68	.00	.88	.12	.48
b1sspdec	.56	.04	.46	−.04	.06	.09	−.01	.02	.01	−.10	−.02	.56	.44	.56
b1spwbe2	.54	.60	.05	.10	.00	−.17	.08	.05	−.03	−.01	−.05	.76	.24	.39
b1ssatis	.53	.17	.10	.04	.04	−.17	.09	.29	.01	−.12	−.03	.49	.51	.57
b1spwbs2	.53	.61	.07	.11	.05	−.05	.07	.08	.00	−.02	−.02	.77	.23	.36
b1spwbr2	.48	.40	.09	.00	.42	−.09	.13	.02	−.02	.00	−.02	.67	.33	.34
b1sctrl	.48	.57	.05	.12	−.06	.01	.06	.08	.00	.02	−.07	.64	.36	.36
b1sfamso	.47	.00	.02	.00	−.01	.00	.53	.00	−.57	−.01	−.01	1.00	.00	.22
b1sestee	.46	.63	.05	.14	−.05	−.08	.04	.02	−.03	.00	−.01	.71	.29	.30
b1spwbu2	.45	.56	.06	.02	.14	.10	.04	.10	.00	−.05	.02	.64	.36	.32
b1sorien	.42	.50	.04	.03	.09	.04	.00	.12	−.05	−.03	.00	.51	.49	.34
b1snegfw-	.42	.17	−.03	.06	.04	−.37	−.02	.07	−.11	−.10	−.10	.41	.59	.43
b1snegpa-	.40	.47	−.01	−.03	−.03	−.26	.05	.00	−.05	−.01	−.07	.46	.54	.35
b1spospa	.40	.30	.02	.24	.15	−.11	.04	.10	−.02	−.02	−.04	.45	.55	.35
b1spiwor-	.39	.27	−.02	−.02	−.07	.03	.02	.48	−.03	−.06	−.01	.53	.47	.29
b1skinne-	.39	−.01	.01	.01	.00	.00	−.05	.01	−.93	−.01	−.01	.99	.01	.15
b1spwbg2	.38	.54	.01	.14	.15	.17	−.01	.08	.02	−.02	−.01	.64	.36	.23
b1sposfw	.38	−.02	.15	.11	.10	.26	.03	.21	.04	−.01	−.14	.34	.66	.42
b1skinpo	.37	.01	.01	−.01	−.02	.00	.93	.00	.02	.00	.00	.99	.01	.14
b1sneuro-	.35	.55	−.03	−.09	−.01	−.18	−.02	−.03	−.08	−.05	−.01	.45	.55	.27
b1sjobdi-	.35	.06	.01	−.09	−.02	−.21	.01	.47	−.09	−.04	−.03	.43	.57	.29
b1snegwf-	.34	.18	−.04	.02	.03	−.55	.00	.17	−.04	−.07	−.04	.52	.48	.22

b1smpqwb	.32	.25	.00	.40	.15	.08	−.05	.13	−.06	.00	−.03	.52	.48	.20
b1spifam-	.32	.20	.05	.03	−.06	.03	.12	.15	−.05	−.06	.00	.21	.79	.49
b1spihom-	.31	.16	.07	.00	−.07	.07	.09	.26	−.04	−.05	.01	.23	.77	.43
b1spwba2	.29	.44	.00	.34	−.12	.00	.03	−.08	−.03	−.03	.01	.47	.53	.18
b1sprcop	.29	.31	.00	.23	.16	.28	.03	.12	−.02	−.03	.01	.49	.51	.17
b1shomet	.29	.06	.10	.06	−.02	.04	.10	.23	−.04	.00	−.01	.18	.82	.47
b1spkins	.29	.01	−.04	.00	.11	.01	.66	.03	.06	−.03	−.03	.54	.46	.15
b1smpqag-	.28	.38	−.02	−.35	.29	.02	.02	.03	−.06	−.04	−.03	.36	.64	.22
b1semcop-	.28	.59	−.04	−.15	−.14	.08	−.03	−.02	−.07	−.04	−.01	.41	.59	.19
b1sfdspo	.27	.04	.09	.08	.30	−.01	.19	.17	.00	.03	.01	.33	.67	.23
b1sfdsne-	.27	.07	−.07	−.09	.04	−.04	−.10	.07	−.40	−.05	−.09	.28	.72	.27
b1sextra	.25	.01	.01	.60	.38	−.16	.02	.01	−.02	.00	.00	.65	.35	.10
b1scons2	.25	.30	−.08	.09	.14	.13	.02	.00	.01	−.11	−.02	.26	.74	.25
b1sjcds-	.25	.01	.00	−.03	−.01	−.49	.00	.19	−.04	−.08	−.01	.37	.63	.18
b1sopen	.22	.13	−.02	.54	.11	.19	.00	.03	−.03	−.05	.01	.52	.48	.09
b1smpqsc	.22	.08	.06	.14	.46	−.17	.06	.02	.04	.06	−.02	.37	.63	.13
b1sagree	.21	−.04	.00	.10	.68	−.02	.04	.04	−.02	−.03	.00	.55	.45	.08
b1sgener	.20	.11	−.01	.29	.22	.22	.03	.19	.00	−.03	.02	.40	.60	.10
b1sagenc	.18	.06	.00	.74	−.15	.02	.02	−.01	.03	−.01	−.02	.60	.40	.05
b1sindep	.18	.12	−.01	.29	.11	.00	.01	.00	−.04	−.05	.01	.18	.82	.19
b1sjcss	.18	−.12	.03	−.04	.04	−.21	.03	.55	−.02	.00	.04	.38	.62	.09
b1sintag	.17	.45	−.06	.01	−.05	.13	−.01	.03	.00	−.02	.01	.27	.73	.11
b1sjccs	.17	−.07	−.01	−.03	.06	−.06	.05	.51	−.04	.04	.00	.31	.69	.09
b1sjcda	.15	.11	−.01	.09	−.16	.24	.03	.36	.04	.02	−.03	.25	.75	.09
b1sswbms-	.14	.24	−.02	.05	−.08	.07	.00	.02	−.02	−.02	−.01	.10	.90	.21
b1sswbsa-	.13	.13	.04	−.03	−.04	.03	−.03	.09	.01	.02	−.04	.05	.95	.37
b1sposwf	.12	−.03	.01	.10	.07	.26	−.03	.42	.03	.03	−.01	.30	.70	.05
b1sswbsi-	.11	.07	.04	−.02	.10	−.01	.05	.06	.03	.04	−.02	.04	.96	.26

Continued

Table 8.8 Schmid–Leiman factor loadings of 63 variables on g and 10 primary factors—cont'd

Variables	g	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	h2	u2	p2
b1sspiri	.10	.04	−.02	−.13	.49	.16	.04	.03	.03	.00	−.03	.30	.70	.04
b1smpqcn	.09	.12	.03	−.12	.25	.18	.02	−.02	−.06	−.04	.06	.13	.87	.07
b1smndfu	.08	−.02	−.04	.00	.51	.15	.08	.03	.03	.01	−.02	.33	.67	.02
b1sswbao-	.08	.09	.00	−.07	.03	.04	−.02	.09	−.04	.01	.00	.03	.97	.20
b1smpqtr	.04	−.05	−.01	−.16	.37	−.10	.03	−.03	.00	−.05	.02	.16	.84	.01
b1ssymp	.04	−.16	−.01	−.03	.47	.05	.03	.05	.00	−.02	−.01	.24	.76	.01
b1sinter-	.02	.20	−.06	.02	−.18	−.04	.02	−.06	.03	.00	−.02	.07	.93	.00
b1mpqha	.02	.00	−.03	−.24	.31	−.10	.05	−.05	.08	−.04	−.01	.16	.84	.00
b1sswbsc	.02	−.06	−.04	.01	.00	−.05	.04	−.02	−.01	.02	−.09	.02	.98	.03
Eig	8.38	4.74	.95	2.22	2.61	1.59	1.75	1.86	1.45	.90	.64			
% of var	31	12	6	6	5	4	3	3	3	2	1			

F1 to F10 represent first-order or primary factors; *g*, second-order factor, presumably general factor; *h2*, communality; *p2*, percent of general factor variance in the common variance of a variable; *u2*, uniqueness.

A diagnostic tool for testing the appropriateness of a hierarchical model is p2 represents a diagnostics indicating the percent of the common variance for each variable, which is explained by general factor. The variables with the appended minus sign (−) were reversely coded during the Schmid–Leiman procedure.

support and family affective solidarity (sixth factor), supervisor support, coworker support, perceived inequality in work, chronic job discrimination and positive family to work spillover (seventh factor), family strain and family affective solidarity (eighth factor), marital disagreement and risk (ninth factor), and marital strain (10th factor).

As the next step, the relationships between primary and second-order dimensions should be clarified more thoroughly. The oblique rotation revealed substantial correlations between the primary factors, extending from .63 to −.61. Thus, the primary factors are certainly interrelated sharing a common variance that is explained by second-order factor, Super-g. The main question is whether the primary and second-order dimensions are organized in concordance with the classical hierarchical model (Burt, 1949) or with the bifactor (Holzinger & Swineford, 1937) model. Both models can be applied to the 63 variables data by means of SEM analysis. SEM analysis was performed using the *lavaan* package of R (Rosseel, 2012). It seems that both models could satisfactorily fit the data, although the bifactor model yielded slightly better fit indices (RMSEA = .056; CFI = .854; TLI = .840; SRMR = .056) than the hierarchical model (RMSEA = .075; CFI = .802; TLI = .792; SRMR = .091). The difference is small, however, and, facing the fact that hierarchical model is more parsimonious, the advantage of the bifactor model is not definitely convincing.

The variables entered into the research model in this study can be grouped into several psychological domains and, consequently, we can inspect the appearance of the dominant first factors in different domains as well as, in general, in all domains together. On theoretical grounds, all variables can be divided into different domains, forming respective groups or sets of variables. According to this, the 63 variables were sorted into the following 14 variable sets or domains:

- The Big Five (labeled B5 with five variables: neuroticism, extraversion, agreeableness, openness, and conscientiousness);
- Well-being (WB, with eight variables: life satisfaction, autonomy, environmental mastery, personal growth, positive relations with others, purpose in life, self-acceptance, and optimism);
- Affect (AF, with two variables: negative affect, positive affect);
- Self-concept (SELF, with five variables: self-esteem, agency, perceived control, interdependence, independence);
- Personality dimensions from the Multidimensional Personality Questionnaire (MPQ, with six variables: well-being, social potency, aggression, constraint control, traditionalism, harm avoidance);

- Perceived intellectual aging (IAG, with one variable: personality in intellectual aging);
- Generativity (GEN, with one variable: generativity);
- Coping (COP, with two variables: problem focus coping, emotion focus coping);
- Spirituality (SPI, with two variables: spirituality, mindfulness);
- Work characteristics (WOR, with 10 variables: work to family spillover positive, work to family spillover negative, family to work spillover positive, work to family spillover negative, skill discretion, decision authority, coworker support, supervisor support, chronic job discrimination, perceived inequality in work);
- Family characteristics (FAM, with nine variables: perceived neighborhood quality/health, perceived inequality in home, family support, family strain, family affective solidarity, providing family support, friend support, friend strain, perceived inequality in family);
- Home characteristics (HOM, with six variables: marital risk scale, spouse/partner disagreement, marital empathy scale, spouse/partner strain, spouse/partner affective solidarity, spouse/partner decision-making);
- Social well-being (SWB, with five variables: social coherence, social integration, social acceptance, social contribution, social actualization);
- Empathy (EMP, with one variable: sympathy).

First, we can perform classical factor analysis for all variable sets or domains separately and then inspect the correlations between the first factors representing domain-specific DGFs. The ML algorithm for the factor analysis was used in each case of domain, and the correlations between the representative domain-specific DGFs are shown in Table 8.9. For the domains, which were defined by one single variable (IAG, GEN, and EMP), the values of the respective variables were entered into the correlation analysis instead of the factors. As we can see, the majority of the domain-specific DGFs have moderate to substantial correlations corroborating thus the hypothesis that they share the essential amount of the variance. Only three domains—SPI, SWB, and EMP—remain with low or insignificant correlations. These results convincingly prove the substantial relationships between the majority of domain-specific DGFs. Therefore, the results clearly indicate the existence of a strong common denominator, a latent dimension, which is underlying the majority of the local DGFs representing thus the higher-order DGF, the hypothesized Super-g.

We should now compare the correlations in Table 8.9 with the correlations between sets of variables in Table 8.4. The number of the variables and

Table 8.9 Correlations between domain-specific dominant general factors

	B5	WB	AF	SELF	MPQ	IAG	GEN	COP	SPI	WOR	FAM	HOM	SWB	EMP
B5	1	.60	−.47	.54	.60	.25	.50	−.44	.30	−.32	.23	−.16	−.12	.22
WB	.60	1	−.67	.85	.59	.41	.42	−.62	.20	−.56	.41	−.39	−.22	.03
AF	−.47	−.67	1	−.62	−.45	−.31	−.26	.46	−.10	.49	−.35	.32	.18	−.02
SELF	.54	.85	−.62	1	.47	.41	.37	−.60	.09	−.48	.35	−.35	−.19	−.03
MPQ	.60	.59	−.45	.47	1	.20	.37	−.40	.35	−.38	.27	−.21	−.20	.25
IAG	.25	.41	−.31	.41	.20	1	.24	−.40	.07	−.20	.11	−.05	−.11	.02
GEN	.50	.42	−.26	.37	.37	.24	1	−.38	.24	−.21	.13	−.07	−.14	.14
COP	−.44	−.62	.46	−.60	−.40	−.40	−.38	1	−.18	.35	−.26	.20	.11	−.01
SPI	.30	.20	−.10	.09	.35	.07	.24	−.18	1	−.11	.10	−.03	−.11	.27
WOR	−.32	−.56	.49	−.48	−.38	−.20	−.21	.35	−.11	1	−.39	.33	.13	−.05
FAM	.23	.41	−.35	.35	.27	.11	.13	−.26	.10	−.39	1	−.35	−.09	.05
HOM	−.16	−.39	.32	−.35	−.21	−.05	−.07	.20	−.03	.33	−.35	1	.09	−.01
SWB	−.12	−.22	.18	−.19	−.20	−.11	−.14	.11	−.11	.13	−.09	.09	1	−.01
EMP	.22	.03	−.02	−.03	.25	.02	.14	−.01	.27	−.05	.05	−.01	−.01	1

variable sets is different, 63 variables (14 sets) in Table 8.9 and 32 variables (8 sets) in Table 8.4. The correlations between the same or similar sets clearly correspond, yet it is also clear that the variances in both sets are far from being identical. For example, the correlations of the Big Five with other sets are more substantial in the matrix shown in Table 8.4 than in the matrix of 14 × 14 correlations in Table 8.8. That implies the conclusion that the GFP is sharing more variance with the CFP, calculated from the 32 variables, than with the Super-g, computed from the 63 variables in this study. Indeed, the correlation between the first factors of 32 and 63 variables is very substantial (.49), yet not very high. As the GFP is concerned, it is highly associated with the CFP (r = .70) but very much less with the Super-g (r = .25).

The mere inspection of Table 8.9 clearly suggests the existence of the strong common denominator of the great majority of the extracted domain-specific DGFs. The higher-order DGF (a DGF of domain-specific DGFs) can be obtained by the factor analysis of all 14 domain-specific DGFs. Indeed, such analysis is strongly recommended, as shown by the indices of the factor analysis suitability of the correlation matrix seen on Table 8.9. KMO measure of sampling adequacy amounts to .893 and Bartlett Test of sphericity is highly significant. The scree test and parallel analysis suggested three factors (or components) to retain for factor analysis, while acceleration criterion suggested only one factor (Fig. 8.4). Thus, we decided again for Schmid–Leiman transformation procedure subjecting three factors to the hierarchical analysis. In Table 8.10 we can see that all domain-specific DGFs have moderate to high loadings on the general factor (g) except SPI, SWB, and EMP. However, only one item (EMP) failed completely to load on general factor. Nine of all DGFs loaded higher on the general factor than on any of three primary factors.

It is clear that the substantial amount of the variation of the primary factors can be explained by the general factor. The general factor absorbed practically all the variance of the first primary (F1), yet also the essential parts of F2 and F3. The eigenvalue of the general factor strongly exceeds the eigenvalues of three primary factors: 4.30 (eigenvalue of g) versus .02 (F1), .69 (F2), and 1.19 (F3). The general factor variance (p2 in the last column in Table 8.10) is substantial to very high for all domain-specific items except SPI and EMP. The general factor loadings are also higher than communalities (h2) and uniquenesses (u2) for the majority of the domain-specific GDFs. The McDonald's omega hierarchical model is also quite high (.79) together with the other indices of the item homogeneity (Cronbach

Table 8.10 Schmid–Leiman factor loadings for 14 domain-specific dominant general factors (g and three primary factors)

	g	F1	F2	F3	h2	u2	p2
B5	.61	.03	−.08	.49	.63	.37	.59
WB	.93	.06	.16	.11	.90	.10	.96
AF-	.68	.04	.22	.08	.52	.48	.89
SELF	.91	.06	.04	−.04	.83	.17	.99
MPQ	.54	.01	.14	.55	.62	.38	.48
IAG	.47	.04	−.17	−.03	.25	.75	.88
GEN	.44	.02	−.20	.35	.37	.63	.54
COP-	.67	.05	−.07	.08	.47	.53	.97
SPI	.15	−.01	.01	.50	.27	.73	.08
WOR-	.53	.02	.39	.09	.44	.56	.64
FAM	.37	.01	.42	.07	.32	.68	.44
HOM-	.35	.01	.43	−.03	.31	.69	.40
SWB-	.21	.01	.05	.08	.06	.94	.82
EMP-	.02	.02	−.04	−.47	.22	.78	.00

Note. The scores of some domain-specific dominant general factors (DGFs) were inversely coded in order to obtain positive loadings on the general factor. The labels of these DGFs are marked with appended − sign.

alpha = .83; Guttman G6 = .86; McDonald's omega total = .87). Thus, about 80% of the total variance is explained by the general factor.

Finally, the general factor of domain-specific DGFs is practically identical with the previously analyzed first factor of 63 variables (r = .99). Obviously, the general factor in the Schmid–Leiman transformation of domain-specific GDFs is identical with the general factor obtained in previous Schmid–Leiman analysis of 63 variables. It represents very well the hypothesized Super-g, a very general highest-order dimension that can be interpreted as a general factor of almost all variables in the research model including domain-specific GDFs.

Although the results of Schmid–Leiman transformation confirmed the plausibility of the bifactor structure of the general and primary factors, the suitability of both bifactor and classical hierarchical structural solution was tested by the SEM also for the domain-specific data. For the sake of space, we display here only the graphical solutions of the *omega* algorithm in R *psych* package (Revelle, 2015) for all 14 domain-specific DGFs. Fig. 8.5 depicts the hierarchical, and Fig. 8.6 depicts the bifactor solution. Both dimensional structures can serve as the models disposed to the further confirmatory SEM analyses. According to the *lavaan* algorithm of SEM, the most acceptable model with assumed general factor and three primary

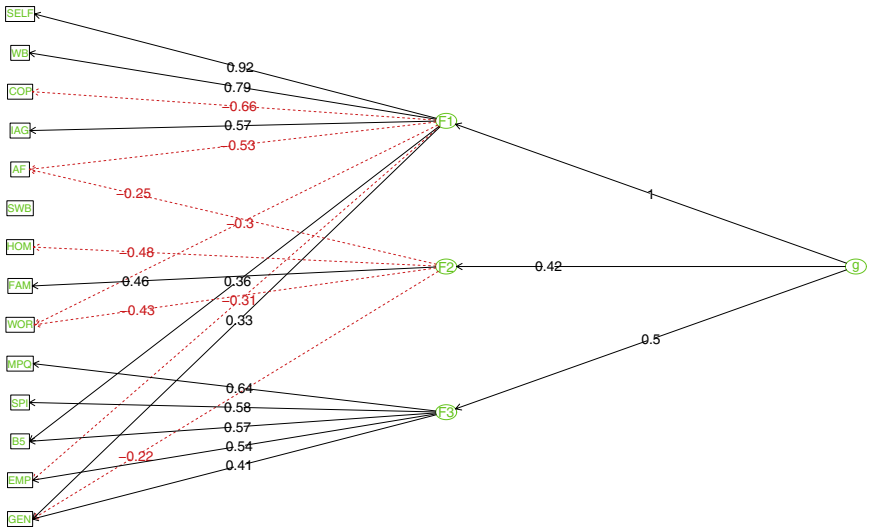

Figure 8.5 Hierarchical structure of 14 domain-specific DGFs.

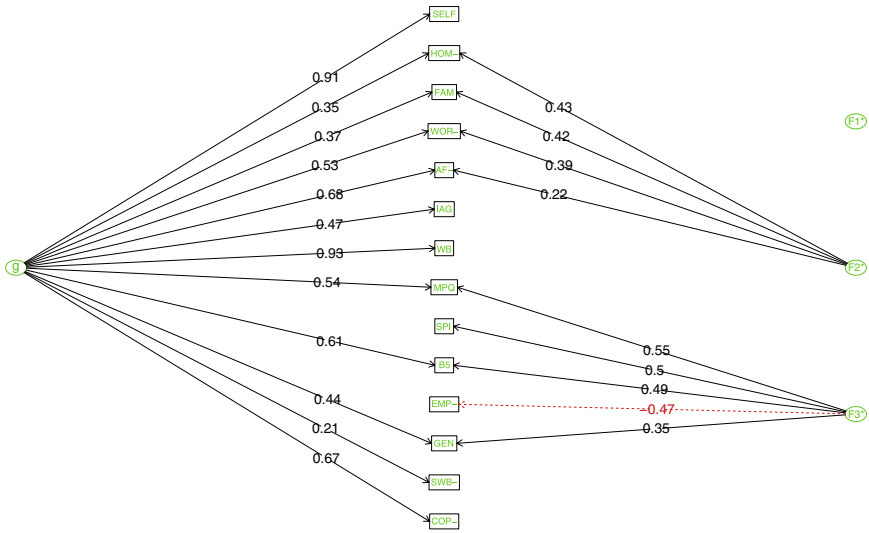

Figure 8.6 Bifactor structure of 14 domain-specific DGFs.

factors is the bifactor model (RMSEA = .059, SRMS = .035, CFI = .959, TLI = .940). Yet, the hierarchical model is fairly acceptable also (RMSEA = .074, SRMS = .055, CFI = .925, TLI = .908) and essentially more parsimonious.

More detailed insight into the relationships between the latent dimensions across different sets of variables could be obtained by the MFA approach, which allows inspection of the latent dimensions for the separate groups of variables (Escofier & Pagès, 1990, 1994; Husson et al., 2011, 2015). In the usual factor or component analysis, all variables are treated equally, and consequently some groups or sets with more variables may have more influence on the resulting latent dimensions than other groups or sets. For example, in the list of 63 variables used in this study, variables comprising mental well-being outnumber the variables of coping by eight against two. Thus, the variables of well-being could have a substantially bigger contribution to the resulting latent dimensions. In the MFA, however, the influence of each group of the variables is balanced and the comparison of the extracted factors across different sets of variables makes full sense. MFA algorithm performs PC analysis on each group or set of variables, normalizes the datasets and merges them into a common matrix, which is then factorized again by PC analysis (Escofier & Pagès, 1990, 1994). In normal factor analysis the larger variable sets dominate in the resulting dimensional structure, while MFA equalizes the influence of different variable sets on factor solutions and makes it possible to simultaneously analyze and compare the dimensionality of all variable sets.

Although many dimensions could be extracted in MFA (five by default), our attention should be devoted to the first one, which corresponds to the tentative general dimension in the universe of 63 variables divided into several variable sets. Table 8.11 provides the values of component loadings, eigenvalues, percentages of the explained variance, and inertia ratios for five extracted latent dimensions or components (inertia ratios are roughly equiproportional to eigenvalues and to the percentage of explained variance). All clearly confirmed the strength of the first dimension. Moreover, the first global MFA component is substantially related to all first components in separate variable sets with the exception of empathy (see the second column in Table 8.11). The first component is also almost identical with the first dimensions as previously extracted PC and ML analyses of 63 variables in Schmid–Leiman procedure: $r = .979$ and $r = .973$, respectively. Thus, it should be straightforwardly interpreted as Super-g.

Another great advantage of the MFA is the possibility to relate the groups or sets of the variables among themselves. This can be realized by two interrelated measures, Lg coefficients and RV coefficients. Both coefficients can be interpreted as measures of the association between two groups of variables. Lg coefficients are scalar products between the matrices

Table 8.11 The loadings of multiple factor analysis (MFA) dimensions across the variable groups

Groups	Dim.1	Dim.2	Dim.3	Dim.4	Dim.5
WB	.92	.27	.50	.21	.23
SELF	.83	.35	.46	.26	.25
B5	.81	.61	.52	.46	.23
MPQ	.77	.52	.58	.58	.29
AF	.74	.33	.25	.15	.10
COP	.73	.50	.28	.34	.24
WOR	.70	.35	.52	.25	.20
FAM	.65	.44	.41	.23	.12
GEN	.55	.31	.38	.08	.02
IAG	.48	.20	.27	.42	.27
HOM	.45	.20	.44	.31	.25
SWB	.39	.27	.23	.46	.81
SPI	.30	.61	.09	.19	.18
EMP	.13	.64	.21	.15	.01
Eigenvalues	5.62	1.97	1.52	1.08	1.01
% of variance	19.96	6.98	5.39	3.83	3.60
Inertia	.41	.17	.14	.10	.08

representing each group and can be interpreted analogously to the coefficients of covariance. RV coefficients are defined as quotients of the Lg coefficients and the products of the norms of the matrices associated with each group. They are analogous to the linear correlation coefficients, which extend from 0 to 1 and, therefore, are easier to interpret. Table 8.12 displays the Lg coefficients above the diagonal and RV coefficients under diagonal. The values on the diagonal represent Lg values that can be interpreted as indicators of the multidimensionality of the group (the higher the multidimensionality the more the values exceed 1). MFA values (last row and last column in the table) give the amount of the connection between extracted MFA dimensions and each group.

As we can see, the majority of the groups are moderately to substantially associated (Big Five, MPQ personality dimensions, Well-being, Self-concept, Affect, Coping, Family characteristics, Work characteristics, Generativity, Home characteristics, and Intellectual aging). The rest of the groups have very low, although prevalently significant, connections (Social well-being, Spirituality, and Empathy). It must be noted that Lg and RV coefficients depict the association between groups, which is based on different dimensions including the dimensions that sharply differ between groups. Thus, it is understandable that these coefficients show lower values than, for

Table 8.12 Lg coefficients and RV coefficients (under diagonal)

	B5	WB	AF	SELF	MPQ	IAG	GEN	COP	SPI	WOR	FAM	HOM	SWB	EMP	MFA
B5	*1.45*[a]	.49	.35	.45	.54	.11	.26	.37	.11	.22	.19	.06	.05	.08	.84
WB	.39	*1.07*	.45	.68	.44	.19	.18	.41	.05	.40	.33	.19	.11	.01	.89
AF	.27	.41	*1.13*	.37	.25	.09	.08	.22	.02	.27	.18	.11	.06	.00	.64
SELF	.31	.54	.29	*1.46*	.34	.15	.16	.36	.01	.27	.21	.11	.08	.02	.84
MPQ	.28	.26	.15	.17	*2.57*	.07	.16	.30	.17	.22	.19	.07	.07	.08	.97
IAG	.09	.18	.09	.13	.04	*1*	.06	.16	.00	.06	.04	.01	.05	.00	.36
GEN	.21	.18	.07	.13	.1	.06	*1*	.17	.06	.12	.09	.01	.03	.02	.43
COP	.27	.35	.18	.26	.16	.14	.15	*1.29*	.06	.18	.14	.05	.07	.02	.68
SPI	.09	.05	.02	.01	.1	0	.06	.05	*1.09*	.03	.04	.00	.02	.07	.31
WOR	.14	.29	.19	.17	.11	.05	.09	.12	.02	*1.72*	.26	.19	.06	.01	.71
FAM	.13	.27	.14	.15	.1	.03	.08	.11	.03	.16	*1.43*	.16	.05	.03	.60
HOM	.05	.18	.1	.09	.04	.01	.01	.05	0	.14	.13	*1.05*	.03	.00	.36
SWB	.03	.06	.03	.04	.03	.03	.02	.04	.01	.03	.03	.01	*2.99*	.01	.66
EMP	.07	.01	0	.02	.05	0	.02	.02	.07	.01	.02	0	.01	*1*	.24
MFA	.57	.7	.49	.56	.49	.29	.35	.49	.24	.44	.41	.29	.31	.2	*1.52*

[a]The values on the diagonal represent Lg values that indicate the multidimensionality of the group (the higher the more they exceed 1).

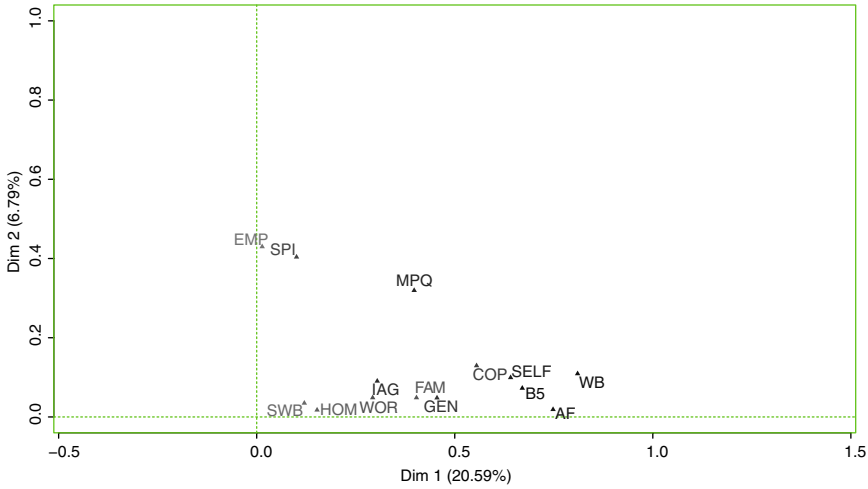

Figure 8.7 Representation of the 14 sets of variables in the space of the two largest MFA components. All sets are positioned quite close together except empathy and spirituality set (EMP and SPI), which also have the lowest loadings with the first global MFA component.

example, the loadings on the first MFA dimension for each group as displayed on Table 8.11. Nevertheless, the coefficients convincingly confirmed that different sets of the variables have much in common. They are not independent at all, and their shared variance can be explained by means of strong general dimension that connects domain-specific dominant dimensions.

The relationships between the groups of variables can be presented in still another way. Fig. 8.7 shows the locations of the groups in the space of the first two MFA dimensions (compare the locations with those from Fig. 8.2). It is obvious that all groups except empathy and spirituality form a wide cluster along the first dimension, thus confirming the existence of an essential common denominator of the majority of the variables. Empathy and spirituality form a small distant cluster, which is very low on the first dimension but substantially connected with the second dimension.

We may now return to the question, how is Super-g related to the GFP? Although the immediate correlation between both of them is very moderate, it is obvious that the Big Five set of variables is highly loaded with the first MFA dimension interpreted as Super-g. The loading .81 indicates a very considerable amount of the variance shared between Super-g and GFP.

The Nature of Super-g

The results show convincingly that the variables included into the research model share a substantial common variance. Moreover, the majority of domain-specific general factors or GDFs also substantially correlate. They are represented by a dominant first factor or component, which was labeled Super-g. The Super-g reflects the shared variance of the domain-specific GDFs, including the dominant first factor of personality traits (GFP), well-being, self-esteem, affect, coping, generativity, family characteristics, work characteristics, home characteristics, and intellectual aging. Thus, the Super-g deserves to be labeled as a higher-order dimension of different domain-specific GDFs. It is, so to say, a GDF of GDFs. Super-g is therefore practically identical with the comprehensive factor of personality (CGF) identified in the previous study on 32 psychological variables.

What is the psychological content of the Super-g? For some plausible assumptions concerning the psychological nature of the Super-g, the results of the debate over the nature of GFP (which is undoubtedly highly associated with the Super-g) can be helpful. Consequently, the possible theoretical interpretations of the Super-g can be roughly divided into three categories: the substantive interpretations, the response-style or bias interpretations, and the artifact interpretations. For example, the vast majority of the interpretations regard the GFP as a result of the substantive correlations between the lower-order personality dimensions. In this regard, the GFP reflects the shared variance of real behavioral and experiential traits (Erdle & Rushton, 2010; Erdle, Irwing, et al., 2010; Hirschi, 2008; Musek, 2007; Rushton et al., 2009, 2008; Rushton & Irwing, 2008, 2009a, 2009b; Van der Linden, Nijenhuis, et al., 2010; Van der Linden, Scholte, et al., 2010; Van der Linden et al., 2011; Vecchione et al., 2011; Veselka et al., 2009). Similarly, Super-g can be interpreted as a dimension based on the substantial behavioral correlations between the different psychological domains of personality and beyond, including personality traits, well-being, self, affect, coping, and others, yet not including cognitive abilities.

Some authors claim that the GFP may be explained as a result of correlations between traits caused by response styles like social desirability (Bäckström et al., 2009) or self-esteem pervasiveness (Anusic et al., 2009). Two major objections can be addressed against the response-style and bias interpretations. First, the empirical research demonstrated that the GFP variance is only partially related to the social desirability and self-esteem (Musek, 2010a). And second, the social desirability itself is more probably a substantial dimension based on real behavior than a mere response style

(Fleming, 2012; McCrae & Costa, 1983; Musek, 2010a). Also, it seems quite improbable that the correlations between personality traits could be due to the methodological or other artifacts (Ashton et al., 2009). The GFP was confirmed in the studies where different traits, methods, and assessment approaches (including peer ratings) were used (Van der Linden, Nijenhuis, et al., 2010; Van der Linden, Scholte, et al., 2010; Van der Linden et al., 2011). In general, the existence of the GFP as a substantial dominant highest-order dimension of personality seems to be well documented. The GFP is reflecting the real, substantive variance in personally and socially adapted behavior (Lachman et al., 2008; Musek, 2007, 2010a; Rocke & Lachman, 2008), it is universal (Aghababaei, 2013; Musek, 2010a; Rushton et al., 2008; Van der Linden, Dunkel, Beaver, & Louwen, 2015; see also the review in the Chapter 3 of this book), heritable (Figueredo et al., 2004; Loehlin, 2011a, 2011b; Loehlin & Martin, 2011; Rushton et al., 2008), evolutionary based (Figueredo & Rushton, 2009; Figueredo et al., 2016; Musek, 2007; Rushton et al., 2008; Veselka et al., 2009), and neurophysiologically traceable (DeYoung & Gray, 2009; Musek, 2007). In summary, if we conceive the GFP as a very essential part of the Super-g, the later can also be assumed to reflect a common variance of the socially well-adapted noncognitive traits or dimensions with very probable biological basis (evolutionary, genetic, and neurophysiologic).

It can be concluded therefore that Super-g is very probably the result of personally and socially adapted behaviors and experiences, which pervade a great number of important psychological variables including personality traits, well-being, self, affect, coping, characteristics of work, family and home relations, and others. Only a few domains or variables included into the research model are not connected with the Super-g (Social well-being, Spirituality, and Empathy). It seems also probable that Super-g is based on the evolutionary processes that favor personal adjustment to social environment in a long run. The heritability and neurological correlates discovered in several variables of our research model additionally corroborate this opinion. The Super-g can be conceived as a scientific basis of the worldwide used laypersons' descriptions of someone as generally good and positive (acceptable, agreeable, well-adapted, good-natured, respectable) person.

Nevertheless, the Super-g is not identical with the previously identified CFP, although the correlation between both is substantial (.49). The GFP is essentially included in CFP and also in Super-g, as we have seen, but its connection with the latter is not high. Very probably, Super-g includes only a part of the GFP variance. Thus, the Super-g comprises the variance

between the majority of noncognitive psychological variables that considerably extends beyond the personality in the narrower sense of meaning. All 63 variables included into the model being investigated in this study have much in common, yet they subsume the psychological and behavioral content that is very complex indeed. In this complex reality we can find several domain-specific DGFs, which are related yet not identical, and which are more or less covered by the Super-g as a dominant general factor of domain-specific general dominant factors—a DGF of DGFs.

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