A General Factor of Personality in a sample of inmates: associations with indicators of life-history strategy and covitality[2]

Janko Međedović[1, 2] & Daliborka Kujačić[3]

[1]Institute of criminological and sociological research, Belgrade, Serbia
[2]Faculty of media and communications, Belgrade, Serbia
[3]Penitentiary Facility in Belgrade, Serbia

This study looked for a General Factor of Personality (GFP) in a sample of male convicts (N=226; mean age 32 years). The GFP was extracted from seven broad personality traits: FFM factors, Amoralism (the negative pole of the lexical Honesty-Humility factor) and Disintegration (operationalization of Schizotypy). Three first-order factors were extracted, labeled Dysfunctionality, Antisociality and Openness, and GFP was found through the hierarchical factor analysis. The nature of the GFP was explored through analysis of its relations with markers of fast Life-History strategy and covitality. The results demonstrated that the GFP is associated with unrestricted sexual behavior, medical problems, mental problems, early involvement in criminal activity and stability of criminal behavior. The evidence shows that the GFP is a meaningful construct on the highest level of personality structure. It may represent a personality indicator of fitness-related characteristics and could be useful in research of personality in an evolutionary context.

Keywords: General Factor of Personality, covitality, life-history theory, criminal behavior

General Factor of Personality

Participants' scores on personality traits frequently correlate. This empirical finding was used as a starting point in studies of higher-order personality factors. In fact, empirical data has shown that a singular general dimension can be obtained from the correlations between personality factors (Musek, 2007). It is named „The Big One", or the General Factor of Personality (GFP). The presence of the GFP is further documented in two meta-analyses of correlations between the Big Five factors (Rushton & Irwing, 2008). The GFP was shown to reside at the top of the hierarchy of personality traits measured by at least 15 different personality inventories (Rushton & Irwing, 2009a, 2009b, 2009c; Veselka et al., 2009; Woods & Hardy, 2012). These results may suggest that the GFP is

Corresponding author: janko.medjedovic@fmk.edu.rs

highly robust and fully replicable. However, researchers frequently dispute the very existence of the GFP, due to its psychometrical problems and the possibility that the construct is an artifact of socially desirable responding on personality measures (Ferguson, Chamorro-Premuzic, Pickering, & Weiss, 2011).

The nature of the GFP: could it be important for evolutionary analysis of personality?

Previous data may show that the replicability of the GFP is reasonably well substantiated, but what is the nature of such a psychological construct? It seems that the structure of the GFP is comprised of a combination of socially desirable personality traits (for example, in the case of the Big Five, the GFP is positively saturated by all five personality domains, with Neuroticism measured as its opposite pole, i.e. Emotional stability: Musek, 2007). One possible way to interpret the GFP is from an evolutionary perspective (Rushton, Bones, & Hurr, 2008). In fact, the GFP is involved in what is perhaps the most important contemporary debate in evolutionary personality psychology, which focuses on the problem of the type of natural selection that influences personality traits (Penke, Denissen, & Miller, 2007). Recent behavioral genetic research on the GFP has revealed, not only that the inheritance of the GFP is around 50% (similar to singular personality traits), but also that this effect is attributable to non-additive (or dominance) genetic variance (Rushton et al., 2008). This finding is in accordance with the hypothesis of a directional selection on personality that favors prosocial, cooperative characteristics, typically described by a high GFP. Further corroboration of this assumption comes from the evolutionary genetics of personality: empirical data indeed confirmed that directional selection influences personality traits, while their genetic variance is partially generated by mutations (Verweij et al., 2012).

Additional findings that encourage the assumption of the GFP as an evolutionary-relevant construct are the ones that show its positive correlation with measures of psychological adjustment (Chen, Watson, Biderman, & Ghorbani, 2015). There is also a positive relation between GFP and the G factor of intellectual abilities (Dunkel, Stolarski, van der Linden, & Fernandes, 2014). Finally, relations between GFP and Life-History (LH) traits have also been found. LH theory is an evolutionary theory that describes the trade-offs individuals make to optimize their fitness (Del Giudice & Belsky, 2011). There are two main trade-off strategies that correspond to the *r* and *k* type of natural selection (Reznick, Bryant, & Bashey, 2002): "fast" or *r-selected* (i.e., early maturation and reproduction, quantity over quality, mating over parenting, unrestricted sexual behavior) and "slow" or *K-selected* (the opposite pattern). It is found that the GFP is a part of a slow LH strategy, which means that it indicates more restricted sexual behavior, higher emotional investment in romantic relations and higher parental investment (Dunkel, Kim, & Papini,

2012). It is even possible that GFP, slow LH strategy and physical and mental health coevolved under the influence of directional selection because their shared genetic variance is partially explained by nonadditive genetic effects (Figueredo & Rushton, 2009).

Goals of the present study

The first goal of this study is to look for the GFP in a segment of the population that has rarely been examined (the only notable exception is the study of van der Linden, Dunkel, Beaver, & Louwen, 2015), while using personality characteristics that have not been included in previous studies. In this study, the GFP was examined in a sample of convicts, a population that is relevant for evolutionary analysis of behavior because it dominantly adopts a fast LH strategy (Yao, Långström, Temrin, & Walum, 2014). The GFP was sought within an extended model of personality structure, which included two additional broad dispositions beside the FFM traits in the analysis. The first one is Amoralism (Knežević, Radović, & Peruničić, 2008; Paulhus & Jones, 2015). It represents a personality disposition to behaviors that violate moral, social or legal norms. It could be understood as the negative pole of the lexical Honesty-Humility factor (Međedović, 2011), extracted in recent emic studies of basic personality traits (Lee & Ashton, 2013). The second one is schizotypy. It is a personality disposition defined as a proneness to psychosis (Claridge, 2010); it is irreducible to the Big Five traits (Knežević et al., 2016; Watson, Clark, & Chmielewski, 2008) and theoretically represents an important extension of the personality space. This part of the study aims to isolate the GFP in a sample of convicts and analyze its structure, comparing it to previous findings about the GFP.

The second level of analysis is related to the debated nature of the GFP. The best method for answering the question of whether the GFP is a mere artifact of the social desirability of questionnaire items is to examine the GFP's relations with external criteria, preferably some objective forms of behavior or rating measures. In the present study, the relations between the GFP and real life outcomes like antisocial, sexual behavior and problems in physical and mental health was examined. These variables were selected in order to provide information about the evolutionary relevance of the GFP, because they represent indicators of covitality (physical and mental health, characteristics which are associated with fitness: Figueredo, Vásquez, Brumbach, & Schneider, 2004) and fast LH strategy (unrestricted sexual behavior and antisocial behavior).

Previous research has shown that the GFP is related to parental support (van der Linden, Figueredo, de Leeuw, Scholte, & Engels, 2012). We aimed to broaden knowledge about the GFP and family characteristics by analyzing the relations between the GFP and detrimental family characteristics (family-risk factors further on) like the presence of criminal behavior, substance abuse and mental illness in the participant families.

We were guided by three hypotheses: 1) GFP isolated in the present study would depict maladaptive personality characteristics because of the two

additional traits used in the analysis: Amoralism, and especially Disintegration; 2) GFP would be positively correlated with problems in physical and mental health and positively associated with the measures of fast LH strategy; 3) GFP would be positively correlated with family-risk factors.

Method

Sample and procedure

Participants were selected from two inmate populations in Serbia. The first one comprised the convicts who were serving their terms in the Penitentiary of Padinska Skela (112 participants). The second one comprised the individuals who, apart from serving their prison terms, also had to undergo an obligatory drug rehabilitation program in the Special Prison Hospital in Belgrade (113 participants). The total sample size included 225 male inmates, with a mean age of 32.7 years (*SD*=9.6). All the individuals participated in the research voluntarily. All participants had elementary reading skills. Data gathering was carried out in three waves. In the first one, the participants filled in self-report measures. Afterwards, the interviews were held, which contained the questions about physical health, mental health and sexual behavior. Finally, relevant information about the participants' criminal behavior was taken from their prison dossiers.

Measures

1. The five lexical personality factors were examined by the NEO-FFI Personality Inventory (Costa & McCrae, 1992). It contains 60 items, with twelve for each of the domains of the Five-factor model: *Extraversion*, *Neuroticism*, *Openness*, *Agreeableness* and *Conscientiousness*. The reliability of the scales ranged from α=.61 (Openness) to α=.81 (Conscientiousness).

2. Amoralism was measured by the AMORAL 9 instrument (Knežević et al., 2008; Paulhus & Jones, 2015). This inventory explores Amoralism through nine indicators: *Poor behavioral control, Hedonism*, *Laziness, Stubbornness, Resentment*, *Sadism, Brutal modulation of resentment* and *Passive amorality* (refraining from giving help, carelessness, passive Schadenfreude). In this study, we only analyzed the scores on the general Amoralism factor. The questionnaire contained 115 items, and its overall reliability was α=.91.

3. Schizotypy was explored through the *Disintegration* construct and measured via DELTA 10 inventory (Knežević, Opačić, Kutlešić, & Savić, 2005). It explores pro-psychotic experiences and consists of ten modalities: *General Executive Dysfunction*, *Perceptual Distortions, Increased Awareness*, *Depression*, *Paranoia*, *Mania*, *Social Anhedonia*, *Flattened Affect*, *Somatoform Dysregulation* and *Magical Thinking*. A short version of the scale was used in this study, and each Disintegration modality was measured with one item. The scale's reliability was α=.80.

4. External criteria were chosen to indicate important features of individual adaptation and functioning. The first three measures were collected from the respondent's penitentiary criminal files similarly to the previously described measure.

a) Characteristics of the participant's families that could affect personality and especially influence proneness to antisocial and criminal behavior (*family risk-factors*) were examined. Three variables were included: presence of criminal activity, alcohol or drug abuse, and documented psychiatric problems in the respondent's family. These measures were binary coded. The absence of a family risk-factor was represented by 0 and its presence was coded with 1. The scores on individual items were averaged in order to obtain the total score on family risk-factors.

b) *Behavioral problems in adolescence* were examined by the presence of the following indicators before the participant turned 18 years of age: being a suspect in a criminal investigation, being arrested, convicted or institutionalized in a juvenile home. These measures were coded and calculated in the same way as the previous variable.

c) Stability of criminal behavior was operationalized through *criminal recidivism*. Information about the number of criminal offenses, the number of lawful sentences and the number of previous terms in correctional institutions were collected. We could not use the mean score on all of these measures because the range of three variables was quite different (eg. the range of the number of criminal offenses is several times higher than the number of previous terms in correctional institutions). This is why the recidivism indicator was calculated as the first principal component of these variables (eigenvalue of 1.495; 75% of the original variables variance is explained). Criminal recidivism and behavioral problems in adolescence measure criminal behavior and as such are used as indicators of fast LH strategy (Yao et al., 2014).

The following measures were based on the interviews that were conducted with each participant individually:

d) *Health problems* were coded as the average number of occasions in which a respondent was treated by his physician (and given a medical prescription) during one year. Mental problems were excluded.

e) Four indicators served as markers of *psychological problems*: seeing a psychologist for advice or counseling, having a psychiatric diagnosis, hospitalization in a psychiatric institution, and suicide attempts. All of the measures were binary coded. The average score on all of the indicators was used in the analysis.

f) *Sexual strategy* was examined with a single score of the participants' promiscuity rated by the interviewer. The score ranged from 0 to 2, and was based on the information about the age of the participant's first sexual intercourse, the total number of sexual partners, and infidelity during any ongoing partner relationship. This measure is adopted from the PCL-R scale, a rating method for the exploration of psychopathy (Hare, 2003). Higher scores indicated a fast LH strategy as suggested by previous research (Dunkel & Decker, 2010).

Results

Correlations between the personality traits and their latent structure

Bivariate relations between the examined personality traits are shown in Table 1. Principal Component Analysis was used to examine the latent space of seven personality measures. GFP is often extracted from personality factor scores (Musek, 2007; Rushton & Irwing, 2009a). We decided to use hierarchical factor analysis in order to provide more detailed information about the levels of higher order structure of seven analyzed personality traits. Factorization of the participants' scores on personality measures was performed using the FACTOR.10 program (Lorenzo-Seva & Ferrando, 2006). Parallel analysis and the Guttman-Kaiser criterion were used to determine the number of components that should be retained in the analysis. Both methods converged to the three-component solution. The components were rotated using the promax algorithm afterwards. They explained the following percentage of the original measures variance, respectively: 36.72%, 17.44% and 15.09%. The loadings of traits on

latent variables are shown in Table 1. The first extracted component is most heavily saturated by Neuroticism, while Extraversion and Conscientiousness have negative loadings on this component. The last constituent is Disintegration. It is quite clear that this component describes psychological dysfunctions: frequent experiences of negative emotions, weak social interactions, the absence of planning and control, and finally, psychotic-like experiences. For this reason, the first component is labeled Dysfunctionality. The second latent component is constituted mostly by low Agreeableness and high Amorality, followed by Extraversion to some extent. This indicates aggressiveness, non-cooperation, resentment, and destructiveness, probably followed by high arousal levels. It is named Antisociality. Finally, the third component is dominantly saturated by Openness and, to a small extent, low Agreeableness. We kept the name of the original Openness factor. Dysfunctionality correlated positively with Antisociality (r=.27; p<.01) with no significant correlation with Openness (r=-.07; p>.05). Antisociality had a negative correlation with Openness (r=-.15; p<.05).

To obtain the second-order factor (GFP) a Schmid-Leiman algorithm was applied (Schmid & Leiman, 1957). The loadings of personality measures on the second-order factor are also shown in Table 1. As can be seen, the GFP extracted from the present measures describes dysfunctional personality: high levels of neurotic and schizotypal features combined with immoral and antisocial dispositions. Extraversion and Openness had low loadings on the GFP. Considering the first-order factors, Antisociality (.77) had the highest loadings on the GFP, followed by Dysfunctionality (.71) and Openness (-.49). GFP explained 44.87% of the first-order factors.

Table 1
Correlations and the loadings of the personality traits on first and second-order factors

	1	2	3	4	5	6	Dys	Antisoc	Open	GFP
1. Neuroticism	/						**.79**	.10	-.01	**.72**
2. Extraversion	-.23**	/					**-.74**	**.47**	-.12	-.22
3. Openness	.01	.04	/				.01	.11	**.97**	-.21
4. Agreeableness	-.17*	.02	-.09	/			-.01	**-.83**	**-.30**	**-.56**
5. Conscientiousness	-.50**	.25**	.02	.24**	/		**-.68**	-.17	-.04	**-.67**
6. Amoralism	.32**	.05	-.14*	-.50**	-.34**	/	.14	**.78**	-.16	**.76**
7. Disintegration	.62**	-.21**	-.09	-.26**	-.37**	.42**	**.67**	.24	-.14	**.77**

Notes. Dys – Dysfunctionality; Antisoc – Antisociality; Open – Openness; *– p<.05; **– p<.01; loadings higher than .30 on the extracted factors are bolded.

Relations between family risk-factors, LH and covitality indicators

Relations between family risk-factors, LH variables and covitality measures are explored via bivariate correlations. Furthermore, we performed factor analysis on LH variables and covitality. Principal axis with promax

rotation was used as a method for factor extraction, because the latent structure of the examined variables is hypothesized a priori. This analysis is important because it can show whether the relations between these measures follow the theoretically expected pattern. We expected the positive relations between LH measures and between covitality variables. Furthermore, we hypothesized that two latent factors, depicting fast LH and covitality would emerge. The results of these analyses are presented in Table 2.

Table 2
Relations between family risk-factors, LH and covitality measures

	1	2	3	4	5	FLHS	Covitality
1. Family risk-factors	/					/	/
2. Adolescence problems	.19**	/				**.72**	.09
3. Criminal recidivism	.16*	.51**	/			**.67**	-.30
4. Psychological problems	.35**	.30**	.32**	/		.19	**.81**
5. Health problems	.26**	.10	.21**	.40**	/	-.07	**.78**
6. Sexual strategy	.04	.29**	.22*	.24*	.03	**.72**	.23

Notes. factors loadings are presented in two columns on the right (loadings above .30 are bolded). FLHS - Fast Life-History Strategy; * - $p<.05$; ** - $p<.01$

The results of performed analyses show that the correlations and latent structure of the examined variables are in accordance with expectations. LH measures and covitality indicators correlate positively between themselves. Furthermore, factor analysis confirmed that the proposed indicators measure two latent constructs indeed: covitality (physical and mental health: 21.74% of explained variance) and fast LH strategy (unrestricted sexual behavior, antisocial and criminal behavior: 42.89% of explained variance). The results confirmed the validity of the indicators as measures of these two constructs.

Relations between personality traits, extracted factors and the external criteria

Correlations between the original personality traits, first and second-order factors and the measures of LH strategy, family risk-factors and covitality are explored in this analysis. To be sure that the relations between personality and external criteria would not be confounded by the participants' age and education, we conducted a separate analysis where these variables were controlled. The results are shown in Table 3.

Table 3

Correlations between personality traits, extracted factors and the external criteria

	Family risk-factors	Adolescence problems	Criminal recidivism	Psychological problems	Health problems	Sexual strategy
Neuroticism	.05(-.01)	.07(.02)	.09(.06)	.20**(.18**)	.14*(.11)	-.01(-.01)
Extraversion	-.12(-.14*)	-.02(-.01)	-.01(-.01)	-.11(-.11)	-.08(-.08)	.22*(.14*)
Openness	.02(.08)	-.06(-.05)	.08(.12)	.06(.09)	.02(.06)	-.05(.05)
Agreeableness	-.19**(-.15*)	-.27**(-.20**)	-.26**(-.25**)	-.32**(-.28**)	-.15*(-.14*)	-.20*(-.34**)
Conscientiousness	-.10(-.07)	-.16*(-.10)	-.20**(-.18**)	-.27**(-.25**)	-.26**(-.24**)	.12(-.05)
Amoralism	.22**(.13)	.25**(.14*)	.26**(.23**)	.23**(.15*)	.14*(.10)	.10(.22**)
Disintegration	.08(.05)	.10(.10)	.13*(.12)	.23**(.20**)	.18**(.15*)	-.03(-.02)
Dysfunctionality	.11(.09)	.12(.07)	.15*(.13)	.27**(.25**)	.22**(.20**)	-.14*(-.05)
Antisociality	.18**(.10)	.28**(.19**)	.29**(.26**)	.29**(.23**)	.16*(.13)	.23*(.33**)
Openness	.02(.09)	-.06(-.04)	.05(.10)	.06(.10)	.01(.06)	-.06(.05)
GFP	.16*(.07)	.25**(.17*)	.23**(.18**)	.29**(.23**)	.20**(.16*)	.07(.14*)

Notes. *– *p*<.05; **– *p*<.01. Partial correlations, controlled for the variance of age and education are shown in the brackets

As can be seen from Table 3, personality measures are related to behavioral manifestations of covitality and life-history strategy. Dispositions towards antisocial behavior (low Agreeableness and Conscientiousness and elevated Amorality) are most systematically related to external criteria, which was expected. Pro-psychotic and neurotic tendencies (Disintegration and Neuroticism) are related to medical and mental problems. GFP correlates with five out of six criterion variables. Important information that can also be derived from Table 3 is that the associations between the GFP, covitality and fast life-history strategy remains significant after controlling for the participants age and education. In fact, the association between GFP and restricted sexual strategy, when age and education are controlled, is also significant, although the zero order correlation is not.

Discussion

The debate regarding the existence of GFP is still ongoing (Davies, Connelly, Ones, & Birkland, 2015). Therefore, the first goal of the present study was to examine the existence of the General Factor of Personality in an inmate sample, with personality space being defined by seven dimensions. This analysis confirmed that there is a broad, comprehensive construct that occupies the apex of the hierarchy of personality – the General Factor of Personality. Factor analysis of personality traits yielded a GFP depicted by psychological maladaptation on its positive pole and adaptive and functional personality characteristics on its negative pole. Previous research extracted general factors of similar content when factorized personality scales were saturated with characteristics indicating dysfunction and adjustment problems (Rushton & Irwing, 2009a; 2009b). We believe that Amoralism and Disintegration, and not the specific sample that was explored turned the GFP to the maladaptive side of personality. The rationale for this assumption is the earlier finding that the GFP had social adjustment on its positive pole even when extracted in the population of convicts (van der Linden et al., 2012).

The first component extracted from analyzed personality traits is mostly saturated by Neuroticism and the negative poles of Extraversion and Conscientiousness. The presence of Disintegration probably shifted the first component into a space of general psychological dysfunction. This finding is in accordance with previous research which shows that schizotypy correlates positively with Neuroticism and negatively with Conscientiousness in the general population as well (Kwapil, Wrobel, & Pope, 2002). In fact, the first isolated factor resembles to newly-conceptualized general factor of susceptibility to psychopathology (Del Giudice, 2016). Correlations were found between the lexical factor of Honesty and Agreeableness in the general population too (Ashton, Lee, Marcus, & De Vries, 2007), so we can assume that the structure of the second component could also be replicated in future studies. Openness remained distant as the third component. The nature of GFP, extracted as a second-order factor, is very similar to others that were found in various personality traits: it represents general adaptability, integration of psychological functioning, prosociality and plasticity, versus maladaptivity, psychological dysfunctions, antisociality and rigidity (Rushton, 2012). However, on the positive pole of the GFP isolated in the present study are the measures of personality dysfunction which is in accordance with our first hypothesis.

The data obtained in the present research show that GFP is related to conceptually-linked external psychological and behavioral criteria. Individuals with a more pronounced GFP (which in our case means higher Dysfynctionality, Antisociality and cognitive rigidity) get involved in criminal activity earlier in their life and commit more criminal offences; they express unrestricted sexual behavior and finally, they have more physical and psychological problems. We can consider the first two forms of behavior as indicators of fast LH strategy, while the latter measures are indicators of low covitality and they can indicate decreased fitness in general. These findings are in line with data showing that the maladaptive side of GFP is related to violence, criminal behavior and psychological dysfunction (van der Linden et al., 2015). It is interesting to mention that the relations between GFP and sexual behavior emerged only after age and education were controlled in the analysis. This finding implies that one (or both) of these variables probably has a suppressor effect (MacKinnon, Krull, & Lockwood, 2000) on the link between GFP and sexual behavior. Finally, the fact that family characteristics are also related to the GFP represents an interesting finding too. It is in line with previous findings that GFP is related to parental support (van der Linden et al., 2012). It suggests that GFP could serve as a mediator of the link between harsh environmental factors and fast LH strategy.

Relations between the GFP and external criteria gave us an opportunity to draw several conclusions. The GFP is not a simple artifact of social desirability: the scores on self-reported GFP are related to biographical and rating measures in a conceptually expected manner. The present data favor a view of the GFP as

a complex personality dimension related to fitness (Rushton, 2012). Individuals with a higher GFP have decreased fitness, expressed in more frequent medical and psychological problems. They also engage in antisocial and criminal activity more frequently, which is an indicator of fast LH strategy (Dunkel et al., 2012; Figueredo et al., 2004) together with unrestricted sexual behavior.

The findings obtained in the present study indirectly support the mutation-selection balance as a selection mechanism that maintains genetic variability in personality (Penke, 2010). This model presumes that selection has a directional influence on genetic variants that produce higher levels of phenotypic traits, with the mutations acting against it. How can we interpret the behavioral strategy that increases fitness across various environments? Some scholars believe that *prosocial behavior* is highly adaptive and fitness increasing in almost every environment and across various situations (Rushton, 2012). If an optimal strategy could be found at all, pro-sociality could be its crucial part. In fact, a large part of the GFP extracted in the present study can be attributed to prosocial behavior, which depicted the opposite pole of the GFP obtained in this research.

Concluding remarks

There is no doubt that the General Factor of Personality cannot replace more specific, narrower and hierarchically lower personality traits in explaining personality and its role in behavior. However, it may be a useful psychological construct in studying personality in an evolutionary context. The GFP is based on a hypothesis that there is a single dimension of human personality that generally affects fitness-related outcomes. A confirmation of such a relationship would greatly increase our knowledge of personality. In fact, data on this topic could help us understand something about the core nature of personality: the way (or ways) in which natural selection influences personality, which is a question that has not even been asked among evolutionary psychologists until recently, because personality was treated as a noise in an evolutionary context (Tooby & Cosmides, 1990).

The present research has several limitations. The key indicators of fitness are longevity and reproductive success; however, these characteristics were not measured directly in the present research. Our criterion measures are related to fitness but they do not operationalize fitness itself. Findings of the present study cannot be easily generalized at the population level because of the specific characteristics of the sample. Future research should explore the relations between the GFP and fitness directly. It would also be imperative to further explore the role of the environment in the GFP. Environment could be the moderator of the relation between GFP and fitness related outcomes. Finally, it would be beneficial to explore the relations between GFP and other markers of Life History, like pubertal timing, first sexual intercourse and the age at first reproduction. The data would serve to deepen the understanding of personality in an evolutionary framework.

References

Ashton, M. C., Lee, K., Marcus, B., & De Vries, R. E. (2007). German lexical personality factors: Relations with the HEXACO model. *European Journal of Personality, 21*, 23–43. doi:10.1002/per.597

Chen, Z., Watson, P. J., Biderman, M., & Ghorbani, N. (2015). Investigating the properties of the General Factor (M) in bifactor models applied to Big Five or HEXACO data in terms of method or meaning. *Imagination, Cognition and Personality*. Advanced online publication. doi:10.1177/0276236615590587

Claridge, G. (2010). Personality and psychosis. In P. J. Corr & G. Matthews (Eds), *The Cambridge handbook of personality psychology* (pp. 631–648). Cambridge: Cambridge university press.

Costa, P. T., & McCrae, R. R. (1992). *Revised NEO Personality Inventory (NEO-PI-R) and NEO Five-Factor Inventory (NEO-FFI) Professional Manual.* Odessa, FL: Psychological Assessment Resources.

Davies, S. E., Connelly, B. S., Ones, D. S., & Birkland, A. S. (2015). The General Factor of Personality: The "Big One," a self-evaluative trait, or a methodological gnat that won't go away? *Personality and Individual Differences*, *81*, 13–22. doi:10.1016/j.paid.2015.01.006

Del Giudice, M. (2016). The Life History model of psychopathology explains the structure of psychiatric disorders and the emergence of the p factor: A simulation study. *Clinical Psychological Science*, *4,* 299–311. doi: 10.1177/2167702615583628

Del Giudice, M., & Belsky, J. (2011). The development of life history strategies: Toward a multi-stage theory. In D. M. Buss & P. H. Hawley (Eds.), *The evolution of personality and individual differences* (pp. 154–176). Oxford: Oxford University Press.

doi:10.1093/acprof:oso/9780195372090.003.0006

Dunkel, C. S., & Decker, M. (2010). Convergent validity of measures of life-history strategy. *Personality and Individual Differences*, *48*, 681–684. doi:10.1016/j.paid.2009.12.014

Dunkel, C. S., Kim, J. K., & Papini, D. R. (2012). The general factor of psychosocial development and its relation to the general factor of personality and life history strategy. *Personality and Individual Differences*, *52*, 202–206. doi: 10.1016/j.paid.2011.10.016

Dunkel, C. S., Stolarski, M., van der Linden, D., & Fernandes, H. B. (2014). A reanalysis of national intelligence and personality: The role of the general factor of personality. *Intelligence*, *47*, 188–193. doi: 10.1016/j.intell.2014.09.012

Ferguson, E., Chamorro-Premuzic, T., Pickering, A., & Weiss, A. (2011). Five into one doesn't go. A critique of General Factor of Personality. In T. Chamorro-Premuzic, S. von Stumm, & A. Furnham (Eds). *The Wiley-Blackwell Handbook of Individual Differences* (pp. 162–186). Chichester: Blackwell Publishing.

Figueredo, A. J., Vásquez, G., Brumbach, B. H., & Schneider, S. M. R. (2004). The heritability of life-history strategy: The *K*-factor, covitality, and personality. *Social Biology*, *51*, 121–143. doi:10.1080/19485565.2004.9989090

Figueredo, A. J., & Rushton, J. P. (2009). Evidence for shared genetic dominance between the general factor of personality, mental and physical health, and life history traits. *Twin Research and Human Genetics*, *12*, 555–563. http://dx.doi.org/10.1375/twin.12.6.555

Hare, R. D. (2003). *The Hare Psychopathy Checklist—Revised, 2nd edition.* Toronto, ON, Canada: Multi-Health Systems.

Knežević, G., Lazarević, L. B., Bosnjak, M., Purić, D., Petrović, B., Teovanović, P., ... Bodroža, B. (2016). Towards a personality model encompassing a Disintegration factor separate from the Big Five traits: A meta-analysis of the empirical evidence. *Personality and Individual Differences*, *95*, 214–222. http://dx.doi.org/10.1016/j.paid.2016.02.044

Knežević, G., Opačić, G., Kutlešić, V., & Savić, D. (2005). Preserving psychoticism as a basic personality trait: A proposed reconceptualization. *113th Annual Convention. American Psychological Association, August 18–21, Washington. Book of Abstracts,* p. 176.

Knežević G., Radović, B., & Peruničić, I. (2008). Can Amorality be measured? *14th European Conference on Personality, Tartu, Estonia, July 16–20, 2008, Book of Abstracts*, p. 137.

Kwapil, T. R., Wrobel, M. J., & Pope, C. A. (2002). The five-factor personality structure of dissociative experiences. *Personality and Individual Differences*, *32*, 431–443. doi:0.1016/S0191–8869(01)00035–6

Lee, K., & Ashton, M. C. (2013). *The H factor of personality: Why some people are manipulative, self-entitled, materialistic, and exploitive—and why it matters for everyone*. Waterloo: Wilfrid Laurier University Press.

Lorenzo-Seva, U., & Ferrando, P. J. (2006). FACTOR: A computer program to fit the exploratory factor analysis model. *Behavior research methods*, *38*, 88–91. doi:10.3758/BF03192753

MacKinnon, D. P., Krull, J. L., & Lockwood, C. M. (2000). Equivalence of the mediation, confounding and suppression effect. *Prevention Science, 1,* 173–181. doi:10.1023/A:1026595011371

Međedović, J. (2011). Da li je Amoralnost šesti faktor ličnosti? [Is Amorality the sixth factor of personality?] *Zbornik Instituta za kriminološka i sociološka istraživanja, 30*(1–2), 7–31.

Musek, J. (2007). A general factor of personality: Evidence for the Big One in the five-factor model. *Journal of Research in Personality, 41*, 1213–1233. doi:10.1016/j.jrp.2007.02.003

Paulhus, D. L., & Jones, D. N. (2015). Measures of dark personalities. In G. J. Boyle, D. H. Saklofske, & G. Matthews (Eds): *Measures of personality and social psychological constructs* (pp. 562–594). San Diego: Academic Press.

Penke, L. (2010). Bridging the gap between modern evolutionary psychology and the study of individual differences. In D. M. Buss & P. H. Hawley (Eds), *The evolution of personality and individual differences* (pp. 243–279). New York: Oxford University Press.

Penke, L., Denissen, J. J. A., & Miller, G. F. (2007). The evolutionary genetics of personality. *European Journal of Personality, 21,* 549–587. doi:10.1002/per.629

Reznick, D., Bryant, M. J., & Bashey, F. (2002). r– and K-selection revisited: The role of population regulation in Life-History evolution. *Ecology, 83*, 1509–1520. http://dx.doi.org/10.1890/0012–9658(2002)083[1509:RAKSRT]2.0.CO;2

Rushton, J. P. (2012). The General Factor of Personality: A reply to Muncer. *Personality and Individual Differences, 52*, 236–239. doi:10.1016/j.paid.2011.10.013

Rushton, J. P., Bons, T. A., & Hur, Y.-M. (2008). The genetics and evolution of a general factor of personality. *Journal of Research in Personality, 42*, 1173–1185. doi:10.1016/j.jrp.2008.03.002

Rushton, J. P., & Irwing, P. (2008). A general factor of personality (GFP) from two meta-analyses of the big five: Digman (1997) and Mount, Barrick, Scullen, and Rounds (2005). *Personality and Individual Differences, 45*, 679–683. doi:10.1016/j.paid.2008.07.015

Rushton, J. P., & Irwing, P. (2009a). A general factor of personality in the Comrey Personality Scales, the Minnesota Multiphasic Personality Inventory-2, and the Multicultural Personality Questionnaire. *Personality and Individual Differences*, *46*, 437–442. doi:10.1016/j.paid.2008.11.015

Rushton, J. P., & Irwing, P. (2009b). A General Factor of Personality in the Millon Clinical Multiaxial Inventory-III, the Dimensional Assessment of Personality Pathology, and the Personality Assessment Inventory. *Journal of Research in Personality, 43*, 1091–1095. doi:10.1016/j.jrp.2009.06.002

Rushton, J. P., & Irwing, P. (2009c). A general factor of personality in 16 sets of the Big Five, the Guilford–Zimmerman Temperament Survey, California Psychological Inventory, and Temperament and Character Inventory. *Personality and Individual Differences, 47*, 558–564. doi:10.1016/j.paid.2009.05.009

Schmid, J., & Leiman, J. M. (1957). The development of hierarchical factor solutions. *Psychometrika*, *22*, 53–61. doi:10.1007/BF02289209

Tooby, J., & Cosmides, L. (1990). On the universality of human nature and the uniqueness of the individual: The role of genetics and adaptation. *Journal of Personality, 58*, 17–67. doi:0.1111/j.1467–6494.1990.tb00907.x

van der Linden, D., Dunkel, C. S., Beaver, K. M., & Louwen, M. (2015). The unusual suspect: The General Factor of Personality (GFP), Life History Theory, and delinquent behavior. *Evolutionary Behavioral Sciences, 9,* 145–160. http://dx.doi.org/10.1037/ebs0000027

van der Linden, D., Figueredo, A. J., de Leeuw, R. N., Scholte, R. H., & Engels, R. C. (2012). The General Factor of Personality (GFP) and parental support: testing a prediction from Life-history Theory. *Evolution and Human Behavior*, *33*, 537–546. doi:10.1016/j.evolhumbehav.2012.01.007

Veselka, L., Schermer, J. A., Petrides, K. V., Cherkas, L. F., Spence, T. D., & Vernon, P. A. (2009). A general factor of personality: Evidence from the HEXACO Model and a measure of trait emotional intelligence. *Twin Research and Human Genetics, 12*, 420–424. http://dx.doi.org/10.1375/twin.12.5.420

Verweij, K. J., Yang, J., Lahti, J., Veijola, J., Hintsanen, M., Pulkki-Råback, L., ... Zietsch, B. P. (2012). Maintenance of genetic variation in human personality: Testing evolutionary models by estimating heritability due to common causal variants and investigating the effect of distant inbreeding. *Evolution*, *66*, 3238–3251. doi:10.1111/j.1558–5646.2012.01679.x

Watson, D., Clark, L. A., & Chmielewski, M. (2008). Structures of personality and their relevance to psychopathology: II. Further articulation of a comprehensive unified trait structure. *Journal of Personality*, *76*, 1545–1585. doi:10.1111/j.1467–6494.2008.00531.x

Woods, S. A., & Hardy, C. (2012). The higher-order factor structures of five personality inventories. *Personality and Individual Differences, 52*, 552–558. doi:10.1016/j.paid.2011.11.001

Yao, S., Långström, N., Temrin, H., & Walum, H. (2014). Criminal offending as part of an alternative reproductive strategy: investigating evolutionary hypotheses using Swedish total population data. *Evolution and Human Behavior*, *35*, 481–488. doi:10.1016/j.evolhumbehav.2014.06.007