Personality and Individual Differences 218 (2024) 112470

Contents lists available at ScienceDirect

Personality and Individual Differences

journal homepage: www.elsevier.com/locate/paid

The general factor of personality as a female-typical trait☆

Satoshi Kanazawa*

Department of Management, London School of Economics and Political Science, United Kingdom

ARTICLE INFO

Keywords:
The Big Five
Personality psychology
Differential psychology
"Personalient"
"Personalique"

ABSTRACT

General factor of personality (GFP) is a central concept in personality and individual differences. Various scholars have suggested that GFP is an indicator of social effectiveness, emotional intelligence, or slow life history. Because women have advantage over men in all three, women should have higher levels of GFP than men *regardless* of its true nature. Analyses of the National Child Development Study in the UK (Study 1; $n = 17{,}419$) and the National Longitudinal Study of Adolescent to Adult Health in the US (Study 2; $n = 20{,}745$) confirmed the hypothesis. Women had substantially higher levels of GFP than men did in both nations. Study 3 made the first attempt to extract a macrolevel GFP (the Big Big One) from aggregate data (mean Big Five personality factors in US states). The macrolevel GFP was also a female-typical trait, being significantly correlated with the proportion female in the state samples. The results from all three studies show that GFP is a female-typical trait.

The general factor of personality (GFP) was originally proposed as the personality equivalent of the general factor of intelligence (*g*) (Musek, 2007). Just as *g* exists at the apex of a hierarchical latent factor structure of various cognitive tests, GFP exists at the apex of a hierarchical latent factor structure of various personality tests. The same person – Sir Francis Galton – who originally proposed the general factor of intelligence (Galton, 1869) also initially hinted at the existence of the general factor of personality (Galton, 1884, 1887). A large number of studies have confirmed the existence of GFP (Dunkel et al., 2021; Figueredo et al., 2004; Kawamoto et al., 2017; Rushton et al., 2008; van der Linden, te Nijenhuis, et al., 2011; Veselka et al., 2012). For comprehensive reviews, see Musek (2017), Rushton (2020, pp. 286–302), Rushton and Irwing (2011), and van der Linden et al. (2017, 2021). In terms of the Big Five personality factors, GFP is positively associated with Openness to experience (O), Conscientiousness (C), Extraversion (E), and Agreeableness (A), and negatively associated with Neuroticism (N) (or positively associated with emotional stability). In other words, in factor analysis, O, C, E, and A have positive loadings, and N has a negative loading, on GFP.

Despite its long and prolific history, GFP remains a somewhat controversial concept. While most personality psychologists accept its existence, some contend that it is merely a methodological or mathematical artifact (Ashton et al., 2009; Bäckström et al., 2009; McCrae et al., 2008; Revelle & Wilt, 2013). For example, Ashton et al. (2009) suggest that any higher-order factor can be extracted from any set of same-sign indicators, but Musek (2017, p. 117) and Irwing (2013) empirically contradict their interpretation, showing that Ashton et al. (2009) assume orthogonality of the Big Five factors. Bäckström (2007) and Bäckström et al. (2009) argue that GFP merely captures social desirability as a survey response bias, but Musek (2017, pp. 113–116) argues that social desirability is not merely a response style but a genuine personality trait that happens to be correlated with GFP. Further, Irwing (2013) empirically demonstrates that GFP is not attributable to social desirability. Others have extensively and effectively dealt with these criticisms elsewhere (Irwing, 2013; Musek, 2017, pp. 107–123; van der Linden et al., 2016, 2017); I will therefore not repeat them here. The field of personality psychology has largely moved beyond these debates: "With the establishment of the existence of a GFP, attention has been redirected at identifying its nature" (Dunkel et al., 2021, p. 2). As van der Linden et al. (2017, pp. 37–38) astutely point out, the concept of the general factor of intelligence initially received *identical* criticisms that some personality psychologists now level against GFP. Yet today very few psychologists doubt the existence of *g*. The acceptance of GFP may similarly be a mere matter of time.

Perhaps the most convincing evidence for the substantive reality of GFP is the fact that the same single latent factor emerges *regardless of which personality test batteries one employs* (Loehlin, 2012; Loehlin & Martin, 2011; Rushton et al., 2009; van der Linden, te Nijenhuis, et al.,

☆ I thank Peter J. Rentfrow for very kindly sharing his unpublished data on the sample sex ratios from his 2008 study, and Curtis S. Dunkel, Aurelio José Figueredo, Jan te Nijenhuis, and Dimitri van der Linden for their comments on earlier drafts.

* Department of Management, London School of Economics and Political Science, Houghton Street, London WC2A 2AE, United Kingdom.
E-mail address: S.Kanazawa@lse.ac.uk.

https://doi.org/10.1016/j.paid.2023.112470
Received 23 August 2023; Received in revised form 24 October 2023; Accepted 30 October 2023

2011; but see de Vries, 2011, and Hopwood et al., 2011 for counterevidence). After statistical correction for measurement errors, correlations between GFPs extracted from different personality test batteries on the same set of respondents approach unity (Rushton & Irwing, 2011, Fig. 5.12). This is the personality equivalent of Spearman's (1927) "theorem of the indifference of the indicator" in the cognitive domain, according to which the same *g* will be extracted no matter what cognitive tests are used (Jensen, 1998). GFP is also known to have a genetic basis (Rushton et al., 2008; van der Linden et al., 2018b).

In this paper, I will continue personality and differential psychologists' current effort at identifying the precise nature of GFP, and venture into a hitherto unexplored area of GFP research: its potential sex difference. I will hypothesize that women have a significantly higher level of GFP than men do. Then, I will revisit Darwin's (1871, pp. 158–184) original speculation, later articulated and explicitly hypothesized by others (Figueredo et al., 2004; Rushton et al., 2008), that GFP has been evolutionarily selected. I will test these two hypotheses with two, large, nationally representative samples from prospectively longitudinal data in the United Kingdom (Study 1) and the United States (Study 2). I will then use previously published macrolevel data on the Big Five personality factors (means across 50 US states and the District of Columbia) in a first attempt to extract *a macrolevel GFP* (the Big Big One) (Study 3).

1. What is the nature of GFP?

Personality psychologists have proposed three related ideas about what the latent factor of GFP captures: Social effectiveness, emotional intelligence, and a slow life history indicator.

1.1. GFP as social effectiveness

Some scholars (Dunkel & van der Linden, 2014; Loehlin, 2012; Rushton & Irwing, 2011; van der Linden et al., 2016) suggest that GFP is a measure of social effectiveness. Because high levels of O, C, E, and A and low levels of N (or high levels of emotional stability) are all considered to be socially desirable, individuals who are high in GFP are preferred by others as friends, mates, allies, and colleagues. Individuals with higher levels of GFP possess the knowledge, competence, and motivation to behave in ways that others find attractive and desirable. As a result, those with high GFP are better able to achieve social goals in their interpersonal relations. Others are more likely to agree with such individuals and would want to help them.

Studies have confirmed the view that high-GFP individuals are more socially effective. Adolescents with higher levels of GFP are rated as more likable and popular by their classmates (van der Linden et al., 2010); military job applicants with higher levels of GFP are judged to be more suitable for the jobs and are thus more likely to be recruited, and soldiers with higher levels of GFP are judged by their supervisors to have greater integrity (van der Linden et al., 2014); job applicants with higher GFP are rated higher by recruiters (van der Linden, Bakker, et al., 2011), and employees with higher GFP are rated higher on their job performance by their supervisors (van der Linden, Bakker, et al., 2011); and sales employees with higher levels of GFP actually perform better by six different objective and quantitative sales performance measures (Sitser et al., 2013). There is therefore accumulating evidence that high-GFP individuals are more likely to be liked and valued in many domains of social life, and, as a result, they are more likely to achieve their social and interpersonal goals than low-GFP individuals are.

1.2. GFP as emotional intelligence

A very similar idea suggests that GFP is a measure of emotional intelligence (EI; Salovey & Mayer, 1990). While there is no universally accepted definition of EI (Zeidner et al., 2008), the concept is usually taken to encompass three distinct mental processes: empathy (appraising and expressing emotion in self and others), self-presentation (regulating emotion in self and others), and self-regulation of mood (using emotion adaptively to achieve one's goals) (Fox & Spector, 2000, pp. 204–206). The third part of the definition is essentially social effectiveness. Thus "if the GFP largely reflects social effectiveness..., then it can be expected to have some overlap with measures of EI, as EI also relates to how one effectively deals with social demands" (van der Linden et al., 2017, p. 37).

Trait EI refers to emotional intelligence that is manifest in specific trait or behavior such as empathy, assertiveness, and optimism, while *ability EI* (originally called *information-processing EI*) refers to the ability to identify, express and label emotions (Petrides & Furnham, 2000). The correlation between trait EI and ability EI is typically very low (Petrides, 2011). A large ($k = 142$, $n = 36{,}268$) meta-analysis (van der Linden et al., 2017) shows that the correlation between GFP and trait EI is $r = 0.86$, although that between GFP and ability EI is smaller ($r = 0.28$). The authors conclude that the correlation between GFP and trait EI is so large that GFP is practically synonymous with trait EI. A genetic study of North American monozygotic and dizygotic twins shows that the genetic correlation between GFP and trait EI is extremely high ($r = 0.90$), further bolstering the claim that the two constructs were virtually identical (van der Linden et al., 2018b). Emotional intelligence therefore may be the mechanism and means by which high-GFP individuals achieve high social effectiveness.

1.3. GFP as a slow life history indicator

A slightly different, but older, idea suggests that GFP is part of a bundle of traits that reflect slow life history (Figueredo et al., 2004; Rushton et al., 2008). Individuals vary in their life history strategies. Some individuals pursue a faster life history strategy characterized by shorter time horizons; such individuals behave as though life can end at any time, thus preferring short-term gains in the present over long-term investments in the future. Others pursue a slower life history strategy characterized by longer time horizons; such individuals behave as though life will continue for the foreseeable future, thus preferring long-term investments in the future over short-term gains in the present. Further, drawing on Darwin's (1871, pp. 158–184) suggestion that natural selection favors prosociality, altruism, cooperation, sympathy, and other traits that are today characterized as typical of a slower life strategy, researchers argue that there are selective forces for slower life strategies and against faster life strategies (Figueredo et al., 2004; Rushton et al., 2008). Some personality psychologists suggest that GFP is part of the suite of slower life strategy.

Accordingly, Figueredo et al. (2004) show that GFP and a slower-life strategy (what the authors call the "*K*-factor") are significantly and strongly correlated with each other ($r = 0.69$) and, together with "Covitality factor" (a measure of health, well-being, and positive affect), load on a single "Super-*K* factor." Rushton et al. (2008) demonstrate in three separate studies that individuals with higher levels of GFP are more altruistic and prosocial, and are less likely to engage in delinquent behavior. In their studies, individual differences in GFP emerge by early childhood, and are substantially heritable. Dunkel et al. (2014) show that GFP is significantly correlated with the tendency to cooperate in Prisoner's Dilemma games; high-GFP individuals are therefore more altruistic and prosocial. However, the association is significantly mediated by the subjects' life history strategy, thereby suggesting that GFP might be a measure of a slow life history strategy.

2. Is there a sex difference in GFP?

In this paper, I will not try to adjudicate between different proposals for the underlying nature of GFP. I will instead argue that, *regardless* of whether the true nature of GFP is social effectiveness, emotional intelligence, or slow life history, we would predict a significant sex difference in GFP, because there is a significant sex difference in social effectiveness, emotional intelligence, and life history speed. All three perspectives invariably lead to the prediction that women on average have a higher level of GFP than men do.

2.1. Sex difference in social effectiveness

To the best of my knowledge, there have been no studies that have specifically examined a sex difference in social effectiveness. However, there are some evolutionary theoretical reasons to expect women to be higher on social effectiveness than men are.

The available molecular genetic evidence suggests that humans practiced female exogamy throughout evolutionary history (Seielstad et al., 1998). When girls reached puberty, they left their natal groups to marry into neighboring tribes in order to avoid inbreeding, whereas boys stayed in their natal groups their entire lives. So all men in a hunter-gatherer band during human evolutionary history were genetically related to each other, whereas women were not. The practice of female exogamy meant that adult women have always had to navigate social and interpersonal relationships, maintain friendships and alliances, protect their children, and survive in the company of genetic strangers, whereas men could always fall back on their genetic relatedness to dictate their interpersonal relationships. Among other things, the human evolutionary history of female exogamy might suggest that judging and evaluating others according to their genetic similarity for preferential treatment of and altruistic behavior toward them, as proposed in the genetic similarity theory (Rushton, 1989; Rushton et al., 1984), may be more important for women than men. Men have always interacted with others to whom they are maximally genetically related to a known precise degree (brothers, uncles, nieces and nephews, cousins), whereas women interacted with others to whom they might or might not be genetically related and to an unknown degree.

This sex difference in the social world that adult women and men faced in the ancestral environment has left an evolutionary legacy in the architecture of the brain of women and men. The typical female brain is *empathizing*, while the typical male brain is *systemizing* (Baron-Cohen, 2003; Geary, 1998, pp. 259–303; Greenberg et al., 2018). The typical woman is therefore better than the typical man at relating with other humans and navigating interpersonal relationships, just as the typical man is better than the typical woman at figuring out logical systems of things. To this day, women are more interested in pursuing "people" occupations in which they typically deal with other people, whereas men are more interested in pursuing "things" occupations in which they typically deal with systems and things (Kuhn & Wolter, 2022; Lippa, 1998; Stern & Madison, 2022; Stoet & Geary, 2018).

All these evolutionary considerations would lead us to hypothesize that women on average are better than men at maintaining successful interpersonal relationships with friends and allies, because they are simply better at dealing with people than men are. They would therefore have higher levels of social effectiveness on average than men would.

2.2. Sex difference in emotional intelligence

Recall that emotional intelligence – especially trait EI – is very closely associated with social effectiveness, and social effectiveness is virtually synonymous with trait EI (van der Linden et al., 2017, 2018b). Thus, if women on average have higher levels of social effectiveness, then it logically follows that they should also have higher levels of emotional intelligence on average.

Available empirical evidence indeed confirms this prediction. A large number of studies show that women score higher than men in emotional intensity (Gross & John, 1998), emotional expressivity (Simon & Nath, 2004), emotional contagion (Doherty, 1997), empathy (Baron-Cohen, 2003; Baron-Cohen et al., 1997, 2001), and emotional intelligence (Clarke et al., 2016; Schutte et al., 1998). See Brody et al. (2016) for a comprehensive review. Given the evolved sex differences in the brain architecture discussed above (Baron-Cohen, 2003; Geary, 1998, pp. 259–303; Greenberg et al., 2018), where the typical female brain is empathizing (oriented toward other people) whereas the typical male brain is systemizing (oriented toward things and systems), such female advantage in emotional intelligence is hardly surprising.

Another reason to expect women to have higher emotional intelligence – in particular, empathy – is evolutionary. Women throughout human evolutionary history have been the primary caretakers of babies and infants. Until they are able to speak and articulate their needs, babies and infants are not able to communicate verbally what they need and want to their caretakers, and women have therefore had to *infer* what their babies and infants need without verbally communicating with them. There have been tremendous selection pressures for women's empathetic skills in this regard, as the babies and infants of women who were unable to infer their unverbalized needs were likely to suffer and possibly die. Incidentally, women's evolved higher skills at empathy is probably the primary reason that women dominate primatology (Fedigan, 1994). Primate subjects are also unable to verbalize their needs, wants, and emotional states, and good primatologists are nevertheless required to infer their primate subjects' unvocalized internal states during their observations.

2.3. Sex difference in life history strategy

In evolutionary biology, life history strategy is typically used to characterize entire species and populations on the fast–slow continuum (MacArthur & Wilson, 1967). In the study of humans, life history strategy is usually taken to be an individual difference variable within each sex, where some women in some environments pursue faster life history strategies than other women in different environments do, and some men in some environments pursue faster life strategies than other men in different environments do (Del Giudice, 2009; Gangestad & Simpson, 2000). However, it is nonetheless possible to discuss a sex difference in life history strategy. One can compare a female-typical life history strategy and a male-typical life history strategy, to see which sex on average might pursue a faster or slower life history strategy in general. A large meta-analysis suggests that males tend to pursue faster life history strategies in general than females, especially in the context of polygynous breeding systems (Tarka et al., 2018). Humans have had a mildly polygynous breeding system throughout evolutionary history (Alexander et al., 1979; Leutenegger & Kelly, 1977).

There is indeed evidence that men on average pursue faster life history strategies than women do. Physiologically, women live longer than men in every human society (Barford et al., 2006). It is true that girls mature faster than boys, and women attain smaller adult stature than men do, when both of these are indicators of faster life history strategies. However, women's faster rate of maturity and smaller adult stature are both direct consequences of polygynous breeding systems (Kanazawa & Novak, 2005). Behaviorally, due to the asymmetries in reproductive biology (Trivers, 1972), men pursue faster life history strategies by prioritizing mating opportunities over parental investments (Buss & Schmitt, 1993, 2019). Men are also far more competitive, aggressive and violent in their intrasexual competition than women are, which are also characteristics of faster life history strategies (Réale et al., 2010). It is therefore reasonable to conclude that, in general, men as a whole pursue faster life strategies than women do.

3. Summary

Regardless of whether the true nature of GFP is social effectiveness, emotional intelligence, or slower life history strategy, or some combination of the three, we would invariably predict that women on average would have a higher level of GFP than men would. In what follows, I will test this prediction with two separate, prospectively longitudinal, nationally representative samples from the United Kingdom (Study 1) and the United States (Study 2). Further, I will test the prediction, originating from Darwin (1871) and later articulated by Figueredo et al. (2004) and Rushton et al. (2008), that there is evolutionary selection for

GFP. If both predictions turn out to be true – if women have higher levels of GFP in general, and if there is current evolutionary selection for GFP – then we would inevitably be led to the conclusion that *humans are becoming more female over time in their typical personality*, in the sense that human personality in general – of both women and men – are becoming more female-typical. Then, in Study 3, I will use previously published macrolevel data on mean levels of the Big Five personality factors across the 50 states and the District of Columbia (Rentfrow et al., 2008) in a first known attempt to extract a macrolevel GFP (the Big Big One).

4. Study 1: United Kingdom

4.1. Data

The National Child Development Study (NCDS) is a large, ongoing, and prospectively longitudinal study that has followed a *population* (not a sample) of British respondents since birth for over 60 years. The study included *all* babies (n = 17,419) born in Great Britain (England, Wales, and Scotland) during one week (03–09 March 1958). The respondents were subsequently reinterviewed in 1965 (Sweep 1 at age 7; n = 15,496), 1969 (Sweep 2 at age 11; n = 18,285), 1974 (Sweep 3 at age 16; n = 14,469), 1981 (Sweep 4 at age 23; n = 12, 537), 1991 (Sweep 5 at age 33; n = 11,469), 1999–2000 (Sweep 6 at age 41–42; n = 11,419), 2004–2005 (Sweep 7 at age 46–47; n = 9534), 2008–2009 (Sweep 8 at age 50–51; n = 9790), and 2013 (Sweep 9 at age 55; n = 9137). There were more respondents in Sweep 2 than in the original sample (Sweep 0) because Sweep 2 sample included eligible children who were in the country in 1969 but not in 1958. In each sweep, personal interviews and questionnaires were administered to the respondents; to their mothers, teachers, and doctors during childhood; and to their partners and children in adulthood. Virtually all (97.8 %) of the NCDS respondents were Caucasian. The Centre for Longitudinal Studies (CLS) of University College London now conducts NCDS and the data are publicly and freely available to registered users of the UK Data Service (https://ukdataservice.ac.uk/).

4.2. GFP

At age 51 (and only at age 51), NCDS measured the respondents' Big Five personality factors with the 50-item International Personality Item Pool. Each respondent could answer each of the 10 statements per factor on a five-point Likert scale from 1 = "very inaccurate" to 5 = "very accurate." Thus, after reverse coding where necessary, each respondent's score varied from 10 to 50 on a personality factor.

I subjected the raw scores for the Big Five personality factors to principal axis factoring with no rotation. The factor analysis extracted only one latent factor with Eigenvalue >1.0, with the following factor loadings: O = 0.601, C = 0.399, E = 0.619, A = 0.564, N = −0.251. Unlike many previous studies on GFP (Rushton & Irwing, 2011), NCDS data did not require a two-step derivation process in which the Big Five personality factors were first reduced to the Big Two, and then finally to the Big One. GFP has a mean of 0 and a standard deviation of 1.

4.3. Other variables

The respondent's sex was measured at birth. The number of biological children the respondent has had was measured at ages 23, 33, 42, 47, 51, and 55.

4.4. Results

Fig. 1, Panel a), presents a clear sex difference in GFP among NCDS respondents. The mean GFP was 0.1242 among women and − 0.1289 among men (Cohen's d = 0.316; $t(7962)$ = 14.116, p < .001). The sex difference in GFP was therefore between "small" and "medium" (Cohen, 1992).

In the entire sample, GFP was largely uncorrelated with the number of biological children (age 23: r = 0.051, n = 6818, p < .001; age 33: r = −0.014, n = 7024, p = .232; age 42: r = 0.011, n = 6753, p = .345; age 47: r = 0.019, n = 6138, p = .136; age 51: r = 0.018, n = 6138, p = .155; age 55: r = 0.017, n = 6990, p = .151). However, the null correlations between GFP and the number of biological children in the entire sample masked some sex difference. It was largely negative among women (age 23: r = −0.095, n = 3499, p < .001; age 33: r = −0.075, n = 3633, p < .001; age 42: r = −0.044, n = 3519, p = .009; age 42: r = −0.029, n = 3205, p = .103; age 47: r = −0.029, n = 3205, p = .101; age 55: r = −0.030, n = 3607, p = .076) and largely positive among men, except at age 23 (age 23: r = −0.066, n = 3319, p < .001; age 33: r = 0.010, n = 3391, p = .553; age 42: r = 0.049, n = 3234, p = .006; age 47: r = 0.051, n = 2933, p = .006; age 51: r = 0.052, n = 2933, p = .005; age 55: r = 0.058, n = 3383, p < .001). Thus we have a curious situation in which British women who had more female-typical personality were less fertile, and British men who had more female-typical personality were more fertile.

4.5. Discussion

The analysis of the NCDS data supported the first prediction about the sex difference in GFP. As predicted, British women had a significantly higher level of GFP than British men did. The effect size was between "small" and "medium."

The NCDS data, however, did not support the prediction about the

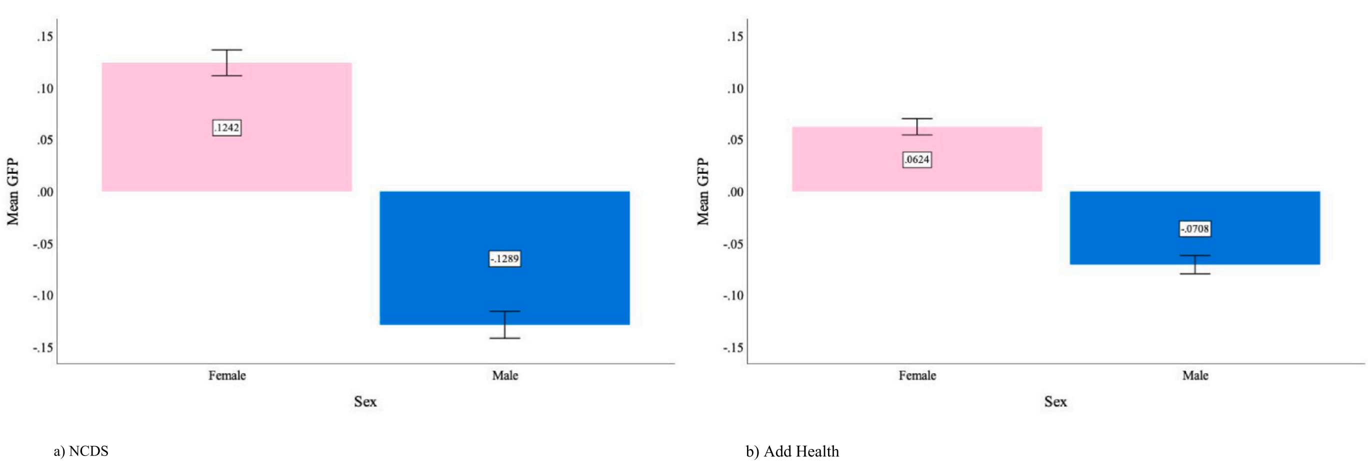

Fig. 1. Sex difference in general factor of personality: a) National Child Development Study; and b) Add Health.

evolutionary selection for GFP. Among the entire sample, GFP was largely uncorrelated with the number of biological children that the British respondents had (except for age 23). There were some sex differences in the association between GFP and fertility, in which the association was mostly negative among women and mostly positive among men. This result was consistent with some earlier findings (van der Linden et al., 2018a). Since every child has a mother and a father, and inherits its genes – including yet-to-be-identified genes for GFP – equally from its mother and father, the evidence suggests that there is no current evolutionary selection for GFP.

5. Study 2: United States

5.1. Data

National Longitudinal Study of Adolescent to Adult Health (Add Health) is a prospectively longitudinal study of a nationally representative sample of American youths, initially sampled when they were in junior high and high school in 1994–1995 (Wave I, n = 20,745, mean age = 15.6) and reinterviewed in 1996 (Wave II, n = 14,738, mean age = 16.2), in 2001–2002 (Wave III, n = 15,197, mean age = 22.0), in 2007–2008 (Wave IV, n = 15,701, mean age = 29.1), and in 2016–2018 (Wave V, n = 12,300, mean age = 38.0). See additional details of sampling and study design at http://www.cpc.unc.edu/projects/addhealth/design.

5.2. GFP

At age 29 (and only at age 29), Add Health measured the respondent's Big Five personality factors with the 20-item Mini-International Personality Item Pool. The respondent could answer each of the four statements per personality factor on a five-point Likert scale, from 1 = strongly disagree to 5 = strongly agree. Thus, after reverse coding where necessary, each respondent's score varied from 4 to 20 on a personality factor.

I subjected the raw scores for the Big Five personality factors to principal axis factoring with no rotation. The factor analysis extracted only one latent factor with Eigenvalue >1.0, with the following factor loadings: O = 0.484, C = 0.226, E = 0.466, A = 0.577, N = −0.230. Once again, Add Health data did not require a two-step derivation process and produced the Big One in one step.

5.3. Other variables

The respondent's sex was measured at age 15 in the first wave. The number of biological children the respondent has had was measured at ages 29 and 38.

5.4. Results

Fig. 1, Panel b), once again presents a clear sex difference in GFP among Add Health respondents, although the magnitude of the sex difference was smaller than it was among NCDS respondents in Study 1. The mean GFP was 0.0624 among women and − 0.0708 among men (Cohen's d = 0.181; t(15589) = 11.301, $p < .001$). The sex difference in GFP was therefore "small" (Cohen, 1992).

In the entire sample, there was no evidence that GFP was positively selected (age 29: r = −0.147, n = 15,540, $p < .001$; age 38: r = −0.003, n = 10,616, p = .735), and the results were replicated in a subsample of women (age 29: r = −0.180, n = 8274, $p < .001$; age 38: r = 0.006, n = 6094, p = .663) and in a subsample of men (age 29: r = −0.144, n = 7264, $p < .001$; age 38: r = −0.009, n = 45,211, p = .525).

5.5. Discussion

The results from Add Health largely replicated the results from NCDS in Study 1. There is a clear and significant sex difference in GFP (although the absolute magnitude of the sex difference was smaller in Add Health than in NCDS); American women on average had a significantly higher level of GFP than American men did. Study 2 also replicated Study 1's null result on the evolutionary selection for GFP. There was no evidence that individuals with higher levels of GFP had greater fertility, and, unlike in Study 1, there was no evidence of sex difference in it.

6. Study 3: The Big Big One

6.1. Data

I used the previously published data on the mean levels of the Big Five personality factors across the 50 states and the District of Columbia in the United States (Rentfrow et al., 2008, p. 351, Table 1). I used the z scores presented in the table as raw data for the level of O, C, E, A, and N in each state and subjected them to factor/principal component analysis. The sex ratios (proportion female) in each state sample were obtained personally from the first author of the study. The proportion female in the state population in 2000 (around the time that Rentfrow et al. (2008) collected their data) was obtained from the Census Bureau (https://www2.census.gov/library/publications/decennial/2000/briefs/c2kbr01-09.pdf), and the measures of state fertility in 2005 were obtained from the Centers for Disease Control and Prevention (https://www.cdc.gov/nchs/pressroom/sosmap/fertility_rate/fertility_rates.htm). It was the earliest year the data were available at this website.

6.2. Results

In individual studies of GFP, it is generally recommended that one use factor analysis, in particular, principal axis factoring, not principal component analysis, in order to extract GFP from the individual measures of personality (van der Linden et al., 2017, p. 38n, footnote 1). However, since this was the very first attempt to extract a GFP from macrolevel data, I used both principal axis factoring (GFP-PAF) and principal component analysis (GFP-PC) to extract a macrolevel GFP. In the end, however, it made very little difference which method I used, as the two alternate measures of the macrolevel GFP were virtually identical (r = 0.973).

In principal axis factoring, the factor loadings were: O = −0.250, C = 0.742, E = 0.568, A = 0.826, and N = −0.227. The extracted factor explained 43.67 % of the variance in the measures of Big Five personality factors. In principal component analysis, the loadings were: O = −0.402, C = 0.800, E = 0.736, A = 0.833, and N = −0.362. The measures of Big Five personality factors explained 43.37 % of the variance in the component. Unlike in all previous studies of GFP at the individual level (including Studies 1 and 2 above), the loadings for O in both principal axis factoring and principal component analysis were negative.

Both measures of the macrolevel GFP were very strongly and significantly associated with the proportion female in the sample (GFP-PAF: r = 0.420, n = 51, p = .002; GFP-PC: r = 0.365, n = 51, p = .008). Interestingly, neither measure of macrolevel GFP were significantly associated with the proportion female *in the state population* (GFP-PAF: r = 0.054, n = 51, p = .707; GFP-PC: r = −0.052, n = 0.51, p = .718). This is despite the fact that the sample proportion female and population proportion female were moderately positively associated (r = 0.318, n = 51, p = .023). Thus the female typicality of the macrolevel GFPs were driven by the sample characteristics, not by the population characteristics.

Fig. 2 presents the scatterplot for the bivariate association between GFP-PAF and sample proportion female. The comparable figure for GFP-PC looks virtually identical. The figure presents a very strong positive association between GFP-PAF and the proportion female in the sample. One also detects that Alaska and Utah are outliers in the scatterplot. Removing Alaska and Utah from the analysis slightly increases the

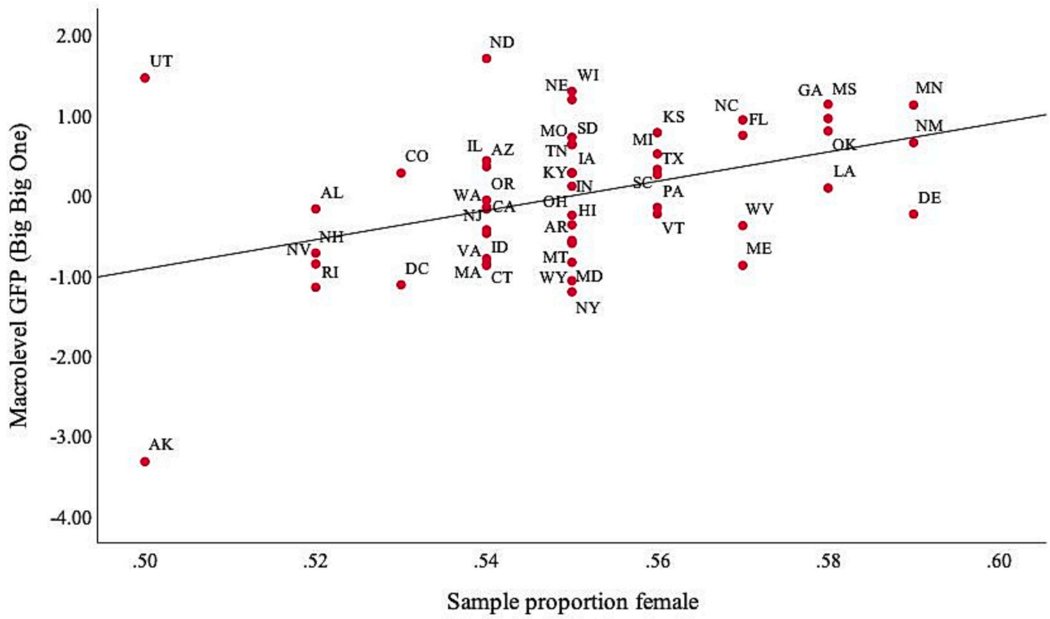

Fig. 2. Bivariate association between macrolevel GFP (GFP–PAF) and proportion female in the state sample.

positive association between macrolevel GPF and sample proportion female (GFP–PAF: $r = 0.444$, $n = 49$, $p = .001$; GFP–PC: $r = 0.400$, $n = 49$, $p = .004$).

Contrary to the findings in Studies 1 and 2 at the individual level, macrolevel GFP was positively associated with state fertility, measured by general fertility rate (number of children born per 1000 women aged 15–44) (GFP–PAF: $r = 0.285$, $n = 50$, $p = .045$; GFP–PC: $r = 0.386$, $n = 50$, $p = .006$). (The state fertility is not available for the District of Columbia.) Note, however, that both measures of macrolevel GFP were driven by the sample proportion female, *not* by the population proportion female. Thus the large positive association between macrolevel GFP and state fertility seemingly suggests that general fertility was higher in states in which Rentfrow et al. (2008) recruited proportionately more female respondents than in states in which they recruited proportionately more male respondents. Yet fertility was not associated with sample proportion female ($r = -0.174$, $n = 50$, $p = .226$), while it was significantly and strongly *negatively* associated with population proportion female ($r = -0.594$, $n = 50$, $p < .001$).

6.3. Discussion

Study 3 presented a preliminary attempt to extract a macrolevel GFP (the Big Big One) from aggregate data on mean levels of the Big Five personality factors. While I was able to extract a macrolevel GFP successfully, and it was robust to the specific method of extraction (principal axis factoring vs. principal component analysis), there were some oddities in the results. Unlike all studies of GFP at the individual level, O was negatively, not positively, associated with macrolevel GFP. It is not immediately obvious why GFP is positively associated with O at the individual level and negatively associated with it at the macro level, *when it is similarly associated, with the identical signs, with the other four Big Five personality factors.*

Consistent with the results from Studies 1 and 2, the macrolevel GFP was also a female-typical trait, being significantly positively associated with the sample (though not population) proportion female. The higher the proportion of women in the state sample in Rentfrow et al.'s (2008) original study, the higher the macrolevel GFP (See Fig. 2).

Unlike the results from Studies 1 and 2, there was some evidence that macrolevel GFP may be evolutionarily selected. It was significantly positively associated with general fertility in the state around the time when Rentfrow et al. (2008) collected their data. Fertility was not significantly associated with the sample proportion female, yet it was positively associated with macrolevel GFP, which was partly driven by sample proportion female.

7. General discussion

Prospectively longitudinal data from large representative population samples from the United Kingdom (Study 1) and the United States (Study 2) replicated earlier, smaller studies and established the existence of GFP. Both studies also confirmed the first hypothesis about the sex difference in GFP; both in the UK and in the US, women had significantly higher levels of GFP than men did. However, Studies 1 and 2 did not confirm the second hypothesis about the current evolutionary selection for GFP. There was no evidence in either nation that individuals with higher levels of GFP were reproductively more successful (at least as measured by the total number of biological children).

Study 3 represented the first known attempt to extract a macrolevel GFP (the Big Big One) by using the aggregate data (mean levels of the Big Five personality factors across the US 50 states and the District of Columbia). Via both principal axis factoring and principal component analysis, I successfully extracted a macrolevel GFP. The Big Big One was also a female-typical trait; it was significantly positively correlated with the proportion female in the state sample. While the macrolevel GFP was significantly associated with the general fertility in the state, it is difficult to interpret this finding when one recalls that the macrolevel GFP was driven by sample proportion female, not by population proportion female.

While GFP indeed appears to be a female-typical trait, the future does *not* appear to be female. There is no evidence that humans are becoming more female in their personality. Even though the future may not be female, however, the results presented in this paper suggest that the present may be female. The significant sex difference in GFP means that the suite of more desirable personality – high O, C, E, A, and low N – is a female-typical trait. Women are more likely to possess higher levels of GFP than men are. Paradoxical though it may sound, *human* personality is more female than male, perhaps somewhat similar to the manner in which some suggest that human intelligence is more male than female (Baron-Cohen, 2003; Irwing & Lynn, 2005; Lynn & Irwing, 2004).

It is important to note, however, that the conclusion derived from the results presented above that the future is *not* female is contradicted by other studies. Individuals with slower life history strategy have higher fertility in the United States and Sweden (Woodley of Menie et al., 2017), and American men and women who are high on Extraversion and Openness, and low on Neuroticism – and therefore high on GFP – have more children (Jokela et al., 2011). More research is clearly necessary to adjudicate between conflicting results and determine whether the future is indeed female.

The strategic differentiation-integration effort hypothesis (Figueredo et al., 2013) proposes that, as individuals and populations become more *K*-selected, adopting slower life history strategies, *K*-selective traits become less positively correlated with each other, allowing more *K*-selected individuals to pursue more specialized niches in the environment. Both in the NCDS and Add Health data, however, the correlations between GFP and such other indicators of slow life history strategy as general intelligence, height, and the number of children at a young age (as an inverse indicator of slow life history strategy) were actually *stronger among women than men* (NCDS: intelligence: $r = 0.246$ vs. 0.245; height: $r = 0.082$ vs. 0.056; number of children: $r = -0.095$ vs. –0.066; Add Health: intelligence: $r = 0.263$ vs. 0.252; height: $r = 0.068$ vs. 0.049; number of children: $r = -0.180$ vs. –0.144). Thus, assuming that women are indeed more *K*-selected than men are, there does not appear to be any evidence in support of the strategic differentiation-integration effort hypothesis in the NCDS and Add Health data.

7.1. Limitations

The results from Studies 1 and 2 are both consistent with previous studies (in that they demonstrated the existence of GFP) and consistent with each other (in that they both showed a clear sex difference in GFP and no evidence for its evolutionary selection). In contrast, the results from Study 3 must be interpreted very cautiously as only preliminary. First, this is the very first attempt to extract a macrolevel GFP (the Big Big One), and, as such, must be replicated with other aggregate data on the Big Five (and other) personality factors. (Recall that GFP, like *g*, is indifferent to specific test batteries.) Second, it is not clear why O loaded negatively on GFP at the macrolevel, when it always loads positively at the individual level. Third, it is not clear what GFP's significantly positive association with state fertility means substantively, when one recalls that the macrolevel GFP was significantly associated with sample proportion female but not with population proportion female. It appears to lead to the seemingly impossible-to-interpret conclusion that general fertility is higher in states in which Rentfrow et al. (2008) recruited proportionately more female respondents. Both the concept of the macrolevel GFP and its substantive interpretation await further empirical investigations and verifications.

8. Conclusion

If it can be firmly established that GFP is a female-typical trait, based on empathizing (social effectiveness, emotional intelligence), just as some scholars have argued that general intelligence is a male-typical trait based on systemizing (Irwing & Lynn, 2005; Lynn & Irwing, 2004; Baron-Cohen, 2003; Geary, 1998, pp. 259–303; Greenberg et al., 2018), then, among many other theoretical and practical implications, the current findings provide a potential causal explanation for the fact that men are more likely to seek "things" occupations while women are more likely to seek "people" occupations" (Kuhn & Wolter, 2022; Lippa, 1998; Stern & Madison, 2022; Stoet & Geary, 2018).

If the general factor of personality (GFP) is as firmly established empirically as the general factor of intelligence (*g*), then we may soon face a need for a neologism. Individuals who have higher levels of intelligence are called "intelligent." We do not have a comparable word for individuals who have higher levels of personality – individuals who have higher levels of GFP. Neither of the two adjectives that share the root with the word "personality" – personal and personable – mean exactly "having higher levels of GFP," in the same sense that "intelligent" means "having higher levels of *g*." "Personable" is closer to it than "personal," but it is not obvious why someone who is more Open or more Conscientious is more personable. Neologisms are terrible, and to be avoided at all cost, *except* when there are no other alternatives. We may soon face a need to invent a new adjective in the English language, like *personalient* or *personalique*, to denote "having higher levels of GFP.

CRediT authorship contribution statement

As the sole author of the manuscript, SK is responsible for all of its aspects.

Declaration of competing interest

The author declares absolutely no conflict of interest, real or perceived.

Data availability

All the data are already publicly available.

References

Alexander, R. D., Hoogland, J. L., Howard, R. D., Noonan, K. M., & Sherman, P. W. (1979). Sexual dimorphisms and breeding systems in pinnipeds, ungulates, primates and humans. In N. A. Chagnon, & W. Irons (Eds.), *Evolutionary biology and human social behavior: An anthropological perspective* (pp. 402–435). Duxbury.

Ashton, M. C., Lee, K., Goldberg, L. R., & de Vries, R. E. (2009). Higher order factors of personality: Do they exist? *Personality and Social Psychology Review, 13*, 79–91. https://doi.org/10.1177/1088868309338467

Bäckström, M. (2007). Higher-order factors in a five-factor personality inventory and its relation to social desirability. *European Journal of Psychological Assessment, 23*, 63–70. https://doi.org/10.1027/1015-5759.23.2.63

Bäckström, M., Björklund, F., & Larsson, M. R. (2009). Five-factor inventories have a major general factor related to social desirability which can be reduced by framing items neutrally. *Journal of Research in Personality, 43*, 335–344. https://doi.org/10.1016/j.jrp.2008.12.013

Barford, A., Dorling, D., Davey Smith, G., & Shaw, M. (2006). Life expectancy: Women now on top everywhere. *British Medical Journal, 332*, 808.

Baron-Cohen, S. (2003). *The essential difference*. Penguin.

Baron-Cohen, S., Jolliffe, T., Mortimore, C., & Robertson, M. (1997). Another advanced test of theory of mind: Evidence from very high functioning adults with autism or Asperger syndrome. *Journal of Child Psychology and Psychiatry, 38*, 813–822.

Baron-Cohen, S., Wheelwright, S., Hill, J., Raste, Y., & Plumb, I. (2001). The "reading of the mind in the eyes" test revised version: A study with normal adults and adults with Asperger syndrome or high-functioning autism. *Journal of Child Psychology and Psychiatry, 42*, 241–251.

Brody, L. R., Hall, J. A., & Stokes, L. R. (2016). Gender and emotion: Theory, findings, and context. In L. F. Barrett, M. Lewis, & J. M. Haviland-Jones (Eds.), *Handbook of emotions* (4th ed., pp. 369–392). Guilford.

Buss, D. M., & Schmitt, D. P. (1993). Sexual strategies theory: An evolutionary perspective on human mating. *Psychological Review, 100*(204–232), 8.

Buss, D. M., & Schmitt, D. P. (2019). Mate preferences and their behavioral manifestations. *Annual Review of Psychology, 70*, 77–110. https://doi.org/10.1146/annurev-psych-010418-10340

Clarke, M. J., Marks, A. D. G., & Lykins, A. D. (2016). Bridging the gap: The effect of gender normativity on differences in empathy and emotional intelligence. *Journal of Gender Studies, 25*, 522–539. https://doi.org/10.1080/09589236.2015.1049246

Cohen, J. (1992). A power primer. *Psychological Bulletin, 112*, 155–159.

Darwin, C. (1871/1981). *The descent of man, and selection in relation to sex*. Princeton University Press.

de Vries, R. E. (2011). No evidence for a general factor of personality in the HEXACO personality inventory. *Journal of Research in Personality, 45*, 229–232. https://doi.org/10.1016/j.jrp.2010.12.002

Del Giudice, M. (2009). Sex, attachment, and the development of reproductive strategies. *Behavioral and Brain Sciences, 32*, 1–67. https://doi.org/10.1017/S0140525X09000016

Doherty, R. W. (1997). The emotion contagion scale: A measure of individual differences. *Journal of Nonverbal Behavior, 21*, 131–154.

Dunkel, C. S., Summerville, L. A., Mathes, E. W., Kesserling, S. N., Yockey, S. D., Reeve, S. D., & Stolmeier, J. M. (2014). Using the prisoner's dilemma task to examine the cooperative and social effectiveness hypotheses of the general factor of personality. *Human Ethology Bulletin, 29*(3), 14–22.

Dunkel, C. S., & van der Linden, D. (2014). Evidence for the general factor of personality as social-effectiveness. *Personality and Individual Differences, 64*, 147–151. https://doi.org/10.1016/j.paid.2014.02.030

Dunkel, C. S., van der Linden, D., Kawamoto, T., & Ohio, A. (2021). The general factor of personality as ego-resiliency. *Frontiers in Psychology, 12*, Article 741462. https://doi.org/10.3389/fpsyg.2021.741462

Fedigan, L. M. (1994). Science and the successful female: Why there are so many women primatologists. *American Anthropologist, 96*, 529–540.

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.

Figueredo, A. J., Woodley, M. A., Brown, S. D., & Ross, K. C. (2013). Multiple successful tests of the strategic differentiation-integration effort (*SD-IE*) hypothesis. *Journal of Social, Evolutionary, and Cultural Psychology, 7*, 361–383.

Fox, S., & Spector, P. E. (2000). Relations of emotional intelligence, practical intelligence, general intelligence, and trait affectivity with interview outcomes: It's not all just "G". *Journal of Organizational Behavior, 21*, 203–220.

Galton, F. (1869). *Hereditary genius: An inquiry into its laws and consequences*. Macmillan.

Galton, F. (1884). Measurement of character. *Fortnightly Review, 36*, 179–185.

Galton, F. (1887). Good and bad temper in English families. *Fortnightly Review, 42*, 21–30.

Gangestad, S. W., & Simpson, J. A. (2000). The evolution of human mating: Trade-offs and strategic pluralism. *Behavioral and Brain Sciences, 23*, 573–644.

Geary, D. C. (1998). *Male, female: The evolution of human sex differences*. American Psychological Association.

Greenberg, D. M., Warrier, V., Allison, C., & Baron-Cohen, S. (2018). Testing the empathizing–systemizing theory of sex differences and the Extreme Male Brain theory of autism in half a million people. *Proceedings of the National Academy of Sciences, 115*, 12152–12157. https://doi.org/10.1073/pnas.1811032115

Gross, J. J., & John, O. P. (1998). Mapping the domain of expressivity: Multimethod evidence for a hierarchical model. *Journal of Personality and Social Psychology, 74*, 170–191.

Hopwood, C. J., Wright, A. G. C., & Donnellan, M. B. (2011). Evaluating the evidence for the general factor of personality across multiple inventories. *Journal of Research in Personality, 45*, 468–478. https://doi.org/10.1016/j.jrp.2011.06.002

Irwing, P. (2013). The general factor of personality: Substance or artefact? *Personality and Individual Differences, 55*, 234–242. https://doi.org/10.1016/j.paid.2013.03.002

Irwing, P., & Lynn, R. (2005). Sex differences in means and variability on Progressive Matrices in university students: A meta-analysis. *British Journal of Psychology, 96*, 505–524.

Jensen, A. R. (1998). *The g factor: The science of mental ability*. Praeger.

Jokela, M., Alvergne, A., Pollet, T. V., & Lummaa, V. (2011). Reproductive behavior and personality traits of the Five Factor Model. *European Journal of Personality, 25*, 487–500. https://doi.org/10.1002/per.822

Kanazawa, S., & Novak, D. L. (2005). Human sexual dimorphism in size may be triggered by environmental cues. *Journal of Biosocial Science, 37*, 657–665.

Kawamoto, T., van der Linden, D., & Dunkel, C. S. (2017). The General Factor of Personality (GFP) and moral foundations. *Personality and Individual Differences, 119*, 78–82. https://doi.org/10.1016/j.paid.2017.06.043

Kuhn, A., & Wolter, S. C. (2022). Things versus people: Gender differences in vocational interests and in occupational preferences. *Journal of Economic Behavior and Organization, 203*, 210–234. https://doi.org/10.1016/j.jebo.2022.09.003

Leutenegger, W., & Kelly, J. T. (1977). Relationship of sexual dimorphism in canine size and body size to social, behavioral, and ecological correlates in anthropoid primates. *Primates, 18*, 117–136.

Lippa, R. (1998). Gender-related individuals differences and the structure of vocational interests: The importance of the people-things dimension. *Journal of Personality and Social Psychology, 74*, 996–1009.

Loehlin, J. C. (2012). How general across inventories is a general factor of personality? *Journal of Research in Personality, 46*, 258–263. https://doi.org/10.1016/j.jrp.2012.02.003

Loehlin, J. C., & Martin, N. G. (2011). The general factor of personality: Questions and elaborations. *Journal of Research in Personality, 45*, 44–49.

Lynn, R., & Irwing, P. (2004). Sex differences on the progressive matrices: A meta-analysis. *Intelligence, 32*, 481–498.

MacArthur, R. H., & Wilson, E. O. (1967). *The theory of island biogeography*. Princeton University Press.

McCrae, R. R., Yamagata, S., Jang, K. L., Riemann, R., Ando, J., Ono, Y., et al. (2008). Substance and artifact in the higher-order factors of the Big Five. *Journal of Personality and Social Psychology, 95*, 442–455 (10.1037/10.1037/0022-3514.95.2.442).

Musek, J. (2007). A general factor of personality: Evidence for the Big One in the five-factor model. *Journal of Research in Personality, 41*, 1212–1233. https://doi.org/10.1016/j.jrp.2007.02.003

Musek, J. (2017). *The general factor of personality*. Academic Press.

Petrides, K. V. (2011). Ability and trait emotional intelligence. In T. Chamorro-Premuzic, S. von Stumm, & A. Furnham (Eds.), *The Wiley-Blackwell handbook of individual differences* (pp. 656–678). Blackwell.

Petrides, K. V., & Furnham, A. (2000). On the dimensional structure of emotional intelligence. *Personality and Individual Differences, 29*, 313–320.

Réale, D., Garant, D., Humphries, M. M., Bergeron, P., Careau, V., & Montiglio, P.-O. (2010). Personality and the emergence of the pace-of-life syndrome concept at the population level. *Philosophical Transactions of the Royal Society, Series B, 365*, 4051–4063.

Rentfrow, P. J., Gosling, S. D., & Potter, J. (2008). A theory of the emergence, persistence, and expression of geographic variation in psychological characteristics. *Perspectives on Psychological Science, 3*, 339–369.

Revelle, W., & Wilt, J. (2013). The General Factor of Personality: A general critique. *Journal of Research in Personality, 47*, 493–504. https://doi.org/10.1016/j.jrp.2013.04.012

Rushton, J. P. (1989). Genetic similarity, human altruism, and group selection. *Behavioral and Brain Sciences, 12*, 503–559.

Rushton, J. P. (2020). *Odyssey: My life as a controversial evolutionary psychologist*. Mindstir Media.

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

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

Rushton, J. P., & Irwing, P. (2011). The general factor of personality: Normal and abnormal. In T. Chamorro-Premuzic, S. von Stumm, & A. Furnham (Eds.), *The Wiley-Blackwell handbook of individual differences* (pp. 132–161). Blackwell.

Rushton, J. P., Russell, R. J. H., & Wells, P. A. (1984). Genetic similarity theory: Beyond kin selection. *Behavior Genetics, 14*, 179–193.

Salovey, P., & Mayer, J. D. (1990). Emotional intelligence. *Imagination, Cognition and Personality, 9*, 557–568.

Schutte, N. S., Malouff, J. M., Hall, L. E., Haggerty, D. J., Cooper, J. T., Golden, C. J., & Dornheim, L. (1998). Development and validation of a measure of emotional intelligence. *Personality and Individual Differences, 25*, 167–177.

Seielstad, M. T., Minch, T., & Cavalli-Sforza, L. L. (1998). Genetic evidence for a higher female migration rate in humans. *Nature Genetics, 20*, 278–280.

Simon, R. W., & Nath, L. E. (2004). Gender and emotion in the United States: Do men and women differ in self-reports of feelings and expressive behavior? *American Journal of Sociology, 109*, 1137–1176.

Sitser, T., van der Linden, D., & Born, M. P. (2013). Predicting sales performance criteria with personality measures: The use of the general factor of personality, the Big Five and narrow traits. *Human Performance, 26*, 126–149. https://doi.org/10.1080/08959285.2013.765877

Spearman, C. (1927). *The abilities of men: Their nature and measurement*. Macmillan.

Stern, C., & Madison, G. (2022). Sex differences and occupational choice: Theorizing for policy informed by behavioral science. *Journal of Economic Behavior and Organization, 202*, 694–702. https://doi.org/10.1016/j.jebo.2022.08.032

Stoet, G., & Geary, D. C. (2018). The gender-equality paradox in science, technology, engineering, and mathematics education. *Psychological Science, 29*, 581–593. https://doi.org/10.1177/0956797617741719

Tarka, M., Guenther, A., Niemelä, P. T., Nakagawa, S., & Noble, D. W. (2018). Sex differences in life history, behavior, and physiology along a slow-fast continuum: A meta-analysis. *Behavioral Ecology and Sociobiology, 72*, 132. https://doi.org/10.1007/s00265-018-2534-2

Trivers, R. L. (1972). Parental investment and sexual selection. In B. Campbell (Ed.), *Sexual selection and the descent of man 1871–1971* (pp. 136–179). Aldine.

van der Linden, D., Bakker, A. B., & Serlie, A. W. (2011). The General Factor of Personality in selection and assessment samples. *Personality and Individual Differences, 51*, 641–645. https://doi.org/10.1016/j.paid.2011.05.032

van der Linden, D., Dunkel, C. S., Figueredo, A. J., Gurven, M., von Rueden, C., & Woodley of Menie, M. A. (2018a). How universal is the general factor of personality? An analysis of the Big Five in forager farmers of the Bolivian Amazon. *Journal of Cross-Cultural Psychology, 49*, 1081–1097. https://doi.org/10.1177/0022022118774925

van der Linden, D., Dunkel, C. S., & Petrides, K. V. (2016). The General Factor of Personality (GFP) as social effectiveness: Review of the literature. *Personality and Individual Differences, 101*, 98–105. https://doi.org/10.1016/j.paid.2016.05.020

van der Linden, D., Dunkel, C. S., & Wu, P. (2021). Is there a meaningful general factor of personality? *Spanish Journal of Psychology, 24*, Article e9. https://doi.org/10.1017/SJP.2021.2

van der Linden, D., Pekaar, K. A., Bakker, A. B., Schermer, J. A., Vernon, P. A., Dunkel, C. S., & Petrides, K. V. (2017). Overlap between the general factor of personality and emotional intelligence: A meta-analysis. *Psychological Bulletin, 143*, 36–52. https://doi.org/10.1037/bul0000078

van der Linden, D., Schermer, J. A., de Zeeuw, E., Dunkel, C. S., Pekaar, K. A., Bakker, A. B., … Petrides, K. V. (2018b). Overlap between the general factor of personality and trait emotional intelligence: A genetic correlation study. *Behavior Genetics, 48*, 147–154. https://doi.org/10.1007/s10519-017-9885-8

van der Linden, D., Scholte, R. H. J., Cillessen, A. H. N., te Nijenhuis, J., & Segers, E. (2010). Classroom ratings of likeability and popularity are related to the Big Five and the general factor of personality. *Journal of Research in Personality, 44*, 669–672. https://doi.org/10.1016/j.jrp.2010.08.007

van der Linden, D., te Nijenhuis, J., Cremers, M., & van de Ven, C. (2011). General factors of personality in six datasets and a criterion-related validity study at the Netherlands armed forces. *International Journal of Selection and Assessment, 19*, 157–169.

van der Linden, D., te Nijenhuis, J., Cremers, M., van de Ven, C., & van der Heijden-Lek, K. (2014). The general factor of personality (GFP) relates to other ratings of character and integrity: Two validity studies in personnel selection and training of the Dutch armed forces. *International Journal of Selection and Assessment, 22*, 261–271.

Veselka, L., Just, C., Jang, K. L., Johnson, A. M., & Vernon, P. A. (2012). The General Factor of Personality: A critical test. *Personality and Individual Differences, 52*, 261–264. https://doi.org/10.1016/j.paid.2011.10.007
Woodley of Menie, M. A., de Baca, T. C., Fernandes, H. B. F., Madison, G., Figueredo, A.-J., & Aguirre, M. P. (2017). Slow and steady wins the race: *K* positively predicts fertility in the USA and Sweden. *Evolutionary Psychological Science, 3*, 109–117. https://doi.org/10.1007/s40806-016-0077-1
Zeidner, M., Roberts, R. D., & Matthews, G. (2008). The science of emotional intelligence: Current consensus and controversies. *European Psychologist, 13*, 64–78. https://doi.org/10.1027/1016-9040.13.1.64