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# Using a prison sample to assess the association between the general factor of personality and general intelligence

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ABSTRACT

To date, most research has indicated that there is a positive, yet small, association between the general factor of personality (GFP) and general intelligence (*g*). The premise of the current study was that this relationship could be underestimated due to the measures used to compute a GFP and the failure to control for a social desirability response bias. These possible attenuating factors were examined through the analysis of an extensive data file of prisoners. The GFP was significantly correlated with *g* and this association was stronger with more extensive tests of *g*, with a California Personality Inventory based GFP in comparison to a Minnesota Multiphasic Personality Inventory based GFP, and when socially desirable responding was included as a statistical control. Additional analyses also revealed that the GFP shows Jensen Effects, the stronger the *g* loaded the scale the stronger its correlation with the GFP. A similar trend was found when examining the strength of the correlations between *g* and the personality scales. The higher a personality scale loaded on the GFP, the stronger it tended to correlate with *g*. The results may be informative as to the underlying basis for the GFP.



## 1. Introduction

The notion that a general factor exists in temperament is a relatively old one, dating back to Galton in 1887. For several decades, the main view on the general factor of personality (GFP) was that it merely reflects socially desirable response tendencies (e.g., faking good) in personality measures (e.g. McCrae et al., 2008). As such, the GFP was considered a construct with relatively limited theoretical or practical value. More recently, however, a number of researchers have suggested that the GFP may reflect a substantive trait indicating a *true* tendency for socially desirable behavior. Figueredo, Vásquez, Brumbach, and Schneider (2004) were one of the first to re-emphasize that idea, which thereafter was picked up by several others (e.g., Irwing, 2013; Musek, 2007; Rushton, Bons, & Hur, 2008). Moreover, in a recent article Irwing (2013) provided a list of arguments in favor of the GFP as a substantive factor, including psychometric and genetic evidence.

In this substantive view, high-GFP individuals on average are more open-minded, hard-working, sociable, altruistic, and emotionally stable. Consistent with this, the GFP is assumed to be accompanied by relatively high levels of emotional intelligence and subjective well-being (Musek, 2007; Rushton & Irwing, 2011). Some have described the GFP as a social effectiveness factor (e.g., Loehlin, 2012a,b; Rushton & Irwing, 2011; Rushton et al., 2008) and there are now several studies supporting this substantive view of the GFP. For example, it was found that high-GFP employees are rated more favorably on performance by their supervisors (Van der Linden, Te Nijenhuis, & Bakker, 2010), high-GFP adolescents are rated as more likable and popular by their classmates (Van der Linden, Scholte,

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Cillessen, Te Nijenhuis, & Segers, 2010). Recently, Dunkel and Van der Linden (2014) found that GFPs derived from multiple personality measures were strongly correlated with multiple measures of social-effectiveness and that the associations were not a function of social-desirable response bias.

One of the explanations for the origin of the GFP is that it emerged due to evolutionary selective forces toward social desirable behavior (Rushton et al., 2008). Under conditions where cooperativeness would have made groups of humans more competitive, individuals displaying a broad range of socially desirable behaviors would be preferred by others as mates, co-workers, or leaders. This effect would be accompanied by a social advantage leading to more surviving offspring among those exhibiting higher levels of the GFP. Importantly, this evolutionary explanation also predicts that the GFP may be a life history trait that is associated with cognitive ability as reflected in general intelligence or *g* (Rushton, 1985). Life history describes the ways in which resources are allocated among different domains of fitness based on factors such as the stability of an environment, with stable or predictable environments encouraging individuals to allocate more effort into parenting, society-building and the development of larger brains, and unstable environments instead encouraging higher levels of mating and faster rates of maturation among offspring. Rushton's model is based on the idea that one dimension of life history undergirds all sources of cognitive and conative behavioral variation and explicitly predicts correlations (both at the individual and group-differences level) among many traits, including *g* and the GFP. While this model has been validated for three major domains of individual differences (covitality — an index of general health, the GFP and *K* — a 'core life history factor' present among diverse behavioral measures Figueredo, Vásquez, Brumbach, & Schneider, 2007; Figueredo et al., 2004), a recent meta-analysis revealed a non-significant relationship between *g* and *K* (Woodley, 2011).

In the case of the relationship between *g* and the GFP, the data are not as clear-cut. On the one hand, Dunkel (2013) found relatively strong correlations between the GFP and *g*. However, in this particular study the GFP was extracted from data comprised of ratings from multiple independent raters, rating participants at multiple points in time, and utilizing the rarely employed Q-sort methodology for the ratings. On the other hand, the majority of results, to date eight separate studies with a total of 13 correlations between the GFP and *g*, have come from more commonly used methods (e.g., self-report scales). These studies have resulted in the relatively modest unweighted sample size mean correlation of $r = .11$ (Aitken-Schermer, Carswell, & Jackson, 2012; Aitken-Schermer & MacDougall, 2013; Aitken-Schermer & Vernon, 2010; Irwing, Booth, Nyborg, & Rushton, 2012; Lesson, Heaven, & Ciarrochi, 2012; Loehlin, 2011; Loehlin & Horn, 2012; Rushton et al., 2009).

Given that *g* and *K* do not correlate strongly (Figueredo et al., 2014; Woodley, 2011; values of ρ range from non-significant at .02 to significant at .06), why as a life history indicator (e.g., Dunkel & Decker, 2010; Van der Linden, Figueredo, De Leeuw, Scholte, & Engels, 2012), might the GFP nonetheless correlate positively with *g*? One possible explanation is that the GFP might relate to underlying genetic fitness (an individual's compliment of mutations) (Miller, 2010), in addition to life history strategy. Life history strategies concern the ways in which resources are allocated into different domains, the patterns of which affect fitness outcomes based on the presence of factors such as population density and extrinsic mortality, hence different strategies are favored under different conditions, and when aggregated over phylogeny this fluctuating selection creates individual differences within a population (Ellis, Figueredo, Brumbach, & Schlomer, 2009). Traits revealing of underlying genetic quality (so-called fitness indicators; Miller, 2000a,b) are held in equilibrium within a population via mutation–selection balance, as historically all selection for these would have been positively unidirectional (Penke, Denissen, & Miller, 2007). As pure life history and fitness indicators, there is therefore no reason to expect correlations between *K* and *g* respectively at the individual differences level, as the distinct genetic variances associated with each trait will tend toward linkage equilibrium (random association) given persistent enough stabilizing selection for both traits (Woodley, 2011). Despite this, it is possible that there are hybrid traits, individual differences which are sensitive to both the genetics of life history strategy and also mutation load (Woodley (2011) gives the example of health which is likely to be simultaneously influenced by both underlying mutation load and also the pattern of resource allocations throughout an individual's life span). The association between *g* and the GFP may indicate that the latter is just such a hybrid trait. This view was recently lent support by the findings of Verweij et al. (2010) and Verweij et al. (2012). They found that variance in personality, including the GFP, was best explained by mutation–selection balance.

Even though the aggregate tendency across studies is toward *g* and the GFP being positively correlated, it has also become clear that there is substantial variation around that mean with an actual negative correlation at one pole $r = -.12$ (Lesson et al., 2012) and with two studies showing correlations of $r = .28$ at the other pole (Aitken-Schermer & Vernon, 2010; Loehlin, 2011). One potential factor accounting for at least part of the variation in the findings concerns the use of different measures for extracting the GFP. In the examination of GFPs from multiple measures, Loehlin (2012b) found the intercorrelations among GFPs from eight personality measures to range from −.48 to .72 with an average of $r = .36$. Woods and Hardy (2012) reported that GFP intercorrelations between five measures of personality ranged from $r = .05$ to $r = .78$ with an average of $r = .54$. Similarly, Van der Linden, Te Nijenhuis, Cremers, and Van de Ven (2011) examined GFPs extracted from six different surveys and estimated a mean correlation of $r = .53$ which is also close to the intercorrelations between GFPs reported by Loehlin and Horn (2012). Collectively, the empirical findings garnered from these studies suggest correlations among GFPs of around $r = .50$, which while signifying substantial overlap among GFPs, also indicates that a significant amount of variation is to be expected when examining associations with criterion variables.

These findings also indicate that GFPs extracted from some personality measures may more accurately reflect the underlying construct than others. For example, Loehlin (2012a) analyzed 77 scales from eight personality measures. The California Psychological Inventory (CPI) had the scales (the CPI scales of Sociability and Capacity for Status were the highest) with the highest loadings on the GFP. Likewise, in a factor analysis of GFPs from eight different personality scales, the CPI-based general factor had the highest loadings on overall GFP, independent of the methodology used to extract a GFP (Loehlin,