

Editorial

The Six Challenges for Personality, Intelligence, Cognitive Skills, and Life Outcomes Research: An Introduction to the Topic

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1. Introduction

Understanding how personality (e.g., DeNeve and Cooper 1998; Steel et al. 2019) and intellectual abilities (e.g., Gottfredson 1997, 2004b; Brown et al. 2021; Kulikowski 2021) contribute to shaping aspects of individuals' lives is essential for in the advancement of many scientific disciplines such as psychology, management and medicine. However, although personality and intelligence and their impacts on life outcomes have been a subject of extensive research and interest among scholars across different disciplines, personality and intellectual abilities are most often studied in separation. When delving into the research on important life outcomes such as educational outcomes, career success, interpersonal relationships, mental health and overall well-being, it is vital to recognize that it is the joint influence of personality and intelligence that determines life outcomes (see, e.g., Deary et al. 2010; Damian et al. 2015; Cheng and Furnham 2012). Solely focusing on either intelligence or personality in isolation creates an artificial situation (Judge et al. 1999; Roberts et al. 2007), and only by considering them in tandem can we avoid oversimplifications and gain a deeper understanding of the processes that influence human lives (for more on the importance of ability–personality integration, see also Colom et al. (2019)).

Therefore, this Topic serves a dual purpose. Firstly, we want to give a platform to papers that investigate the relationships between personality, intelligence and a wide range of life outcomes. Secondly, we aim to stimulate scholarly discourse by illuminating the often neglected and underexplored topic of the simultaneous effects of intelligence and personality in shaping individuals' life trajectories. With this editorial, our objective is to highlight the main challenges that should be addressed to facilitate the research on the effects of intelligence and personality on life outcomes and offer a comprehensive overview of potential avenues for future exploration. We hope to inspire further research on personality and intelligence effects on important life outcomes.

2. Challenge 1: Processes

It seems that the majority of research on predicting life outcomes from intelligence and personality is atheoretical. Although studies in this area typically document relevant associations, they usually do not explain or test the mechanisms behind these associations. Rather, they primarily show that, in statistical terms, personality and intelligence predict important life outcomes without explaining the processes underlying these associations. However, to further contribute to our understanding of the interrelations between intelligence, personality and important life outcomes, it is crucial to establish a theoretical network of the mechanism by which intelligence and personality affect life outcomes (see Aguinis and Cronin 2022). In particular, there are three types of processes which are important to the understanding of the relationship between intelligence, personality and life outcomes. First, intelligence and personality can independently affect life outcomes. This

was the focus of many studies, including the recent debate between Zisman and Ganzach (Zisman and Ganzach 2022; Ganzach and Zisman 2022) and the Chicago group led by Nobel Laureate in Economics Jame Heckman (Borghans et al. 2016; Golsteyn et al. 2022; see also Heckman (2011) and Heckman et al. (2013) for earlier publications) who focused on the relative predictive power of personality versus intelligence (see O'Connell (2023) for a similar focus the current Topic).

Second, personality and intelligence may mediate the effects of each other on life outcomes (Zhang and Ziegler 2016). An interesting example is presented in the current Topic in Cao and Liu's (Cao and Liu 2023) paper that documents how depression mediates the effect of time use (i.e., working on homework, playing sports, surfing the Internet, watching TV and sleeping) on cognitive achievement tests. Earlier examples include Chamorro-Premuzic and Furnham (2008), who showed that the effect of intelligence on academic achievement was mediated by personality, or Stephan et al. (2022), who showed that personality mediates the effect of early-life intelligence on later-life cognition. We note, however, that evidence for processes in which intelligence and personality mediate the effect of each other on life outcome is rather rare in the literature, and in the more commonly encountered process research, intelligence and personality play the role of two separate predictors (e.g., Roberts et al. 2007).

Third, a most meaningful area in developing our theoretical understanding of the effects of intelligence and personality on important life outcomes lies in studying their possible moderating effects. For example, Gignac and Zajenkowski (2023) have demonstrated that a higher level of intelligence can potentially mitigate the development of a particular type of narcissistic rivalry, characterized by devaluing others, desiring their failure and displaying aggression. Moreover, Perkins and Corr (2006) found a negative relationship between performance and neuroticism, but only among individuals with lower cognitive abilities, whereas among individuals with higher intelligence, neuroticism was not significantly related to performance. Similarly, Postlethwaite et al. (2009) suggest that individuals with a high level of cognitive ability exhibit heightened safety behaviors, irrespective of their conscientiousness level, whereas conscientiousness had a more pronounced influence on safety behavior among individuals with lower levels of cognitive ability. More generally, it is not just that intelligence and personality may moderate the effect of each other on important life outcomes, but many other individual differences can be seen to moderate the impacts of these two traits. Factors such as age, culture, socioeconomic status, values and situational circumstances can all play a role. For instance, the significance of intelligence and personality might differ under extremely adverse conditions like war, poverty or starvation, as opposed to optimal life circumstances. Furthermore, the influence of intelligence and personality can vary over time and across different stages of development. Intellectual abilities may be particularly critical during certain career phases (Ganzach 2011), while personality traits may become more significant in others. An interesting example is observed among leaders in various fields such as business, culture and politics. Many individuals in contemporary societies reach the pinnacle of their careers at a rather advanced age, when cognitive abilities may not be at their peak levels. However, they still manage to fulfil their responsibilities effectively, underscoring the importance of personality in their achievements. It is also possible that the effects of personality and intelligence on life outcomes are not necessarily linear but might be curvilinear. For example, Antonakis et al. (2017) have shown that the positive perception of leaders as a function of their intelligence followed a curvilinear inverted-U function, where the best perception a leader is when their intelligence is about 1.2 standard deviations above the mean for their group of followers.

All these considerations highlight the possible dynamic nature of the effects of intelligence and personality and emphasize the need to for future researchers to ask not only whether personality or intelligence is more important for life outcomes but also when and how intelligence and personality become more influential. To sum up, we need a deeper theoretical understanding of the processes by which intelligence and personality influence our lives.

3. Challenge 2: Reciprocal Relationships

Although most of the research about the relationship between intelligence/personality and life outcomes has focused on intelligence and personality as predictors and on life outcomes as dependent variables, we also need to consider to what extent life outcomes might influence personality and intelligence. Although intelligence and personality are usually treated as stable individual characteristics, there might be non-obvious reverse causality effects between them. Life outcomes such as social status, job complexity and poverty might affect intelligence and personality. This challenge is similar to the challenge we face when studying the relationship between intelligence/personality and socioeconomic success. Thus, although low intelligence is a most potent determinant of the likelihood of being below the poverty line (Herrnstein and Murray 1994), it is also possible that poverty has an important effect on one's success in intelligence tests (Mani et al. 2013). Similarly, although cognitive ability has an important influence on job complexity (Gottfredson 1997; Wilk et al. 1995), it is also possible that the complexity of a job also influences cognitive functioning (Smart et al. 2014; Parker et al. 2021). In addition, although emotional stability and extraversion have positive effects on socioeconomic success (Seibert and Kraimer 2001), it is also possible that success increases emotional stability and extraversion (Hirschi et al. 2021). In the domain of school achievement, students' personality traits (e.g., openness and conscientiousness) predict the use of deeper learning approaches, but learning approaches also predict personality traits. Similarly, learning approaches predict students' grades, but grades might also influence whether students perceive learning as valuable and what approach (e.g., deep or surface-level) they apply to the learning process (Zhang and Ziegler 2018). In addition, similar reciprocal causation might possibly be encountered when studying the relationship between political ideology and intelligence (Ganzach and Schul 2021; Jedinger and Burger 2022), the relationship between political ideology and personality (Fatke 2017) or the relationship between health and intelligence (Gottfredson 2004a). Thus, by concentrating on unravelling these complex reciprocal dynamics, we can gain a more nuanced understanding of the interplay between intelligence, personality and life outcomes.

4. Challenge 3: What Are "Important Life Outcomes"?

An essential aspect of researching the effects of intelligence and personality on important life outcomes lies in the definition and conceptualization of "important life outcomes" itself. Although research in this area has primarily been concerned with socioeconomic success and has relied on variables such as income or educational attainment as dependent variables, there have been quite a few papers about the relationship between these variables and other life outcomes such as happiness (DeNeve and Cooper 1998; Nikolaev and Salahodjaev 2016), religiosity (Kanazawa 2010), risk taking (Gladden et al. 2009) or marital success (Gonzaga et al. 2010). The current Topic also provides rich and illuminating examples of life outcomes which are not often studied in intelligence and personality research, such as anti-social behavior (O'Connell (2023), which also studies risky behavior), alcohol consumption, smoking and physical activity (Li et al. 2023), as well as scientific creativity (McGregor and Frodsham 2023).

In principle, the perception of what constitutes important life outcomes may vary among individuals and cultures. Furthermore, the effects of intelligence and personality may differ when considering subjective versus objective important life outcomes. For instance, the impact on objective career success criteria such as income, occupational prestige and education level may differ from the effects on more subjective success criteria such as life or job satisfaction, happiness, sense of meaning in life and mental health.

Moreover, how we define important life outcomes in terms of maximum performance versus typical performance (see Sackett et al. 1988; Klehe and Anderson 2007) can also influence the conclusions drawn from research on intelligence and personality. For instance, life outcomes that require maximum performance (e.g., "working smart" needs peak performance but only on occasion) may depend more heavily on intelligence, whereas

outcomes that rely on typical performance (e.g., “working hard” needs average performance but maintained for a long time) may more heavily depend on personality factors such as persistence, self-esteem or optimism.

Finally, in examining important life outcomes, it is important to pay attention to when these life outcomes were measured (Judge et al. 2010). Were they measured in the middle of the 20th century, the late 20th century or the 21st century? Were they measured in young adulthood or in later life? Thus, Ganzach and Pazy (2015) showed that the effect of intelligence, but not the effect of personality, on socioeconomic success increases with age (Ganzach and Pazy 2015), whereas the article of Marks (2023) in the current Topic shows that timing is important, as the effect of intelligence on income is different (stronger) in later than earlier cohorts. Thus, timing may be important in understanding the effect of intelligence and personality on life outcomes.

5. Challenge 4: Conceptualization and Measurement of Intelligence and Personality

The conceptualization and measurement of intelligence and personality might influence our understanding of their effects on important life outcomes, as both of these constructs might be measured and defined in various ways. This challenge is articulated by Stankov (2023) in the current Topic.

5.1. Intelligence

Intelligence might be conceptualized and measured in different ways across different studies. It can be conceptualized as general intelligence, fluid intelligence or crystallized intelligence and assessed through achievement tests or identified within specific cognitive domains like executive attention or working memory. For example, some researchers may focus on measuring fluid intelligence, which is just one aspect of general intelligence, but still refer to it as a measure of general intelligence (Gignac 2015). This suggests that different researchers using the same terms, such as “intelligence” or “cognitive ability”, may in fact be investigating different constructs. In addition to the challenges in defining and measuring intelligence, the context in which intelligence tests are conducted can also play a significant role. Situational factors, such as the motivation to perform well on an intelligence test, can influence scores on intelligence tests (Duckworth et al. 2011; Bates and Gignac 2022). This raises the question of whether intelligence tests administered in high-stakes situations, such as in army recruitment or job interviews, might better predict important life outcomes compared to tests conducted in low-stakes situations, such as academic research on volunteers or students, where participants may not be as motivated to perform at their highest possible level.

5.2. Personality

The conceptualization and measurement of personality are even more challenging than the conceptualization and measurement of intelligence. Unlike intelligence, personality is not a unitary construct. Whereas the basic conceptualization of intelligence comprises a single underlying concept—general mental ability—which underlies the relevant observables, personality is a multi-faceted concept. There is consequently less uncertainty regarding how intelligence should be defined than how personality should be defined in research about the prediction of life outcomes. In fact, most personality research pertinent to the prediction of significant life outcomes focuses on a small number of traits, each of which describes a particular aspect of personality (for examples, see Duckworth et al. (2011), for grit and Ludwig et al. (2019) for playfulness), rather than on a multi-faceted conceptualization of personality.

To overcome this problem, scholars have often relied on the big-five personality traits (<https://dictionary.apa.org/big-five-personality-model>; accessed on: 13 January 2024), which, despite representing individual traits, are still considered to be a full and systematic description of one’s personality when considered together. However, one might ask, what about personality beyond the big five? There are not only different models of

personality, such as HEXACO (Ashton and Lee 2009), which includes six main dimensions, but also many aspects of psychological functioning that might be included in the notion of personality such as hope, efficacy, resilience or optimism forming psychological capital (Youssef-Morgan and Luthans 2015), self-esteem (Pyszczynski et al. 2004), self-efficacy (Scholz et al. 2002) or temperamental dimensions (Langelaan et al. 2006). How should these aspects be incorporated into a comprehensive evaluation of the effect of personality on important life outcomes? Stankov (2018, 2023) refers to this question, arguing for the inclusion of additional personality dispositions in any attempt to predict important life outcome.

Another concern relates to the techniques by which we measure personality, many of which are based on self-descriptions. Is it correct to rely solely on self-descriptive measures of personality, or should we consider measures based on more objective criteria, such as judgments from others, performance assessments or records of actual behaviors? In the case of cognitive abilities, there is only a moderate association between what individuals report about their abilities and their actual performance in more objective settings (Freund and Kasten 2012). Could a similar effect be possible in personality, where we may not be fully aware of our personality traits, and they only manifest themselves in real-life situations? Can self-assessments of personality be considered a reliable measure of one's true personality? Just as intelligence is assessed through performance tests, is it possible to create performance-based tests for personality by observing behavior in real-life situations, making them more comparable to intelligence tests? Additionally, the personality measurement methods used in different studies may differ in terms of reliability and validity. There are various approaches to measurement, including validated psychometric measures, experimental surveys, short surveys or even non-validated business measures. Measurement reliability is closely linked to predictive validity, and thus personality measures with low reliability present a significant challenge when it comes to making predictions based on personality. Yet another methodological question arises regarding structure in personality measurement: should we analyze each personality trait in separation or employ different personality traits as indicators of a common latent construct, the general factor of personality (Van Der Linden et al. 2016), similarly to the general factor of intelligence? Alternatively, should we analyze personality traits not in isolation nor as common latent factors but as combinations of traits, where certain trait patterns, such as high extraversion and conscientiousness, are more favorable than others, like high extraversion but low conscientiousness?

All these questions suggest that to achieve clarity in research and arrive at common conclusions, it may be necessary to establish more standardized methods of measuring intelligence and personality.

6. Challenge 5: Range Restriction

Range restriction (<https://dictionary.apa.org/restriction-of-range>, accessed on: 13 January 2024) refers to whether the research group accurately represents the range of variation in the variable of interest in the larger population of interest or includes a subgroup with artificially limited variation in intelligence or personality. This may be particularly important when the predictive power of intelligence is compared to the predictive power of personality and restriction on intelligence is different from the restriction on personality. In many contexts (e.g., when predicting college students' occupational success), the range of intelligence may be constrained more than the range of personality. As a result, the correlation between intelligence and outcomes in this group might be lower, not because the "true" correlation is low, but because of the low variability in intelligence. This may lead to the impression that to understand and promote educational and economic success, we should focus more on noncognitive individual differences rather than cognitive individual differences, particularly intelligence. However, when the entire population is examined, the importance of intelligence appears to be far stronger than the importance of personality (see, for example, Zisman and Ganzach (2021) for a comparison of the predictive power of intel-

ligence to the predictive power of grit). Thus, considering the impact of range restriction on correlation coefficients is crucial for obtaining accurate findings (Sackett et al. 2008), and using samples that are representative of the entire relevant population of interest becomes essential in exploring the true effects of personality and intelligence on life outcomes.

7. Challenge 6: Overlap between Personality and Intelligence

The final methodological challenge in the study of the relationship between personality/intelligence and important life outcomes is the independence of these two constructs (see, for example, Ackerman and Heggestad 1997; Carretta and Ree 2018; Major et al. 2014; Rammstedt et al. 2018). The relationship between predictors and an outcome may be altered if the predictors are correlated. In this regard, several studies have demonstrated that certain personality traits may be associated with intelligence. For example, cognitive ability is positively related to openness and emotional stability (Rammstedt et al. 2016; Anglim et al. 2022). Furthermore, personality traits may play a role in the development of intellectual skills (e.g., Ackerman 1996, PPIK model). For example, Von Stumm and Ackerman (2013) suggest that personality traits called investment traits might determine how people invest their resources as time and effort in the development of intellect. They show that, among others, openness to experience (such as readiness to re-examine traditional beliefs) or school success (such as putting a high value on educational achievement) were positively correlated with crystallized intelligence (Von Stumm and Ackerman 2013; see also Von Stumm 2013). Moreover, Ziegler et al. (2012) suggest the Openness–Fluid–Crystallized–Intelligence (OFICI) model, which hypothesizes via the environmental enrichment hypothesis that the personality trait of openness to experience has a positive effect on fluid intelligence, and this is because people with higher levels of openness tend to come across more opportunities for new learning experiences, which in turn positively impacts the development of fluid intelligence (see also Ziegler et al. 2015, 2018). Thus, this potential overlap, that is, the correlations between intelligence and personality, presents an additional challenge for researching their simultaneous predictive effects on important life outcomes.

8. Conclusions

In this paper, we call for more research on the joint impact of intelligence and personality on important life outcomes. We highlight six contemporary challenges for this line of research. Challenge 1 relates to the processes by which intelligence and personality influence life outcomes. We have quite a substantial body of evidence that intelligence and personality predict these outcomes, but we still know little about why and how they influence the course of people's lives or about the possible mediating and moderating variables that might influence this process. More theoretical developments are required that will allow us to move beyond statistical reasoning in terms of the weight of correlations and regressions and allow us to understand why we observed these associations. Challenge 2 relates to reciprocal relationships between intelligence, personality and life outcomes, suggesting that not only intelligence and personality might shape trajectories of our lives but also life circumstances might impact personality and intelligence, but these reverse effects are often omitted in contemporary research. Challenge 3 concerns the definition of "important life outcomes". These outcomes might be seen in different ways by different people in different cultures or regions of the world. What might be a success for one person might not be for another and happiness means different things for different people. Thus, it is vital to establish a set of common indicators of important life outcomes. Challenge 4 reflects a similar issue with the conceptualization and measurement of intelligence and personality. Debates about the dimensionality and measurement of both concepts are ongoing. If we do not introduce standardization to this field of research, at least in the area focusing on important life outcomes, it might become impossible to draw generalizable conclusions from contemporary research. Different measures and conceptualizations of intelligence or personality used in different studies mean that under the same common labels this research captures different phenomena. Challenge 5 refers to range restriction, an

issue that has to do with the biased representation of the general population of interest, by the research sample, leading to a biased estimation of the predictive power of intelligence or personality in the general population. This challenge highlights the need for large-scale representative samples in research on the relationship between intelligence and personality, and important life outcomes. Challenge 6 relates to the possible overlap between personality and intelligence. This may be due to an overlap in the definition of the two (e.g., the definition of the personality trait of openness to experience captures aspects of intelligence), or the reciprocal influence they exert on each other during development.

In conclusion, we hope that this Topic will spur further debate on the roles of personality and intelligence in forming important life outcomes. Moreover, by shedding light on the six challenges surrounding this inquiry, we hope to foster a critical examination of these complexities and inspire new and fruitful lines of research. By accounting for the challenges discussed in this editorial, we can gain new insights and minimize the risk of generating misleading conclusions when searching for fresh perspectives on the psychological processes that influence human lives.

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