

# Personality and Intelligence: Correlated or Independent?

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## ABSTRACT

Personality and intelligence may both contribute to life success. Are they independent or related to each other? The purpose of this study was to examine the correlations between the Big Five Personality Traits and intelligence. Based upon previous research (Furnham, Moutafi, & Chamorro-Premuzic, 2005), we hypothesized that neuroticism would be negatively correlated with intelligence and that extraversion and openness would be positively correlated with intelligence. A total of 187 undergraduates completed this study. The Big Five Personality Traits were measured using 8-item versions of the International Personality Item Pool (IPIP) NEO-PI-R (Goldberg, 1999). Twelve intelligence tests were used. Two aspects of fluid intelligence (inductive reasoning and visualization) were each measured with three tests. Similarly, two aspects of crystallized intelligence (verbal ability and verbal closure) were each measured with three tests. To examine the relationships between the five personality traits and the 12 intelligence tests, a total of 60 correlations were calculated.

We found that all five personality traits are correlated with intelligence. As predicted, openness correlated positively with verbal ability. However, conscientiousness also had positive correlations with verbal ability. As predicted, neuroticism had negative correlations with some aspects of intelligence. However, agreeableness also had some negative correlations, and extraversion had positive correlations with some aspects of intelligence and negative correlations with others. Thus, this study replicated previous findings that there are significant (though small) relationships between personality and intelligence. Different factors may account for the relationships for each personality trait. For example, openness might be positively correlated with intelligence because individuals who are open to new experiences put themselves in positions to learn more. In contrast, neuroticism might be negatively correlated with intelligence because people who display neurotic tendencies tend to be more anxious and view the world negatively. This could lower motivation in an academic setting and thus decrease opportunities to increase intelligence. Future research should examine how personality and intelligence interact to contribute to success at school and in the workplace.

## INTRODUCTION

Personality traits and intelligence are often seen in the literature as independent constructs. However, both constructs contribute to life success. Arguably, an individual's personality and their intelligence are factors that can determine if they will have success in arenas of life that impact their sense of accomplishment. For example, personality traits such as conscientiousness and intelligence are positively correlated with an increase job satisfaction, which is a part of overall life success (Judge, Higgins, Thoreseen, & Barrick, 1999; Higgins, Peterson, Pihl, & Lee, 2007). Also, neuroticism consistently has a negative correlation with overall performance, decreasing a person's life success by making them less productive in life (Judge et al., 2007). Furthermore, if both personality and intelligence are intertwined when considering an individual's life success, could both constructs be related?

Intelligence can be divided into two subcategories, fluid and crystallized intelligence (Wood & Englert, 2009). Fluid intelligence is defined as someone's problem solving ability. Fluid intelligence includes many different types of intelligence. For this study, we used inductive reasoning and visualization (Barchard, 2003). Inductive reasoning is the ability to process the rules of a problem and then form testable solutions to a particular situation, while visualization is the ability to manipulate and reform an image into a new pattern (Barchard, 2003). Crystallized intelligence is defined as someone's accumulated knowledge. Crystallized intelligence includes many different types of intelligence. For this study, we used verbal ability and verbal closure (Barchard, 2003). Verbal ability is defined as the ability to understand language, while verbal closure is defined as the ability to identify written words even if letters are missing, the word is scrambled, or the letters are scrambled in other words (Barchard, 2003).

The Big Five Personality traits consist of openness, agreeableness, conscientiousness, neuroticism, and extraversion. Open people are defined as eager to explore new ideas (Goldburg, 1993). Agreeable people are considerate, humble, and helpful towards others (Bartels et al., 2012). Conscientious people are purposeful and perseverant (Furnham, Dissou, Sloan, Chamorro-Premuzic, 2007). Neurotic people are anxious, sad, and distressed (Furnham et al., 2007). Extraverted people are decisive, have high willpower, and have high social involvement (Furnham et al., 2007).

Previous research has shown that personality and intelligence have small (but statistically significant) correlations with each other (Furnham, Moutafi, & Chamorro-Premuzic, 2005). Neuroticism has a negative correlation with intelligence while extraversion and openness are positively correlated with intelligence (Furnham et al., 2005). Agreeableness and conscientiousness are not correlated with intelligence (Furnham et al., 2005). Based on previous findings, we therefore hypothesize that neuroticism will be negatively correlated with intelligence, that extraversion and openness will be positively correlated with intelligence, and that agreeableness and conscientiousness will not be correlated with intelligence.

Our correlation study is important because a correlation allows researchers to form predictions. The stronger the correlation between personality and intelligence, the more accurate a prediction a future researcher can make among the variables. For example, personality can affect an individual's testing style, which in turn can affect the IQ scores (Furnham, et al., 2005). Future investigations can go more in depth and figure out how specific personality types and IQ affect each other and what the larger implications are for success both in the academic field and in the work place.

## METHOD

### Participants

A total of 187 students (120 female, 61 male, 6 unspecified) participated in our study in return for course credit. The participants' ages ranged from 19 years to 48 years (mean 21.65, SD = 3.49). Participants identified themselves as follows: 50.8% Asian, 33.2% Caucasian, 1.1% African-American, 1.1% Hispanic, .5% Native American, and 8.6% other.

### Measures

#### *International Personality Item Pool (IPIP) NEO-PI-R*

Personality was measured by using the International Personality Item Pool (IPIP) NEO-PI-R (Goldberg, 1999). The original IPIP-NEO-PI-R has 10-item scales of 30 facets (Goldberg, 1999). This study used 8-item versions of 23 of the scales (Barchard, 2003). Each item uses a five-point rating scale: very inaccurate 1, moderately inaccurate 2, neither accurate nor inaccurate 3, moderately accurate 4, and very accurate 5 (Goldberg, 1999). For each of the 23 scales, some items are reverse scored, and then the total score is calculated as the sum of the item scores (Goldberg, 1999).

#### *Intelligence Tests*

We used six tests to measure fluid intelligence and six tests to measure crystallized intelligence. Within fluid intelligence, we measured inductive reasoning and visualization. To measure inductive reasoning, we used Letter Sets (Ekstrom, French, & Harman, 1976), Figure Classification (Ekstrom et al. 1976), and Number Series (Thurstone, 1934). To measure visualization, we used Form Board (Ekstrom et al., 1976), Paper Folding (Ekstrom et al., 1976), and Surface Development (Ekstrom et al., 1976). Within crystallized intelligence, we measured verbal ability and verbal closure. To measure verbal ability, we used the Reading Test (Thurstone, 1934), the Advanced Vocabulary Test (Ekstrom et al., 1976), and Inventive Opposites (Ekstrom et al., 1976). For verbal closure, we used Incomplete Words (Ekstrom et al., 1976), Hidden Words (Ekstrom et al., 1976), and Rearranged Words (Barchard, 2003). On average, each test was completed in 5 minutes, with 1 minute allotted for instruction time and the rest was for working time (Barchard, 2003).

### Procedures

Participants were tested in a group setting, but completed the tests individually.

### Data Analysis

To examine the relationship between the 12 intelligence tests and the 5 personality traits, we calculated 60 correlations.

## RESULTS

All of the Big Five Personality traits are significantly correlated with intelligence (see Table 2). Some of these correlations were positive, while others were negative. Conscientiousness was positively correlated with all three tests of verbal ability. Openness was positively correlated with all three tests of verbal ability, and with one test of verbal closure. Neuroticism was negatively correlated with some tests of inductive reasoning, visualization, and verbal ability. Agreeableness was negatively correlated with one tests of visualization. Extraversion was negatively correlated with one test of inductive reasoning, but positively correlated with one tests of visualization.

## DISCUSSION

The purpose of the current study was to investigate whether intelligence and personality are related. We hypothesized that neuroticism would be negatively correlated with intelligence, that extraversion and openness would be positively correlated with intelligence, and that agreeableness and conscientiousness will not be correlated with intelligence. We correlated the Big Five Personality Traits and with each of 12 intelligence tests. We found several small (but significant) correlations. As predicted, openness was positively correlated with intelligence. This makes sense: Open individuals are open to new ideas and experiences, and are likely to put themselves in positions to learn more by getting a higher education or enriching their own environment in some way (Goldburg, 1993). As predicted, neuroticism was negatively correlated with intelligence. This also makes sense: Highly neurotic individuals are prone to anxiety and stress, which may affect their ability to perform well in school, thus affecting their academic performance (Tok & Morali, 2009). Finally, conscientiousness had a significant positive correlation when none was expected. However, this correlation also makes sense: Conscientious individuals are internally motivated and organized, which is essential in order to do well in school (Kappe & Flier, 2012).

Although these correlations make sense, readers should not over-interpret them. The relationships between personality and intelligence were small; therefore, intelligent people are not guaranteed to be open or conscientious or to be low in neuroticism. Moreover, correlation does not imply causation, and so these correlations do not prove that personality causes intelligence or visa-versa. Other factors might be influencing both of these. For example, the socioeconomic status of the parents of a child could impact their education, consequently increasing their intelligence without necessarily contributing to their personality (Tzuriel, 1999). Also, a child who is raised by loving, conscientiousness parents can instill conscientious values to their children without necessarily impacting their intelligence (Tzuriel, 1999).

Two of our findings were surprising. First, extraversion had a positive correlation with one test of intelligence, but a negative correlation with another test of intelligence. Second, agreeableness had a negative correlation with intelligence when a positive correlation was expected. Future research should focus on the relationship of extraversion and agreeableness with intelligence, to try to determine under what circumstances there are positive relationships and under what circumstances there are negative relationships. For example, this study used a sample of university students, which limits its generalizability. Future research should replicate this study using a larger sample that includes a wider variety of ethnicities, cultures, education levels, and values.

Table 1

*Mean and Standard Deviations for All Variables*

Measures	Mean	Standard Deviation
Personality Tests		
Neuroticism	2.80	0.59
Extraversion	3.48	0.61
Openness	3.70	0.46
Agreeableness	3.72	0.51
Conscientiousness	3.48	0.47
Intelligence Tests		
Reading	8.84	4.99
Incomplete Word	10.60	2.61
Letter Sets	6.84	2.13
Advanced	3.03	1.95
Vocabulary		
Form Board	23.91	11.03
Hidden Word	24.18	5.87
Number Series	11.61	4.68
Paper Folding	5.62	2.37
Figure	35.10	12.21
Classification		

Table 2

*Correlations between Personality and Intelligence*

Intelligence Tests	Big Five Personality Trait				
	Neuroticism	Extraversion	Openness	Agreeableness	Conscientiousness
Inductive Reasoning					
Letter Sets	-.12*	-.16*	.07	.06	.03
Figure Classification	.00	.00	.07	-.05	.02
Number Series	-.09	.05	-.06	-.03	-.04
Visualization					
Form Board	-.10	.03	.01	-.22**	.01
Paper Folding	-.18**	.16*	.10	-.13*	-.02
Surface Development	-.12	.07	.07	-.04	.06
Verbal Closure					
Incomplete Words	.09	.03	-.05	.00	-.03
Rearranged Words	-.09	.07	.13*	.05	.09
Hidden Words	-.09	.04	-.06	.04	-.02
Verbal Ability					
Advanced Vocabulary	-.09	-.03	.21**	.04	.19**
Reading	-.16*	.03	.16*	-.06	.13*
Inventive Opposites	-.05	.05	.16*	.04	.18**

\*  $p < .05$ . \*\*  $p < .001$ .

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