

## Chapter #23

### USING PERSONALITY TESTS IN RESEARCH: ARE LONGER TESTS NECESSARILY BETTER?

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#### ABSTRACT

According to the Five Factor Model, the five dimensions of personality are Neuroticism, Extraversion, Agreeableness, Openness to Experience, and Conscientiousness. Although the Neuroticism, Extraversion, Openness Personality Inventory (NEO-PI-R) is the gold standard of personality testing, it is time-consuming, sometimes cumbersome, and provides detailed analysis that is not always necessary. Our purpose was to compare longer (NEO-PI-R; 240 items), medium (Big Five Inventory; 44 items) and shorter (Ten Item Personality Inventory; 10 items) tests. Further, because we were interested if a single item could be used to measure each of the five factors, we asked participants to rate five sets of trait descriptors. Participants were recruited from university samples and completed a series of personality inventories. Results indicated moderate/strong correlations between the tests, including between the single item and established tests. For each test, the dominant trait was defined as the trait associated with the highest absolute factor  $z$ -score. There was significant test concordance, particularly for Extraversion and Conscientiousness. Thus, participants had a general sense of their personality suggesting that a single item may have some indication of specific traits. Although facet level measurement is sometimes preferable, shorter tests can be used when time is a factor or to provide a quick measure of personality.

*Keywords:* big five personality traits, neuroticism, extraversion, openness, personality inventory revised (NEO-PI-R), big five inventory (BFI), ten item personality inventory (TIPI).

#### 1. INTRODUCTION

The labelling and categorization of individual traits and characteristics has preoccupied humans for centuries (Kardas, 2013). Long before formal empirical studies were conducted, people used self-awareness and curiosity to make inferences about each other. The measurement of personality has evolved from pseudoscientific approaches (i.e., phrenology) to the early twentieth century brass instrument approach of physical measurements (Kardas, 2013) to modern computer analyses. In spite of this focus, there is still no definitive language or process universally accepted to describe human behaviour. The formal beginnings of personality research began in the 1930's with the work of Gordon Allport, who provided theoretical basis for the inclusion of personality as a subfield of psychology (Barenbaum, 2000). Allport (1921) emphasized differences between personality and character, linking character to societal norms and moral behaviour and personality to individual characteristics. Modern theoretically driven models of personality focus on specific factors that define these individual characteristics or traits.

## 2. BACKGROUND

Present and past personality research has led to applications beyond experimental psychology; personality differences are recognized as relevant in education, health, business, and pop culture (Credé, Harms, Niehorster, & Gaye-Valentine, 2012). Given the wide applicability, it is important to consider the utility of different types of personality tests. The optimum test styles and average completion times are situation dependent and should be driven by the goals of the test administrator. Other considerations include the media in which the test is presented, the cognitive abilities of participants, and the intended end user of the data. The choice of the most appropriate test determines the full participation of the individual being tested and ultimately the accuracy of the results (Credé et al., 2012).

In the Five Factor Model (FFM) of Personality (Costa & McCrae, 1992) personality is conceptualized as being comprised of five broad factors: Neuroticism, Extraversion, Openness, Agreeableness and Conscientiousness. Neuroticism is defined by increased levels of psychological distress and other unpleasant feelings and emotions. Extraversion is associated with higher levels of friendliness, activity, and the experience of positive emotions. Openness to experience is characterized by an intellectual curiosity, flexibility in thoughts and behaviours, and a readiness to adjust in different situations. Agreeableness is related to feelings of sympathy, cooperation, and trustworthiness, whereas; lower scores indicate feelings of distrust and pessimism. Finally, Conscientiousness is associated with an increased propensity for both organization and diligence (Costa & McCrae, 1992). These factors are considered to represent wholly unique aspects of personality that have been identified across different cultures (McCrae & Terracciano, 2005), are similarly described across languages (Goldberg, 1990), and appear to be a part of an individual's biological make-up (Jang, McCrae, Angleitner, Reimann & Livesley, 1998).

According to Costa and McCrae (1992), the FFM is a tiered system with each domain containing six facets representing specific aspects of personality. The secondary facets may vary in individuals who have similar factor scores (McCrae & John, 1992; Matthews, Deary, & Whiteman, 2003). For instance, individuals scoring high on factor Neuroticism may vary on specific sources of emotional instability, which can be determined by examining individual facet scores (Anxiety, Angry Hostility, Depression, Self-Consciousness, Impulsiveness, Vulnerability; Costa & McCrae, 1992). The NEO-PI-R is used extensively in personality research and is the most validated measure of the FFM (Fazeli, 2012).

John, Naumann, and Soto (2008) analyzed papers published before 1998 and found general consensus on the five factors. Given this consensus, it is important to examine the convergent validity of widely available tests. To date, the FFM model is measured using personality inventories of varying lengths, which can limit the detailed facet level analysis provided by the NEO-PI-R. For example, John and colleagues used the five domains to develop the Big Five Inventory (BFI; John & Srivastava, 1999), a freely available, 44-item test that satisfied the prototype definitions for each domain. These authors reported that the five traits of the BFI are comparable to the NEO-PI-R but are restricted in the measurement of the facets. The Ten Item Personality Index (TIPI; Gosling, Rentfrow, & Swann, 2003) is a scale that uses the same five factors as the FFM (McCrae & Costa, 2008) but only includes two items to measure each factor. Gosling et al. (2003) found that the TIPI was reasonably valid in comparison with longer scales. Although the brevity of the BFI and the TIPI prevent a detailed, facet level analysis of personality, the length of the test could benefit testers and participants, especially in research in which personality is of secondary

interest. Further, the BFI and TIPI are available free of charge, which makes them attractive to many researchers. These considerations often drive the choice of a test and may explain the popularity of the BFI and TIPI as alternatives for researchers who are interested in measuring the Five Factors.

### 3. PURPOSE

There are a multitude of different personality measures and individual researchers must decide which test (and theoretical model) best suits their needs. Shorter tests, such as the TIPI, include fewer items and, thus, provide only a crude measure of personality factors. Despite their lack of detail, shorter tests are useful in specific situations. Researchers sometimes include shorter tests to measure a secondary variable or to control for the effects of broad aspects of personality. For example, researchers commonly include personality when measuring other variables, including life satisfaction (Campbell, Converse, & Rodgers, 1976), cultural/ethnic identity (Benet-Martínez, Leu, Lee, & Morris, 2002) and self-esteem (Robins, Tracy, Trzesniewski, Potter, & Gosling, (2001). In addition, shorter tests may be better suited to specific populations (e.g. individuals with a brain injury, the elderly). In an assessment of different personality tests, Burisch (1984) found that a short nine-item scale for depression was as valid as a complete 50-item scale ( $r = .54$  vs  $r = .51$ ). Longer tests may be preferable to researchers who are interested in how specific outcome variables are directly related to personality characteristics. Using a more extensive test such as the NEO-PI-R can help to reduce error due to random measurement (Credé et al., 2012). Several items are used to assess the same construct and the answers can be averaged to get a more accurate analysis. Further, short tests are not adequate for a detailed, facet level analysis (Credé et al., 2012).

The overall goal of this research was to inform the selection of specific personality tests. In the current study we compared established personality inventories with an inventory developed for this study. The NEO-PI-R (Costa & McCrae, 1992), Big Five Inventory (BFI; John et al., 2008), Ten Item Personality Inventory (TIPI; Gosling et al., 2003) and the Individual Item Index of Personality (III-P), were administered. The III-P contained a single item designed to measure each of the FFM factors. The III-P included a list of trait descriptors and participants indicated which descriptors they thought represented their personality factors (see Cattell, Cattell, & Cattell, 1993). Our goals were to (1) determine the relation between the personality inventories, (2) to determine if simply asking participants to select trait descriptors could provide a reliable measure of personality, and. (3) to provide information to researchers about the applicability of different tests to specific research paradigms.

### 4. METHODS

#### 4.1. Participants

In total, 192 (149 females) participants completed the study. Most participants were enrolled in Introductory Psychology ( $M_{\text{age}} = 20.35$  years,  $SD = 4.95$ ), Caucasian (88%), and Canadian (89%).

## **4.2. Materials**

### **4.2.1. Neuroticism, extroversion, openness personality inventory revised (NEO-PI-R; Costa & McCrae, 1992)**

The NEO-PI-R is a 240-item self-report inventory that provides factor scores for Neuroticism, Extraversion, Openness, Agreeableness and Conscientiousness and facet scores for each of the six facets underlying each factor. Participants respond using a five point Likert scale that ranges from 1 “strongly disagree” to 5 “strongly agree”. The Cronbach’s Alpha measures of reliability are for factor scores are high, ranging from  $r = .86$  to  $.92$  and good for facet scores,  $r = .58$  to  $.80$  for facet scores (Costa & McCrae, 2010).

### **4.2.2. Big five inventory (BFI; John & Srivastava, 1999)**

The BFI is a 44-item measure that assesses the five factors of personality. Participants rate items on a on a five point Likert scale ranging from 1 “Disagree strongly” to 5 “Agree strongly.” The BFI shows good convergence with the NEO-PI-R and a mean Cronbach’s alpha of  $.83$  (John & Srivastava, 1999). In the current study, the coefficient alphas for the individual factors ranged from  $.74$  to  $.85$ , with a mean alpha of  $.80$ .

### **4.2.3. Ten item personality inventory (TIPI; Gosling et al., 2003)**

The TIPI is a 10-item measure of personality that uses paired descriptors assessed on a seven-point scale ranging from 1 “disagree strongly” to 7 “agree strongly.” Although the mean coefficient alpha is lower ( $.51$ ), the scale has good convergence validity with the NEO-PI-R (Gosling et al., 2003). In the current study, the mean coefficient alpha was  $.46$ , which is similar to those reported previously.

### **4.2.4. Individual item index of personality (III-P)**

The III-P is a five-item measure that uses two groups of descriptors placed at opposite ends of a five-point scale. The single item designed to measure each of the FFM factors. For example, as a measure of Introversion-Extroversion, participants were presented with a 5-point scale with quiet, serious, shy, self reliant (Introversion) on one end of the continuum and warm, lively, bold, group oriented (Extroversion) at the other end. Participants indicated the level that best described their personality (see Cattell et al., 1993). After participants selected the trait descriptors that best describe them, they are asked which set of descriptors they thought was the best determinant of their personality (for example, an individual who pays attention to detail may select the Conscientious descriptors as their dominant trait). In selecting their dominant trait, participants were not asked which end of the continuum they were considering, thus, the dominant trait represents strength but not direction.

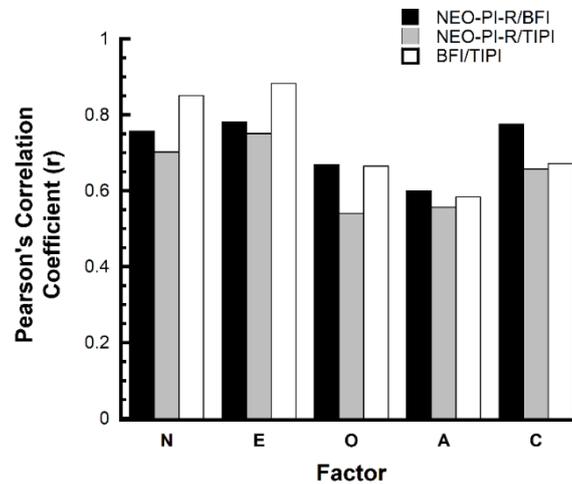
## **4.3. Procedure**

Participants were given a consent form to read and sign followed by a demographics form. The remainder of the questionnaires were counterbalanced to control for order effects. Filling out the questionnaire packet took approximately 60 minutes. Participants were thanked and made aware that the results will be posted on the respective research bulletin boards.

## 5. RESULTS

Correlation coefficients were used to determine the relation between the five factors as measured by the different scales (see Figure 1). All correlations between the NEO-PI-R and BFI Factors were statistically significant at  $p < .0001$  and ranged from strong-moderate ( $r = .60$ ) to strong ( $r = .78$ ), with an average correlation of  $r = .72$ . Correlations between the NEO-PI-R and the TIPI factors ranged from  $r = .54$  to  $r = .75$  with an average correlation of  $r = .64$ . Correlations between the BFI and the TIPI ranged from  $r = .66$  to  $r = .88$  with an average correlation of  $r = .73$ .

Figure 1.  
Absolute correlations between the NEO-PI-R, BFI, and TIPI.



In addition, the III-P factor scores were correlated with the factor scores from the BFI, TIPI, and NEO-PI-R (see Table 1). In all cases, Neuroticism and Extraversion produced the highest correlation coefficients, suggesting higher convergent validity for those factors.

Table 1.  
Compilation of III-P Factor correlations between the personality inventories.

	III-P Factor				
	N	E	O	A	C
TIPI	-.50**	.76**	.44**	.29**	.32**
BFI	.51**	.76**	.34**	.35**	.37**
NEO-PI-R	.44**	.70**	.40**	.38**	.37**

Note. \*\*  $p = .001$ . The negative correlation coefficient between III-P Neuroticism and TIPI Emotional Stability is due to reverse coding of the TIPI factor.

To determine which specific aspects of personality the III-P measured, five hierarchical regressions were conducted. In each regression, the III-P factor score was added as the criterion variables and the corresponding five NEO-PI-R facets were entered as predictors. In each case, a statistically significant proportion of the variability in the III-P factor was accounted for: Neuroticism  $R^2 = .59$ ; Extraversion  $R^2 = .49$ ; Openness  $R^2 = .38$ ; Agreeableness  $R^2 = .40$ ; Conscientiousness  $R^2 = .47$ . All tests were statistically significant at  $p < .001$ . Table 2 presents the NEO-PI-R facets that significantly predicted the III-P factor scores. With the exception of agreeableness, the III-P scores were predicted by two or three factors, suggesting that III-P scores are based on more narrow definitions than the corresponding NEO-PI-R factors.

Table 2.  
NEO-PI-R facets that were statistically significant predictors of III-P factor scores.

III-P Factor				
N	E	O	A	C
Anxiety	Gregariousness	Aesthetics	Trust	Order
Angry Hostility	Assertiveness	Values	Morality	Self-Discipline
Depression			Altruism	Cautiousness
			Cooperation	
			Modesty	
			Sympathy	

Although the BFI only allows for the comparison of 10 facets (Soto & John, 2009), our analyses indicated positive correlations between corresponding facets. Furthermore, Table 3 demonstrates that there were statistically significant (and generally moderate) correlations at the facet level. Further, although the correlations between the III-P and the NEO-PI-R facets were generally lower (with the exception of facets measuring extraversion), the correlations were statistically significant, lending some validity to the idea that a single-item can measure specific aspects of personality.

Table 3.  
Correlation between BFI Facets and NEO-PI-R Facets as well as III-P Factor Scores.

BFI Facet	Correlation (r)	
	NEO-PI-R Facet	III-P Factor
Assertiveness (E3)	.50**	.71**
Activity (E4)	.44**	.54**
Altruism (A3)	.46**	.23**
Compliance (A4)	.51**	.36**
Order (C2)	.55**	.41**
Self-Discipline (C5)	.61**	.27**
Anxiety (N1)	.74**	.43**
Depression (N3)	.65**	.47**
Aesthetics (O2)	.61**	.20**
Ideas (O5)	.49**	.32**

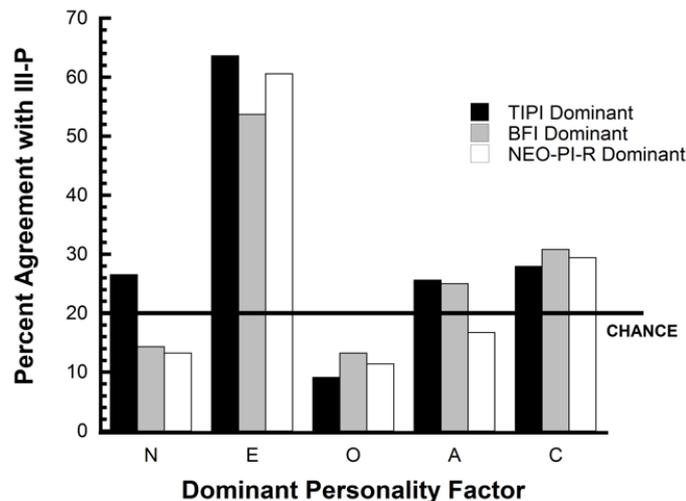
Note. \*\*  $p < .001$ .

### 5.1. Dominant personality factor

Based on the factor *z*-scores for each test, participants were assigned a “dominant” personality trait, defined as the factor with the largest absolute *z*-score; for example, if a participant had a NEO-PI-R Neuroticism score that was -2.99 and this factor had the largest absolute value, their dominant personality factor would be Neuroticism. With this coding, each participant had a single dominant personality trait for each of the personality scales. Figure 2 shows the percent agreement between the III-P dominant traits and the dominant traits based on the TIPI, BFI, and NEO-PI-R.

Figure 2.

Percent agreement between the dominant traits of the III-P and the TIPI, BFI, NEO-PI-R.



Additionally, Chi-Square analyses and Cramer’s V degrees of association were calculated to determine the specific relation between dominant traits. There were statistically significant associations between the III-P and the NEO-PI-R ( $\chi^2(16) = 32.70$ ,  $p = .036$ ; Cramer’s V = .21,  $p = .036$ ), the III-P and the TIPI ( $\chi^2(16) = 41.91$ ,  $p < .001$ ; Cramer’s V = .23,  $p < .001$ ) and BFI ( $\chi^2(16) = 29.69$ ,  $p = .02$ ; Cramer’s V = .20,  $p = .02$ ) dominant traits.

## 6. DISCUSSION

As hypothesized, the correlations between the five factors of personality, as measured by the NEO-PI-R, BFI, and the TIPI were quite high and supported the aforementioned work by John et al. (2008). Gosling et al. (2003) examined the validity of the TIPI in comparison to longer scales and found it to be acceptable. John and his colleagues developed the BFI as a compromise between the length of the test and the ability to measure separate facets. The reduction of items from 240 in the NEO-PI-R to 44 in the BFI produced a mean alpha of .83 (John & Srivastava, 1999) and reducing the items further to 10 items reduced the coefficient mean values to .51 (Gosling et al., 2003), showing lower overall reliabilities.

To assess whether the III-P provided an accurate classification of dominant personality type, the III-P factors with the largest *z*-scores were compared to the corresponding factors on each of the tests. Across all of the tests, Extraversion produced the most stable correlations and associations. In general, there were high correlations between each of the tests and high concordance between the dominant scores as well as between the highest and lowest factor scores. Given that, the terms *Introversion* and *Extraversion* are commonly used, these results make sense. Participants are familiar with these concepts and have likely already associated themselves as being Introverted or Extroverted.

Personality formation is thought to include elements of experience, environment and some portion of genetics (Liebert & Liebert, 1998). Research with identical twins has attempted to reduce variables so differences in personality can be studied (Plomin, Willerman, & Loehlin, 1976). Plomin et al. (1976) argued that at least some portion of personality was inherited and due to biology. Further, Hans Eysenck felt that personality was stable and enduring over time (Liebert & Liebert, 1998). McCrae and Costa (2008) felt that personality underwent change and development in adolescence but stabilized in early adulthood. The desire to determine personality types helps society answer the questions of “What am I *really* like?” and “What is the other person *really* like?” (Liebert & Liebert, 1998, p. 4).

Overall, the current results suggest that the use of the III-P may be useful in areas where a brief add-on questionnaire could provide some initial insight without the challenge of extensive testing. If personality is the primary variable of interest longer tests with more items (i.e., NEO-PI-R) may be preferable. In clinical settings, testing may be used to determine treatment options and, thus, it may be critical to be able to differentiate between Neuroticism facets, such as Depression and Angry Hostility to choose the appropriate course of treatment (Costa & McCrae, 1992). In cases such as these, the increased administration times are necessary and worthwhile. When measuring a specific relationship between personality and other research variables (i.e., attachment, life satisfaction), researchers must carefully consider which measures are most appropriate. If specific relationships between personality facets and other variables are of interest, we would recommend using the scale that had a specific relationship with the facets of interest. For example, if researchers are interested in the Big Five factors of personality, the BFI is likely appropriate but if they are interested in specific nuances of personality, the NEO-PI-R is likely the optimal test.

## 7. LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

In this study, participants completed a series of personality inventories and although the inventories were counterbalanced, the questions in each inventory were designed to measure specific traits and, thus, participants were likely aware that some of the questions were similar. The specific traits included in the III-P were selected because we felt that they best described each personality factor. To prevent participants from forming negative associations between the descriptors and the factors, we avoided words such as neuroticism. If a single item questionnaire were to be more fully developed, the use of specific trait descriptors would have to be validated to inform the selection of individual descriptors.

An interesting extension of this research would be to include 5 items that ask participants to rate FFM traits on a Likert scale. For example, participants could be asked, “On a five-point scale, how Agreeable are you?”. A collaboration among a group of researchers interested in personality either as a primary or secondary variable could easily collect data to allow comparisons between a single item (either FFM labels or III-P trait

descriptors) to evaluate the single item against a wide range of personality tests. Such collaboration would allow researchers to assess if participants have a sense of their own personality characteristics. Studies such as these would provide researchers with a broader range of participant diversity and increase the generalizability of results. In order to establish generalizability, community samples that include more diversity are necessary.

## 8. CONCLUSIONS

Overall, there was moderate to strong correlations between each of the tests. The III-P performed well against the other tests, suggesting that single items can be used as a crude measure of the Big Five personality factors. We would suggest that these results may help researchers and clinicians select appropriate tests. In both experimental and applied settings, if the variables of interest include the Big Five personality factors, it may be advisable to use a shorter measure of personality, such as the BFI. On the other hand, when measuring specific nuances of personality, a longer test that measures specific facets of personality may be more appropriate.

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## KEY TERMS AND DEFINITIONS

**Five Factor Model:** This trait approach proposes that personality is comprised of five major personality dimensions, including Openness to Experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism.

**NEO-PI-R:** Costa and MacCrae formulated the Neuroticism Extraversion Openness Personality Inventory Revised as a measure of the FFM. This measure is longer (240 items) and provides both broad factor and more nuanced facet level scores.

**Big Five Inventory (BFI):** The Big Five Inventory (BFI) is a self-report inventory designed to measure the Big Five dimensions. This inventory is a quite brief (60 items) measure of the FFM.

**Ten Item Personality Measure (TIPI):** The Ten Item Personality *Measure* (TIPI) is a 10-item measure of the Big Five (or Five-Factor Model) dimensions.

**Neuroticism:** Also referred to as emotional stability. This trait measures the tendency to easily express negative emotions (i.e., anxiety, depression). People who are emotionally stable (low Neuroticism scores) have good impulse control and are able to control their emotions.

**Extroversion:** Extroversion is associated with high levels of energy and activity. Extroverted individuals are sociable and tend to seek out situations that involve being with other people. Conversely, individuals who have low scores (labelled Introversion) are more reserved and self-reflexive.

**Agreeableness:** High scores on this factor are associated with higher levels of compassion, and cooperativeness. Individuals with lower scores are generally more suspicious, less cooperative, and more competitive.

**Conscientiousness:** This trait is associated with dependability, self-discipline, and organization. Lower scores are suggestive of sloppiness and unreliability.

**Openness to Experience:** This trait is reflective of intellectual curiosity and high scores are indicative of an appreciation for art, adventure, and new experiences. Very Low scores are associated with more pragmatism and dogmatism.

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