

## Psychometric Tests as a Measure of Personality: A Critical Assessment of Trait Versus Situationalist Positions and the NEO Personality Inventory (NEO-PI-R)

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### Abstract

Over time, the concept of personality has stimulated considerable theorising and debate amongst researchers. Thought to be characteristics within an individual that account for consistent patterns of thought, feelings and behaviours, the quest to understand individual differences between human beings has led to the increased uptake of psychological measurement tools, known as psychometric tests. Many variations of psychometric tests that have been devised to date attempt to operationalise the theoretical principles of Trait theory and the dimensions therein. Typically, these are applied within occupational, educational and clinical settings, where such personality measures are considered increasingly useful in the evaluation of individuals either being assessed, or due to begin working within an organisation. However, despite researchers implementing psychometric tests such as the NEO Personality Inventory [1] reporting high levels of construct validity for the measure [2], criticism surrounding the reliability of findings obtained from applications of the tool, resulting from the general lack of agreement around the trait dimensions that underpin psychometric testing, remain important. Another highly contested issue surrounding the basis of such tests are the stability and situationalist arguments, which criticise such methods as inaccurately representing a true picture of the individual due to failing to take the full environmental influences upon people into account. Such issues are undoubtedly more complex than such a summarisation can accredit, and upon paying systematic and critical consideration to the related assessments, a greater depth of analysis may be drawn.

**Keywords:** *Psychometrics; Personality Inventory; NEO-PI, Neuroticism; Personality Traits*

### Introduction

#### Psychometric Testing

Psychometric tests were developed to provide scientific measurement of differences between individuals, making use of statistical procedures in order to establish relationships between personality traits and other variables [3]. Underpinned by Trait theory principles, many different tests and inventories have been devised in order to identify such individual variations in personality functioning [4]. Moreover, trait theorists all share the basic assumption that personality 'traits' are fundamental units of personality, broadly predisposing individuals to respond in a particularly stable manner over time and between situations [5-7]. Elaborating on the earlier work of Allport, Cattell and Eysenck (whom formed the basis of the Five Factor model of personality 'FFM') [8], Costa and McCrae [9] developed the Neuroticism Extraversion Openness Personality inventory (NEO-PI). This psychometric assessment was devised in order to measure the aforementioned three personality traits as previously ascribed by Eysenck's personality questionnaire (EPQ) and was revised by Costa and McCrae [1] to encompass an additional two traits (Agreeableness, Conscientiousness), making up the FFM. Thereby in an attempt to operationalise the FFM's conceptualisation of an individual's behaviour, thoughts and feelings being attributable to five major domains of personality [5], the NEO-PI-R is thought to identify such dimensions within normal functioning adults [1,7].

#### NEO Personality Inventory (NEO-PI-R)

Within the NEO-PI-R, Costa and McCrae [1] identify six additional, more specific facets within each of the 'big five' personality di-

mensions, each of which themselves are also underpinned by a further eight behavioural descriptors. Despite Costa and McCrae [10,11] reporting consistent convergent and discriminant validity with respect to the NEO-PI-R measure, and some researchers acknowledging advantageous aspects of the NEO-PI-R, such as its use of statements in self-reporting scale measurement, thought to improve clarity and precision in responses in comparison to other inventories, use of abstract descriptions such as Costa and McCrae's [1] "I am a warm and friendly person" or, alternatively, Goldberg's [12] adjective "Warm" [2], others criticised the inventory at a local level with regard to particular aspects of its application. Moreover, aspects of the NEO-PI from which Costa and McCrae have claimed to display good reliability and validity of the inventory, such as high correlations between self-report and spouse-rated personality assessments [5], seem to be methodologically limited. For example, Kammann, *et al.* [13] make a seemingly valid point in that, such close relationships (between spouses) are influenced by acceptance of the other's self-concept and the regularity in which such individuals disclose their thoughts and feelings to one another; a perspective that seemingly gains momentum the more personality inventories become used in conjunction with current peer ratings and with the ever-growing closeness of relationships between friends that recent research has reported [14,15].

### **NEO-PI-R and Personality**

Another criticism of psychometric testing and specifically the NEO-PI-R faced due to Costa and McCrae's hard-line Trait theory and FFM underpinning's [3], is the attribution of findings obtained from studying differences between people across populations, to concepts within the individual [5]. Although the FFM has obtained substantial research support seemingly in line with the notion of five such traits being broadly evident across populations and cultures [2,10,16,17], application of such onto individuals is arbitrarily unfounded and untested. Borsboom, *et al.* [18] conceptualise this issue well, suggesting such between-person analysis to be too abstract from within-person analysis and, therefore, fails to reliably explain personality trait constructs held to varying degrees at an individual level. Therefore, use of psychometric tests, such as the NEO-PI-R used to assess behaviours, thoughts and feelings "indicative of the degree to which a particular trait is held within an individual" [5] appears somewhat of an unsupported assumption.

Although Costa and McCrae [19] suggest many personality researchers now agree individual differences can be usefully organised and encompassed in terms of the five broad dimensions (Neuroticism, Extraversion, Openness, Agreeableness, Conscientiousness), and suggest close parallels in convergent and discriminant validity across inventory instruments, there remains a lack of clear definitive consistency of trait characteristics between other inventories. Moreover, although some correlation occurred between the proposed personality dimensions of NEO-PI-R and the Eysenck Personality Questionnaire (EPQ), correlation between most dimensions and facets therein were not appropriately sized in order to be indicative of concurrence within the 'Big Five' [20]. The most highly correlated dimensions between the two models were Extraversion and Neuroticism [20], however, such is not unexpected given Costa and McCrae's model was derived from these Eysenckian inventories. Nonetheless, even within the extraversion dimension, disagreement occurs around which elements are central facets, with the EPQ "feeling the need to distinguish between sociability and what they call impulsiveness" [6], neither of which are present within the NEO-PI-R.

Furthermore, disagreement is evident within the warmth facet, which is conceptualised as Extraversion by Costa and McCrae [1], but suggested by other 'Big five' researchers to be related more closely related with Agreeableness [5]. Additionally, the trait Openness to experience, suggested by Goldberg [12] to encapsulate intellect and imagination, was an evaluation McCrae, *et al.* [17] did not concur with, proposing such to be too narrow a conceptualisation of the openness factor. Therefore, in terms of the application of psychometric inventory score data, such as the NEO-PI-R popularised and commonly applied within occupational workforce selection [5], there are seemingly important implications of such a lack of agreement underlying the various personality inventories. Anderson making a useful and insightful point suggested:

"An important note of caution... [is that] the applied psychologist [using psychometric testing] in personal selection will end up selecting different people dependent on the personality inventory chosen" Anderson and Ones [21].

Regardless of internal reliability and construct validity of the NEO-PI-R inventory proclaimed by Costa and McCrae [10,11], and other inventories put forward by varying researchers, a lack of agreement between big five trait dimensions, which equate to poor consistency

between scores obtained from different measures despite assessing the same individuals, seems to bring the reliability of such psychometric tests into contention. In relation to application within workforce selection, as is seemingly commonplace in recent times, with the Times newspaper suggesting over 75% of the top one hundred UK companies use such employment assessments in recruitment [22] and increasing clinical therapeutic treatment selection usage of psychometric tests [23], it is seemingly evident that implications to people's careers, companies' success and even therapeutic clients' health, are untellable.

### **Personality: Trait or State**

Within the study of personality, a significant and longstanding area of contention arises between the directly contrasting positions of trait theorists and social-cognitive theorists, widely acknowledged as the 'Person-Situation debate' [24]. Widiger and Trull [2] make the suggestion that, along with the great extent of empirical support for the reliability and validity of the NEO-PI-R as well as its wide applications, a major advantage of the assessment is the copious amounts of supportive research findings around the stability of the trait dimensions (of the 'big five') which it measures. A key study often cited as providing such support is Costa and McCrae's [25] six year Baltimore longitudinal study (BLSAP), whereby the authors found high test re-test correlations for NEO dimensions. Correlations were found to approach reliability scores that the scales (Neuroticism, Extraversion, and Openness to experience) themselves obtained [26]. However more recent longitudinal and cross sectional research has led theorists, such as Costa and McCrae, to slightly amend this view now making the suggestion that certain aspects of the big five do change to an extent with age (such as a decline in Neuroticism and Extraversion and increase in Agreeableness and Conscientiousness; [27,28]) but do so consistently across varying cultures [29]. Thereby the authors continue to refute that any situational effects associated with political or socio-economic factors may occur.

Nonetheless, research to the contrary is not absent or without basis. Helson, *et al.* [30] longitudinal study found that although clear evidence of personality changes emerged across adulthood, such were affected by the social-cultural changes associated with the 1960-70's women's movement in the United States. A recent study by Srivastava, *et al.* [31] also concurred with this notion, finding situational experiences such as the age of parents when rearing children altered NEO-PI-R correlation scores on the agreeableness dimension. Both studies, alongside an array of others which obtained similar findings [32,33], seem to directly contradict Trait theory assumptions that underpin the psychometric inventories used to assess personality 'types', thereby seemingly raising further questions surrounding the utility of such assessments.

McCrae, *et al.* [29] made clear their position on Trait theory, suggesting individuals have "endogenous dispositions that follow intrinsic paths of development, essentially independent of environmental influence." Thereby, assuming behaviour is explicable in terms of the individual rather than the situation, and is thought to be relatively stable over time and across situations, allows broad generalisations of individual personality to be made [24]. Moreover, the position of trait theorists and psychometric assessment is that when situational factors, such as pressures or rewards, are removed, a person scoring high on descriptors, such as kindness, will continue to be kind, attributing behaviours to internal processors or mechanisms [24]. This viewpoint has received much criticism from eminent personality researchers such as Mischel [34], who suggested many such trait dimension measures are largely descriptive, failing to predict behaviour particularly well (e.g., inconsistencies in behaviour between situations, such as the high scoring extravert whom sometimes behaves shy or introverted). Furthermore, Mischel went on to suggest that such personality dimensions only account for approximately ten percent of variance in behaviour, thereby suggesting almost all behavioural variance (90%), is attributed to external, non-personality influence [34]. This notion suggests an overreliance on trait related measures, something which may therefore result in such assessments of the individual to be seen as lacking validity and practical utility. Whilst Maltby, *et al.* [35] notes this limitation can be improved by adopting a multitude of other personality measures alongside psychometric testing, undoubtedly the differing positions of trait and situationist personality theorists appears too distinct to reach such an agreement so easily.

Moreover, the situationist perspective criticises such psychometric tests' scores reliability and the application of such assessments validity in the field. Despite the correlation rates between differing psychometric inventories, which may or may not be evident [3,26],

the basis of such tests are nonetheless founded on the principals of Trait theory, which fail to account for the ability to discriminate between behaviours, according to environmental circumstances [24,36]. These such abilities to alter one's self are suggested by Mischel and Mischel [37] to be basic human capabilities, which if ignored by trait theorists, results in an incomprehensive and incomplete approximation of the importance of the situation upon human functioning.

## **Conclusion**

Individual differences between human beings have historically been measured in a number of different ways from experimental designs [38] to examination of spoken discourse [39] and more typically through psychometric assessment [20]. The NEO-PI-R devised by Costa and McCrae [1] is a popular psychometric test used to measure individual differences in personality, adhering to Trait theory principles of the five-factor model. Despite its popularity, applicability and the evidence put forward by the assessments creators and other researchers supporting the utility of the inventory, the measure has obtained significant criticism. Issues regarding inconsistencies within Trait theory and general models of personality from which the inventory is based, alongside situationist criticism and various practical application limitations, bring into question the validity and reliability that the NEO-PI-R may have. Nonetheless, despite such criticisms which cannot and should not be dismissed, the NEO-PI-R and psychometric tests in general, used alongside other measures of psychological assessment as a package, may provide the best method of preventing an over-reliance on psychometric score data alone and, therefore, offer a more comprehensive assessment of an individual's personality in the future [40].

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