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A study of the psychometric properties of the Personality and Values Questionnaire in a sample of the South African Population

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Supervised by Professor Sumaya Laher

A research report in fulfilment for the Degree Master of Arts by Dissertation (PSYC8003A) in the Department of Psychology, Faculty of Humanities at the University of the Witwatersrand in Johannesburg.

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DECLARATION

I, Crystal Clack, declare that this research is my own, unaided work. It is submitted for the degree of Master by Dissertation at the University of the Witwatersrand, Johannesburg, it has not been submitted before for any other degree or examination at this or any other university.

Sign: 

Date: 15 March 2024

ABSTRACT

Personality assessment plays a crucial role in various domains in South Africa. Both personality traits and values dimensions have been shown to be reliable predictors of performance and behaviour. Research on personality in South Africa is lacking, as is research on values. Assessment use in South Africa is governed by legislation, requiring evidence of reliability, validity, fairness, and a lack of bias. Most objective, self-report personality assessments are based on the Five Factor Model (FFM), which is widely accepted in personality as being universal. However, evidence on personality in South Africa suggests that there are additional elements to these factors. This study explored the applicability of the Personality and Values Questionnaire (PVQ) for use in the South African context. This was done by investigating internal consistency reliability, construct validity, and aspects of construct bias as they pertain to the potential for adverse impact. A non-probability convenience sample of 288 participants completed the PVQ. The study took the form of a non-experimental, cross-sectional design.

From the results, it was evident that the scales of the PVQ demonstrated adequate internal consistency reliability. In assessing construct validity, the five factor structure replicated similarly with regards to the Extraversion and Neuroticism domains, but the domains of Agreeableness, Openness, and Conscientiousness loaded differently to that proposed by the FFM and the test developers and more in line with other research on personality in South Africa. Evidence for construct bias was found. Women were likely to be more considerate of others, and concerned with how they appear to others. Black participants appeared more inclined towards harmony in interpersonal relationships and traditionalism. The differences for the language subgroups were small. The results suggest that the PVQ would have some suitability for use in South Africa depending on the context and sample. More research with larger and more diverse samples is needed.

Keywords: Adverse impact, Five Factor Model; personality assessment; personality; psychometrics; values

ABBREVIATIONS

15FQPlus	15 Factor Questionnaire Plus
16PF	16 Personality Factor Questionnaire
EEA	Employment Equity Act
EFA	Exploratory Factor Analysis
FFM	Five Factor Model
FFT	Five Factor Theory
K-1 rule	Kaiser-Guttman’s Eigenvalues-greater-than-1 rule
KR-20	Kuder-Richardson 20 Formula
NEO-PI-R	NEO Personality Inventory Revised
Openness	Openness to Experience
OPPro	Occupational Personality Profile
PVQ	Personality and Values Questionnaire
SAPI	South African Personality Inventory
UK	United Kingdom
VMI	Values and Motives Inventory
Velicer's MAP	Velicer's Minimum Average Partial

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CHAPTER 1: INTRODUCTION

1.1 Contextualising the study

Psychological assessment plays a crucial role in South Africa across various domains such as organisational selection and development, team-building, career guidance, and subject choice assessment batteries (Foxcroft & Roodt, 2018). Its significance lies in the correlation between specific personality traits and job performance, making personality assessment a reliable predictor of performance. This often leads to selections based on personality fit among candidates with similar qualifications and experience (Foxcroft & Roodt, 2018).

McCrae and Costa (2008) are referenced throughout the literature due to their pioneering work with the NEO Personality Inventory Revised (NEO-PI-R) worldwide, including in South Africa and the rest of Africa. The NEO-PI-R has been extensively used in research and is prevalent in the literature. It is based on trait theory, specifically the Five Factor Model (FFM) of personality. Expanding on this existing body of knowledge contributes to the understanding of personality in South Africa. The Personality and Values Questionnaire (PVQ) assesses personality as well as values, which is a relatively under-researched area of study in personality psychology.

While values assessments are often perceived as luxury additions due to their additional costs, the PVQ combines personality and values assessment into a single instrument. Therefore, this study also explored the potential for values to be considered as a separate element within the assessment.

Assessment use in South Africa is subject to legal requirements. The Employment Equity Act is specifically relevant to this study as it prohibits the use of assessments unless their psychometric properties are verified and considered acceptable for use. This study investigated the psychometric properties, including reliability, validity, and bias (adverse impact, in this case) of the PVQ for its applicability in a sample of the South African population.

The majority of psychometric assessments originate from a European American worldview, which means that the development of the tests is based on this view, and validation is against tests that are also based on this worldview (Foxcroft & Roodt, 2018). Given South Africa's history of apartheid and the influence it has had on assessment policies and practices (Laher & Cockcroft, 2013), it is essential to evaluate the psychometric properties of the PVQ before its use, especially in industrial or occupational settings.

Despite the growing knowledge about the importance of cross-cultural research and applications thereof, there is a dearth of research on personality in Africa, South America, and non-English speaking countries in Europe and Asia (Schultz & Schultz, 2009). This study aimed to contribute to the body of knowledge about personality in South Africa, a culturally diverse country, while ensuring that the assessment does not discriminate against any groups. Interventions would be necessary if evidence of discrimination were found, highlighting the importance of exploring the PVQ's psychometric properties.

Reliability was assessed for internal consistency reliability using Cronbach's Alpha and McDonald's Omega. Construct validity was examined through exploratory factor analysis, while adverse impact was evaluated using t-tests for mean differences between groups and Cohen's d for effect size, as detailed in Chapter 3.

South Africa has a long history of discrimination in assessment. During apartheid, intelligence assessments were used to validate existing beliefs of supposed White superiority. Assessments created and normed for White children were used indiscriminately on children of colour, highlighting systematic biases. Given that assessment policies in South Africa were linked to apartheid, and current practices stemmed from those policies (Foxcroft & Roodt, 2018), there is a need to assess the psychometric properties of the PVQ before allowing it to be used in South Africa. Laher and Cockcroft (2013) note that the earliest record of psychological tests being used in South Africa is in 1915. Tests used during this time were normed for White children but were being used on Black children. Testing then moved into the organisational field in the late 1930s and 1940s (Laher, 2022).

For the purposes of this research, the four main ethnic groups Blacks (people of African descent), Coloured (mixed descent), Asians/Indians (Asian descent) and Whites (European descent) were collapsed into White and Black as per the Employment Equity Act's definition (Fetvadjiev et al., 2015). The language variable in this research was categorised into English first language and English second language. South Africa's 11 official languages also have two subgroups: two Germanic languages, English and Afrikaans, and nine Bantu languages which are spoken by members of the Black group, illustrating the rich linguistic diversity that needs to be considered in psychological assessment (Fetvadjiev et al., 2015).

Therefore, before assessments can be employed in South Africa, their psychometric properties must be verified. Further, it was necessary to evaluate whether there was potential for adverse impact effects across subgroups in South Africa, specifically, gender, language, and race. This study addresses the need for further research on personality in

South Africa, and for further research on values in South Africa by contributing to the body of knowledge on the psychometric properties of personality and values assessment within South Africa on a South African sample. It aimed to expand the body of knowledge of personality theory beyond the traditional Big Five, incorporating social elements of personality.

1.2 Research aims

This study intended to explore the applicability of the Personality and Values Questionnaire (PVQ) on a sample of South African participants. The PVQ is unique in that it incorporates both personality traits and values dimensions into the same assessment. The psychometric properties of the PVQ that were explored were: reliability, validity, and bias by means of adverse impact. The relationships between the factors were explored by means of exploratory factor analyses. The study also did a comparison between a five-factor rotation of the scales on this sample and Paltiel's (the developer's) sample.

1.3 Research questions

The main research question was: Is the PVQ appropriate for use in the South African population? This was established in the following questions:

1.3.1 Questions pertaining to reliability

Do the 34 scales of the PVQ demonstrate acceptable internal consistency reliability coefficients for the South African population?

1.3.2 Questions pertaining to validity

Do the personality traits and values dimensions load independently of one another?

Do the personality scales factor into a five-factor solution?

Do the values dimensions show three separate types of values?

Does the PVQ factor into a five-factor solution in a sample of the South African population?

How does a five-factor solution on PVQ of this sample compare to a five-factor exploratory factor analysis on an international sample?

1.3.3 Questions pertaining to adverse impact

Does the PVQ show potential for adverse impact due to differences in gender groups?

Does the PVQ show potential for adverse impact due to differences in first language?

Does the PVQ show potential for adverse impact due to differences in race?

1.4 Outline of chapters

This dissertation consists of six chapters. Chapter 1 is an introductory chapter that briefly contextualises study, places the PVQ within personality psychology and presents a brief introduction to the study. It contains the outline of the study, the research aims, questions for the study, and an outline of the structure of the study.

Chapter 2 is the literature and theoretical framework of the study; it provides an overview of the core literature relevant to the study. Personality in psychology is discussed first, including the history of personality in psychology. This is followed by a discussion of personality in the workplace. Personality assessment is then discussed to contextualise the PVQ in the theory. This includes approaches to personality assessment, with a specific focus on the trait approach. The Five Factor Model (FFM) of personality is then presented, including criticisms of the FFM, followed by the Five Factor Theory (FFT) and the history of assessment in South Africa. After that, emic and etic testing are briefly discussed. Attributes that effect personality are then presented; these are gender, race, and first language. Values in assessment is then discussed followed by the theoretical background and development of the PVQ. Finally, the psychometric properties, as they pertain to the Employment Equity Act, are then presented that include reliability, validity, and bias in terms of the potential for adverse impact, followed by a conclusion of the chapter.

Chapter Three, the methods chapter, explains the methodology that was followed by the researcher. In this chapter, the aims of the study are stated, as well as the research questions for the study. Following this, the sample, instrument information, research design and procedure are discussed. Finally, the analytic techniques used in the study are presented.

Chapter Four presents the results obtained in the study. Firstly, the descriptive statistics for the sample are presented, followed by a discussion of the demographic information of the sample that was collected for the purposes of this study. This information includes gender, race and first (or home) language. Descriptive statistics on the scales of the PVQ are

presented, and finally the results for the reliability analyses, and the exploratory factor analyses, as well as the t-tests are discussed.

Chapter Five is the discussion. This chapter explains the results and discusses them in relation to other studies in the field. Issues of reliability, validity, and adverse impact (bias) are examined to determine the applicability of the PVQ in South Africa. This is done by examining the standard psychometric requirements of the PVQ for use in South Africa in accordance with the Employment Equity Act. Finally, the conceptual and methodological limitations are discussed, as well as recommendations for future research.

CHAPTER 2: LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Introduction

Colloquially, the term “personality” is used to describe aspects of a person’s behaviour in day-to-day life, a concept that has long captured the interest of scientists and laymen alike. Interest in how a person behaves dates to approximately 129–c.216 AD when the Greek physician Galen attempted to describe personality by determining the presence of body fluids, or “humours” in the body, namely, black bile, blood, yellow bile, and phlegm (Moerdyk, 2022). Since then, the field of personality psychology has grown, and overt behaviour can be quantitatively assessed. Now psychometric assessment is prevalent world over, including in South Africa.

This chapter focuses on the literature of personality and personality assessment in order to contextualise this study within this framework. It explores personality in psychology, personality assessment, including the approaches to personality assessment that pertain to the PVQ. This is followed by assessment in South Africa, and emic and etic testing is then discussed. The Five Factor Model (FFM) of personality and personality assessment is explored, and specific factors that may influence personality – gender, race and first language. This is followed by a discussion of values in assessment. Finally, the PVQ developmental framework and the theoretical background of the assessments that were used to create the PVQ are discussed. The remainder of the chapter discusses the psychometric properties of the PVQ, reliability, validity, and adverse impact, in relation to the use of the PVQ in South Africa, followed by a conclusion of the chapter.

2.2 Personality in psychology

Psychology, as a science, emerged in the late 19th century in Germany, through the work of Wilhelm Wundt who established the first psychology laboratory in which he focused on conscious experience (Schultz & Schultz, 2009). Wundt’s work on conscious experience sparked John B. Watson’s movement, known as behaviourism, in the early 20th century (Schultz & Schultz, 2009). In the 1890s, Sigmund Freud began an independent body of work focusing on the unconscious mind in his system known as psychoanalysis (Schultz & Schultz, 2009). In the late 1930s, Gordon Allport began the study of personality that became formalised in American psychology (Schultz & Schultz, 2009). Since then, many theories of personality have emerged.

Currently, there are eight dominant theories of personality: biological approaches,

developmental approaches, psychoanalytic theories, neo-psychoanalytic theories, need theories, phenomenological approaches, cognitive approaches, and trait approaches (Moerdyk, 2022). According to Allen (2015), the definition of personality has several facets: individual differences; behavioural dimensions; and traits. Individual differences can be characterised as empirical evidence that people differ in many ways (Allen, 2015). Gordon Allport defines personality (Allport, 1937, as cited in Moerdyk, 2022, p.183) as "the dynamic organisation within the individual of those psychosocial systems that determine his or her own unique adjustments to the environment." Summarily, personality can be understood as important individual differences in people's behaviour that leads them to behave in certain consistent ways and make certain consistent choices (Moerdyk, 2022). As this behaviour can be considered consistent over time, and the models for understanding personality, such as the Five Factor Model of personality, have been shown to be good predictors of job performance, and are often assessed in high-stakes environments with far-reaching consequences.

2.3 Personality in the workplace

Differences in patterns of behaviour, thinking, and feeling make up an individual's personality. This needs to be understood both in separate parts (the facets) and how those parts work together in a person as a whole (American Psychological Association, 2019). Early theorists determined that quantitative evidence and explanations underpin the understanding of personality. As a result, instruments have been developed to measure underlying personality structure. Among these, in South Africa, is the 16PF questionnaire which has endeavoured to do this while holistically considering motivation, predictability, and behaviour (Van Eeden et al., 2013).

High-stakes environments include areas such as personnel selection and development, because the success of an organisation is as dependent on employee fit and engagement as it is on intellectual ability (Moerdyk, 2022). Often, applicants will have the same or similar qualifications or level of ability, resulting in personality becoming the deciding factor. Although personality assessment can be used in a wide variety of contexts, it is not the main focus of this study.

Personality is used in the workplace to predict job performance. Evidence accumulated since the mid-1960s has shown that personality traits predict workplace performance, which is important for the wellbeing of both the organisation and the employee (Oswald & Hough, 2010). Knowing a candidate's personality will ensure that the right fit is found, and this can

be achieved through assessment. Oswald and Hough (2010) define organisation-relevant personality traits as psychological characteristics that consistently, over time and across situations, predict motivations, behaviours, and work-related thoughts. Assessing for these characteristics can be done with the PVQ. In addition to personality, values have been shown to be moderators of human behaviour. This study assessed the psychometric properties of the Personality and Values Questionnaire (PVQ) in a South African sample.

2.4 Personality assessment

Personality assessment is prolific in South Africa; it is used in a wide range of contexts across age groups, in areas such as personnel selection and development, vocational guidance, subject choice and school readiness. Personality assessments have commonly been used to determine suitability for occupational roles as there is a correlation between certain personality traits and job performance. As a result, candidates applying for the same job and who are rated similarly in qualifications and experience may be selected on personality fit (Foxcroft & Roodt, 2018).

The early English and USA pioneers of personality assessment include Eysenck, Allport and Spearman (Laher & Cockcroft, 2013). According to these theorists, the underpinning of human behaviour is understood through objective, rational, quantitative evidence (Laher & Cockcroft, 2013). This study focused on the Personality and Values Questionnaire (PVQ) as an assessment of personality and values in a South African sample. The PVQ uses the trait approach to personality, in particular, the Five Factor Model (FFM).

2.4.1 Approaches to personality assessment

There are different approaches to personality assessment; a few of these are discussed below. They are: idiographic vs nomothetic approaches; the lexical approach; the trait approach; and the FFM. There are various methods of studying personality in psychology; these include: the Case History Method; the correlational method; and the experimental method (Allen, 2015). The method used in this study was the correlational method which is defined as a method of study used to determine if variables affect one another, and if a change in one corresponds to a change in the other (Allen, 2015).

2.4.1.1 Idiographic vs nomothetic approaches

There are two different views on personality, according to Moerdyk (2022). These are known as the idiographic and nomothetic approaches. The idiographic approach takes an in-depth

view of the factors that go into the unique makeup of each person but there is no attempt to ascribe a theorical construct or traits to a person. The nomothetic view, on the other hand, emphasises the view of personality characteristics being well-defined entities and, as such, are common to all people (Moerdyk, 2022). The PVQ follows the nomothetic approach.

2.4.1.2 The lexical approach

A common method of developing scale content is the factor analysis of natural language terms about personality, obtained by respondents rating themselves and people they know on adjectives found in everyday language (Hall et al., 2018). Allport and Odbert (1936) were the first to formally isolate all the words in the English dictionary that they believed described personality and divided these into four categories of personality descriptors (Laher, 2013a).

Raymond Cattell took Allport and Odbert's list of adjectives and, using clustering techniques, discovered 35 variables. He then subjected them to factor analytic techniques and extracted 12 variables which formed part of Cattell's 16-Factor Personality Questionnaire (16PF) (Cattell, 1946, as cited in Laher, 2013a). From this, multiple researchers found evidence for the Big Five – five superordinate personality traits (Laher, 2013a). Thereafter, Goldman revived this work through his research when he found that the five factors (Openness to Experience, Conscientiousness, Extraversion, Agreeableness and Neuroticism), "remained invariant across a variety of different methods of factor extraction and rotation even when more than five factors were rotated" (Laher, 2013a).

The base assumption of the lexical approach to personality is that the most important traits or individual differences tend to become encoded in natural language, as single terms in all languages (Laher, 2013a). This means that the FFM has roots in the English lexicon, and not in psychological theory (Oswald & Hough, 2010). The implication of this is that the FFM model is influenced by the English language and related culture, which may not allow for universality of application. The PVQ has scales from the 15FQPlus, which is developed according to Cattell's model. Cattell used the lexical approach to formulate his model for personality.

2.4.1.3 The trait approach

The most common approach to defining and assessing personality is the trait approach (Moerdyk, 2022). It is the underlying theory for many personality assessments in South Africa, for example, the 16 Personality Factor Questionnaire (16PF) and the Basic Traits Inventory (BTI) by JVR and the 15FQPlus by Psytech South Africa, and the South African

Personality Inventory (SAPI), which assesses, but is not limited to, the FFM. Foxcroft and Roodt (2018) define a trait, or a basic tendency, as a predisposition to act a certain way. Trait theorists focus on these internal predispositions as the determining factor for the way people behave consistently over time and in different situations (Foxcroft & Roodt, 2018).

Moerdyk (2022), who defines traits as relatively stable ways in which people differ from one another, points out that, in the realm of personality theory, these ways in which one individual differs from another need to exclude physical attributes such as age. As there are a seemingly endless number of traits available with which to assess personality, trait psychologists regularly use factor analysis to identify the commonalities in underlying sets of variables (Foxcroft & Roodt, 2018).

A common criticism of trait theory is that it does not explain how personality develops within an individual, or its origin (Laher, 2013a). There is no definite list of traits, they are numerous. Fleeson and Jayawickreme (2015) maintain that traits can become circulatory as they are both descriptive and explanatory. Thus the danger is if a construct is used to explain itself, the descriptive meaning of a trait and the explanatory meaning are the same. To avoid this, they suggest having two as separate elements which is called the Whole Trait Theory (Fleeson & Jayawickreme, 2015).

2.5 The Five Factor Model of Personality

The FFM defines personality in terms of five broad factors, namely, Conscientiousness, Agreeableness, Neuroticism, Openness to Experience and Extraversion (Laher & Cockcroft, 2017; Laher & Dockrat, 2019). Openness to experience also comprises Culture or Intellect (Foxcroft & Roodt, 2018) so it can be identified in different cultures. Oswald and Hough (2010) note that advocates for the FFM argue for its universality based on its nomothetic approach, and therefore the belief that the trait, by virtue of being a trait, is stable across gender and ethnic-cultural groups over time. Traits like Extraversion and Emotional Stability are often found to be the most consistent across cultures, with Openness to Experience being the least replicable. However, in studies in Africa, Openness to Experience tends to be found across cultural groups (Laher & Dockrat, 2019).

The FFM follows the lexical approach, factors which emerged through extensive factor analyses of adjectives describing personality (Oswald & Hough, 2010). These adjectives can come from the dictionary or from people rating themselves and/or those they know. It is widely accepted in personality psychology as being the universal model of personality, and

as being the most inclusive (Foxcroft & Roodt, 2018).

The definitions of each facet of the FFM, according to Paltiel (2002), come from research by Costa and McCrae (1987), Goldberg (1990) and Tupes and Christal (1961 as cited in Paltiel, 2002), and are described below. The global factors of the 15FQPlus are bipolar – low scorers are represented by the trait on the lower-end or left-hand side of the scale, and high-scorers on the high end or right-hand side of the scale.

People who score more towards Openness to Experience are more likely to be influenced by feelings and ideas than by hard facts whereas someone more inclined towards pragmatism is likely to be more influenced by tangible evidence, and less open to new ideas. Conscientiousness, in the 15FQPlus technical manual, refers to self-control. At the extreme low-end, scorers could be expected to exhibit low levels of self-control, or potentially not be influenced by norms and expectations. At the other end of the spectrum, presentation could be very high levels of self-control to the point of rigidity. Openness to Experience is also sometimes named Intellect (Soto & Jackson, 2020).

Extraversion is at the high end of the scale, and Introversion at the low end of the scale. Introversion would be measured by the inversion of those scales. Someone who is high on extraversion is more likely to be orientated to the outside world of people and events; they may have a high need for social contact. Introversion tends to present as a focus on the inner world of thoughts, experiences, and perceptions, and may not require much social contact.

Agreeableness is defined as being tolerant and obliging, neither disagreeable nor opinionated and likely to be happy to compromise. Independence, on the other hand, is defined as being self-determined with regard to own thoughts and actions. A person who is independently minded may be intractable, strong-willed, and confrontational. Neuroticism is referred to in the 15FQPlus technical manual as the “aNxiety” scale and has low anxiety on the low end and high anxiety on the other end of the scale. People with low anxiety tend to present as well-adjusted and calm, resilient, and able to cope with emotionally demanding situations whereas those with high anxiety are more likely to be considered vulnerable, touchy, sensitive, and prone to mood swings.

2.5.1 Criticisms of the FFM

Critiques for the FFM can be traced back to 1995 when Jack Block published his article with critiques about the FFM. His issues were summarised by McCrae (2010) as deficient

methods used to discover and confirm the FFM, that the FFM is not an exhaustive list of important individual differences, and that "the FFM does not adequately account for the dynamic processes that shape behaviour and experience on an ongoing basis" (McCrae, 2010).

Although there are numerous claims that the FFM is universal, research from Laher and Dockrat (2019) shows that there is strong evidence for additional factors to be added, such as individualism and collectivism, as the FFM does not sufficiently include and integrate knowledge on personality that extends beyond the original frame of reference (Laher, 2013a) which is a primarily English, and Western. In addition, Oswald and Hough (2010) note that repeated attempts to use confirmatory factor analysis to fit empirical data to the FFM have failed to do so within acceptable model-fit criteria. They argue that there should be adequate fit within groups for appropriate between-group comparisons to take place (Oswald & Hough, 2010).

The development of the FFM is placed in a Eurocentric tradition and the English lexicon; it therefore may not be applicable in cultures where the dominant language is not English (Laher, 2013a). Additionally, the FFM was developed primarily through factor analysis, resulting in a lack of a theoretical model. Furthermore, it lacks an explanation for how personality develops within the individual (Laher, 2013a).

2.6 Five Factor Theory

In response to the criticism of the FFM cited above, McCrae and Costa (2008) proposed the FFT. Although the FFM is widely used, it does not exhaust all the available traits that mark distinguishable differences in behaviour, is atheoretical, and does not explain the development of personality in people. The FFT attempts to explain these gaps. McCrae and Costa (2008, p.60), summarise the FFT as a

> "personality system situated between biological and socio-cultural inputs and that its major components are basic tendencies (especially the FFM) and characteristic adaptations (habits, attitudes, roles, etc.)."

FFT is based on assumptions that people are knowledgeable (knowability), rational (rationality), variable (variability), and proactive (proactivity) (McCrae & Costa, 2008). It attempts to explain how personality develops in individuals at a given time and across a person's life (Laher, 2013a). FFT provides a framework in which to understand the development and operation of psychological mechanisms (such as the need for closure) and

the behaviour of individual men and women (McCrae & Costa, 2008).

In the FFT, McCrae and Costa (2008) refer to the five factors as “Basic Tendencies” that, they argue, are innate, heritable universal structures. In addition to the five factors, literature often illustrates an individualism/collectivism factor, which needs further examination, particularly in the African context (Laher, 2013a). Collectivist expressions were also found in China by Cheung et al. (2008, as cited in Laher, 2013a).

2.7 Assessment in South Africa

Psychological assessment came to South Africa from Europe and America through events such as colonisation and scholars returning from abroad with Western measures (Foxcroft & Roodt, 2018). At the time, the assessments that existed were individually administered and focused primarily on intelligence testing. Expansion in testing numbers resulted in a need for group testing and increased the scope of assessment to include other domains, such as personality.

Assessment processes in South Africa developed in a context of the political ideologies of the time, used to validate the unequal distribution of resources (Laher & Cockcroft, 2013). This was done by dividing people into groups based on race and categorised as either Black, White, Indian, or Coloured. Assessment therefore developed reflecting ideas of racial segregation and conflict (Foxcroft & Roodt, 2018; Laher & Cockroft, 2013).

Employment procedures that were utilised under the apartheid regime saw that preference was given to White individuals, and psychological testing was misused to support this practice which was known as the job reservation policy (Laher & Cockcroft, 2013). The Employment Equity Act (no. 55 of 1998) was introduced as a means of legally protecting individuals from the discrimination inherent in assessments as a biproduct of the apartheid era. Section 8 refers specifically to psychological assessment and states:

> “Psychological testing and other similar assessments are prohibited unless the test or assessment being used (a) has been scientifically shown to be valid and reliable; (b) can be applied fairly to all employees; and (c) is not biased against any employee or group” (Department of Labour, 1998, p.7).

It is then necessary to ensure that an assessment meets these requirements before it may be used in an industrial setting, such as for personnel selection and development. In South Africa, one cannot assume reliability, validity, freedom from bias and fairness here simply

because that is the case with the assessment overseas.

Values are arguably just as important, as we can try to understand what motivates people. Although personality is a strong predictor of work-place performance, it is not perfect. There are other drivers of human behaviour that could work as an additional source of information, and these are values. The PVQ contains an assessment of values as well as personality. Generally, values assessments are considered an added extra, and not part of routine assessment batteries unless there is a budget for it. There are no other tests currently that assess values and personality together.

When considering the psychometric properties of an assessment in a diverse country, such as South Africa, it should be borne in mind that the majority of psychometric assessments originate from a European or American worldview, which means that the development of the tests is based on this view, and validated against tests that are also based on this worldview (Foxcroft & Roodt, 2018).

This study addressed the need for further research on personality in South Africa, and for further research on values in South Africa by contributing to the body of knowledge on the psychometric properties of the PVQ within South Africa on a South African sample. It hopes to add to the body of knowledge on a universal theory of personality that extends beyond the traditional FFM to include social elements of personality.

2.8 Emic vs etic testing

There has been an increasing emphasis on the importance and necessity of understanding psychological constructs in indigenous cultures and incorporating this understanding into the development of indigenous measures. This includes the adaptation of Western-orientated measure to be culturally appropriate in the multicultural African context (Foxcroft & Roodt, 2018).

According to Cheung et al. (2011), the interaction between culture and personality can be looked at in two ways, through etic studies and emic studies. Etic studies compare constructs and measures of personality across cultures, and emic studies study culture and personality though an in-depth analysis of a specific culture (Cheung et al., 2011).

While highly diverse populations, such as South Africa, would benefit most from emic measures, they are rare (Laher & Cockcroft, 2017). Therefore, practitioners are obligated to adapt psychological measures that were developed in other contexts for other populations

(Laher & Cockcroft, 2017). Alternatively, Cheung et al. (2011) advocate for a blended model of both etic and emic studies.

It is commonplace in South Africa for assessment measures to follow the etic approach, taking a measure from one culture and adapting it to another (Foxcroft & Roodt, 2018). In part, this is due to sanctions posed on South Africa in the late 1980s limiting access to test materials (Laher & Cockcroft, 2013). As such, the Human Sciences Research Council (HSRC) specialised in developing local measures. The PVQ follows the etic approach.

2.9 Gender and personality

The first demographic variable captured for analysis was gender. Cross-cultural research on gender differences in personality, conducted by Costa et al. (2001), found that males consistently score higher on Neuroticism, and females scored higher on Anxiety. Research supports that women score higher in the nurturing facets of personality, whereas men score higher in dominance (Costa et al., 2001). They found gender differences to be consistent across cultures, consistent with gender stereotypes, and of a modest size. Costa et al. (2001) found four main categories to describe most of the gender differences: women were found to consistently be more concerned with feelings than ideas and to be higher in negative affect, nurturance, and submissiveness. In addition, greater gender differences appear to be found in Western cultures than in non-western cultures (Laher et al., 2020).

An understanding of these innate differences in emotional presentation between men and women could possibly be explained by biological differences, aspects such as natural selection, hormonal differences, and their effect on mood, etc. (Costa et al., 2001). Another possible explanation is the social role model. According to Shultz and Schultz (2009), young children are still typically raised according to traditional stereotypes, and this may influence personality in various ways. There is much evidence to support this, particularly with reference to empathy and anxiety.

Findings in South Africa echo international findings on some scales. Agreeableness and its facets, as well as Neuroticism and its facets, suggest that some differences may be innate. Women world over tend to score significantly higher on the factor of Agreeableness, as well as some of its facets such as nurturing, tender-mindedness, and altruism (Costa et al., 2001; Feingold, 1994; Laher & Cockcroft, 2013). This means that women, on average, are more nurturing, tender-minded, and altruistic more often and to a greater extent than men (Weisberg et al., 2011). Research on the 16PF at factor and scale levels on the subgroups

(race, language, gender etc.) saw significant differences only for gender and language, but only gender had differences significant enough to provide separate norm tables for the groups. Research in South Africa on the15FQPlus found large effect sizes for Empathy, and Tender-mindedness (Tredoux, 2013).

The stipulations of the Employment Equity Act (Act No. 55 of 1998) are such that the requirements for all psychometric properties and fairness apply where groups are defined according to gender and race. Therefore, gender differences need to be explored, as they may have implications for bias in decision-making procedures (Laher & Croxford, 2013). Gender differences, whether innate or acquired, have developed as a result of social exposure or genetics. As these differences would be present in an organisational context, it is necessary that they are explored.

2.10 Race and personality

The second demographic group was race, or population group. The term “race” was selected to emphasise the gravitas that this has had on shaping South Africa, and the development of psychology here. As discussed earlier, the history of South Africa has seen race used as a means of justifying discrimination. Psychological assessments were normed for White children and indiscriminately and intentionally used on Black children, thereby incorrectly justifying biased conclusions. The impact of the unequal distribution of resources effects millions of South Africans to this day. Therefore, this study takes the variable of race into account when examining the psychometric properties of the PVQ specifically as it pertains to the potential for adverse impact.

Studies in a South African context usually compare Black and White participants (Valchev et al., 2013). This composite group of Black participants includes all non-White races, thereby not allowing for adequate comparisons between the sub-groups that actively exist in South Africa. Research in South Africa on the15FQPlus found small differences in effect size for Trust and Composure (Tredoux, 2013). Laher (2013b) found that Black participants scored lower on Openness and Extraversion than White participants. One possible explanation for lower scores on Openness to Experience is that the facets within Openness tend toward individualistic traits and behaviours.

2.11 First language and personality

Despite the growing knowledge about the importance of cross-cultural research and applications thereof, there remains much less research on personality in Africa, South

America, and non-English speaking countries in Europe and Asia (Schultz & Schultz, 2009) than in traditional Western countries. Language cannot be separated from culture. Language shapes how we see the world, therefore, it is intrinsically linked to culture. Although the FFM has been found in many different countries and cultures, the FFM and FFT do not capture the collectivist dimension, particularly in Africa and Asia (Laher, 2013a).

The majority of assessments used in South Africa are in English. As language is known to affect test performance, it is imperative to explore the effect of first language on personality and test performance. Generally, it is recommended that a test of English proficiency is used prior to administering an assessment. However, for the purposes of this study, the inclusion criteria stipulated that respondents need to be over the age of 18 and have completed Grade 12 in English, which would require proficiency in English. The PVQ was created in an English-speaking country and has not been adapted for the South African context.

The FFM of personality in South Africa has been shown to have additional elements. Agreeableness also incorporates elements of togetherness and trust. Laher and Dockrat (2019) did an in-depth analysis of individualism and collectivism in the South African context and postulated that these could be additional elements of personality in South Africa. The individualist dimension is characterised by independence from the group, with a focus on personal goals over those of the group while the collectivist is concerned with relationships with others, respect and reverence towards others, loyalty and cooperation (Laher & Dockrat, 2019). This argument is supported by research with the SAPI, where there were findings of communal dimensions versus agentic dimensions. References in literature have been made to Ubuntu as a means of understanding the communal dimensions found in personality assessment research (Laher & Dockrat, 2019; Valchev et al., 2014). African language speakers tend towards more interdependent characteristics when compared to English first language speakers.

Research conducted on differences in performance due to differences in language have been mostly aimed at the item level, where researchers ask about the lack of understanding on individual words within an item. The 16PF5 had adaptations initially in spelling and minor language changes and was later translated (Van Eeden et al., 2013). Issues of translation illustrate that there are some words and concepts in English that do not exist in other languages, for example, isiZulu and Tshivenda. However, this issue did not seem to be present when the test was translated into Afrikaans (Van Eeden et al., 2013). Research into the impact of language on the 16PF found that emotional Sensitivity and Compulsivity could not be identified for the African language group as it could for the English and Afrikaans

groups (Van Eeden et al., 2013). Research in South Africa on the 15FQPlus found small effect sizes for Social-boldness, Trust, Diplomacy, and Composure (Tredoux, 2013).

2.12 Values in assessment

Values are abstract ideas about "desired end states" that are organised in a hierarchy of what is important to us (Torelli & Kaikati, 2009). Values have proven to be difficult to study due to a lack of consensus with regard to definitions of values, and a lack of "proper" empirical studies that replicate the factor structure at all or across cultures (Cheng & Fleischmann, 2010; Schwartz, 2012). Values are also important in an organisational context as they are known to dictate the actions of individuals in organisations (Becker et al., 2017).

There are a substantial number of theories in the field of values in psychology. For the purposes of this paper, Rokeach and Schwartz are discussed. Rokeach because it is the theoretical basis for the values and motives scales in the PVQ, and Schwartz because it was built on Rokeach's theory, and then conducted a thorough study of values in over 20 countries to provide a theory of values that is culturally universal (Schwartz, 2012).

A meta-study conducted by Cheng and Fleischmann (2010) concluded that values can be summarily defined as serving the important principles in life that guide us. Values often refer to traits such as preferences, interests, and moral obligations (Cheng & Fleischmann, 2010). Foxcroft and Roodt (2018) note that traits do not provide insight into behaviour or the motives that underlie behaviour. However, values can provide important insights into what motivates us to achieve what is important to us in our lives (Torelli & Kaikati, 2009). In addition, major changes in society are often reflected in values (Tuulik et al., 2016).

A well-known and early theorist is Milton Rokeach, who is considered to be among the first theorists to bring consensus to the field of values studies when he conceptualised values and established a theoretical connection between values and behaviour (Cheng & Fleischmann, 2010). Cheng and Fleischmann (2010) propose that Rokeach was able to create an operationalised definition of his conceptual values and organise them hierarchically. Respondents were assessed using the Rokeach Value Survey. Rokeach (1973, p.5) defines values as

> "determinants of virtually all kinds of behaviour that could be called social behaviour or social action, attitudes and ideology, evaluations, moral judgements and justifications of self to others, and attempts to influence others".

Rokeach named 36 values divided into two main value dimensions, Instrumental values and Terminal values, each with 18 facets. Terminal values are characterised as the goals that people want to achieve in their lives, and Instrumental values refer to how we will achieve those goals (Rokeach, 1973). Despite the popularity of Rokeach's theory, Gibbins and Walker (1993) believe it is undeserved as Rokeach's theory does not succinctly measure values. Rather, their study showed that the values were open to interpretation, and a factor analysis showed that the Rokeach Value Survey was not as good a measure of relative desirability as it was meant to be. Similarly, Tuulik et al. (2016) found that Rokeach's values list does not sufficiently cover a wide enough variety of values. An additional criticism is that Rokeach did not account for the relationship between the types of values he identified.

The Schwartz Theory of Human Values (Schwartz, 1992) presents 10 motivationally distinct value types consisting of 56 human values and claims to be cross-cultural as the values are considered "basic values that people in all cultures recognise". Another salient point made by Schwartz in his theory is the dynamic relationships among the values, referred to as the structure. The structure of values refers to the relations of conflict and congruence among values. Schwartz (2012) says that the relationships between values is as important as the values themselves as values may conflict with some values but align with others.

The ten values exist in a circular structure, created by two underlying dimensions that are in opposition with each other (Fischer & Boer, 2015). The first of these value dimensions is the Transcendence dimension, comprising Self-enhancement and Self-transcendence, where achievement and power are in opposition with benevolence and universalism (Fischer & Boer, 2015). The second dimension is the Conservation dimension, comprising openness values at one end of the continuum and conservation values at the other. This sees self-direction and hedonism in conflict with conformity and tradition (Fischer & Boer, 2015).

These two underlying dimensions organise Schwartz's ten values into two major dimensions. They are believed to be universal needs to which all individuals and groups of individuals respond (Fischer & Boer, 2015). Schwartz's (2012) findings suggest that values are structured in similar ways across culturally diverse groups, illustrating a universality to the organisation of human motivation. He adds, though, that people will differ in their presentation of values, and to what they attribute importance. The 10 values are Self-direction, Stimulation, Hedonism, Achievement, Power, Security, Conformity, Tradition, Benevolence, and Universalism.

Values are widely considered to motivate and explain decision making for individuals and, as

such, they act as key predictors of human behaviour (Cheng & Fleischmann, 2010). Values and personality have been found to be related (Cheng & Fleischmann, 2010). However, values have been understudied due to their abstract nature and the lack of empirical evidence on the topic (Cheng & Fleischmann, 2010). The PVQ assesses values as well as personality, thereby adding to the knowledge of values in assessment in South Africa.

2.13 The PVQ

The PVQ was created by Psytech International in March 2017 by combining scales from multiple existing Psytech assessments. These are the Fifteen Factor Questionnaire (15FQ+), the Occupational Personality Profile (OPPro) and the Values and Motives Inventory (VMI). Hence, the theoretical framework for this study drew on Cattell's work (Paltiel, 2002), Jung's type theory (Paltiel, 1998a) and Rokeach's work on values and motives (Paltiel, 1998c) in understanding the PVQ. According to Paltiel (personal communication, August 27, 2017), "We used scales from 15FQ+, VMI, and the OPP, chosen because of relevance to the solutions that we expected we would develop." A solution is an assessment or battery of assessments created according to clients' needs.

The PVQ assesses a respondent's interpersonal style, thinking style, motivators and drivers. The motivators and drivers are Interpersonal, Professional and Personal Values. The first three aspects cover personality while motivation and drivers look at values. Interpersonal style is how one interacts with other people; thinking style is how one works and thinks; and coping style is how one will manage in a tough situation. Motivators and drivers are one's interpersonal, professional, and personal values. These are discussed in greater detail in Chapter 3.

2.13.1 Fifteen Factor Questionnaire Theoretical Background

The Fifteen Factor Questionnaire (15FQPlus), the second version of the 15FQ, is based on Raymond Cattell's theory of personality. The 15FQ, which was first developed by Psytech in 1992, measures the personality dimensions that were identified by Raymond B. Cattell (Paltiel, 2002). The 15FQPlus has an added dimension of Intellectance (Scale ß) which has reconstructed the Intelligence scale (Factor B) from Cattell's original 16 factors into the scale Intellectance, which is a metacognitive personality variable (Paltiel, 2002). According to Paltiel (2002), this scale was changed due to the widespread understanding that ability can only be reliably measured by timed tests and, as personality tests are untimed, this would produce a setting where you could not assess ability with acceptable reliability and validity.

2.13.2 The Occupational Personality Profile Theoretical Background

The Occupational Personality Profile (OPPro) is a personality test developed in the UK specifically for use in industrial and organisational settings (Paltiel, 1998b). A large sample of applicants (for jobs in the UK) was drawn from a wide range of occupational groups. The OPPro measures nine personality dimensions and contains one distortion scale. Each of the dimensions is bi-polar. There is extensive research evidence demonstrating the validity of the scales chosen for the OPPro (Paltiel, 1998b).

2.13.3 Values and Motives Inventory Theoretical Background

The Values and Motives Inventory (VMI) is largely underpinned by Rokeach's theory of values. Rokeach's theory is discussed in more detail in section 2.11. Paltiel (1998c) defines values as implicit or explicit ideas distinctive to an individual or characteristics of a group. Values are considered to be general instead of specific, with an irresolute attachment to attitudes. Rokeach determined that a set of values would form a value system, which is defined as "enduring organisations of beliefs concerning preferable modes of conduct or end-states of existence along a continuum of importance" (1973, p.254).

The VMI, based on research that encompasses occupationally relevant values, has been reviewed in this light. The scales of the VMI are Interpersonal Values, Extrinsic Values, and Intrinsic Values. Interpersonal values look at how the respondent interacts with others. Extrinsic Values evaluate external motivating factors in the workplace, and Intrinsic Values explore the respondent's personal beliefs and attitudes.

Paltiel used the 15FQ+, the OPPro and the VMI to assess a wide range of traits for the development of the PVQ (see Appendix A). The items in the test are not arranged according to scale order. Combining tests is common practice for Psytech International, as this is done to create assessments that suit the needs of clients. The Employment Equity Act (EEA) requires that assessment be psychometric reliable, valid, fair to use and free from bias..

2.14 Psychometric properties

As part of determining reliability, validity, fairness, and lack of bias, it is necessary to do between-group comparisons. For this reason, compliance with the EEA, the groups used for looking at these properties were: gender, race and first language. As such, the psychometric properties are discussed herein.

2.14.1 Reliability

There are various kinds of reliability, which are briefly explored in this chapter. Reliability can be described as consistency of measurement. Foxcroft and Roodt (2018) define reliability as the consistency with which something measures what it claims to measure and identify the following types of reliability: test-retest reliability; alternate-form reliability; split-half reliability; inter-item reliability; inter-scorer reliability; and intra-scorer reliability.

Test-retest reliability is measured by the same respondents taking the same test twice, with a reasonable period in between (Foxcroft & Roodt, 2018), usually a minimum of three months. Alternate-form, also referred to as parallel-form, reliability is measured when two equivalent forms of an assessment are administered to the same group of respondents (Foxcroft & Roodt, 2018). Split-half reliability is obtained by one assessment being split into two equivalent forms of the measure (Foxcroft & Roodt, 2018). Inter-item reliability is based on the responses to all the items within a measure (Foxcroft & Roodt, 2018). Inter-scorer, or inter-rater, reliability is obtained by two or more examiners scoring a respondent's assessment. Intra-scorer reliability "is the consistency of ratings for one rater" (Foxcroft & Roodt, 2018).

This study did not do test-retest reliability due to time constraints, and for the logistics of confidentiality, data were anonymised. As there is no alternative form for this assessment, parallel/alternate form reliability could not be done. Split-half reliability was not done as the scales were too short to facilitate this. Inter-rater reliability was not relevant for this measure as it is a quantitative measure. This study assessed inter-item consistency reliability because it was the only option available to determine consistency of the measure.

The coefficient used in calculating inter-item or internal consistency reliability is determined by the nature of the data. If the response scale facilitated the collection of dichotomous data (i.e., data that has a right and a wrong answer), then reliability would be calculated using the Kuder-Richardson method (KR-20) (Foxcroft & Roodt, 2018). For psychological measures that have a different response format, such as the Likert scales of the personality measures, the most common method for determining inter-item consistency is the Coefficient Alpha (α) formula developed by Cronbach (Foxcroft & Roodt, 2018). Gignac (2009) argues that McDonald's Omega is the most "well-established method of estimating internal consistency".

Reliability for this study was calculated using Cronbach's Alpha, Standardised Alpha, and McDonald's Omega, which are measures of internal consistency reliability. In order for test scores to be meaningful, there needs to be consistency of measurement. According to

Foxcroft and Roodt (2018), unreliable tests can lead to incorrect decisions because these tests contain errors (“noise”). Inter-item reliability is calculated using the KR-20 method (Kuder-Richardson) for dichotomous response scales (Foxcroft & Roodt, 2018). The PVQ uses a 5-point Likert response scale, thus KR-20 was abandoned in favour of Cronbach’s Alpha, Standardized Alpha, and McDonald’s Omega to calculate inter-item consistency. Three types of reliability coefficients were calculated as reliability is an estimate therefore, having more than one estimate is likely to provide a more accurate representation of inter-item consistency.

Table 3.3 shows the reliability coefficients for the PVQ in an international sample. The alphas for the scales of Paltiel’s sample range from .53 for Abstract thinking to .79 for Conscientiousness, omegas range from .56 for Abstract Thinking to .79 for Conscientiousness. The personality scales that fall below .70 are Assertiveness, Enthusiasm, Tender-mindedness, Objective Thinking, Radical Thinking, and Resilience. The values scales that fall below this cut-off are: Need for Altruism; Need for Achievement; Work Ethic; and Traditional Values.

2.14.2 Validity

Validity is defined as the ability of an assessment to measure that which it claims to measure. There are various forms of validity. Foxcroft and Roodt (2018) identify the following types of validity: Content description procedures, which include face validity and content validity; construct identification procedures, which include construct validity; factorial validity; convergent and discriminant validity; incremental validity; differential validity; and Criterion-prediction procedures, which include criterion-related validity, concurrent validity, and predictive validity.

Face validity refers to what a test appears to measure, what the respondents see at face-value, and helps with respondent buy-in (Foxcroft & Roodt, 2018). Face validity was not addressed in this study. When developing a psychological assessment, face validity is usually determined in the beginning of the process when content experts observe the items for the assessment and various scales and determine whether or not they appear to measure what they should be measuring.

Criterion-related validity consists of two types of validity: Concurrent validity and Predictive validity. Concurrent validity refers to the accuracy with which the scores on one measure correlate with the scores on an existing valid measure (Foxcroft & Roodt, 2018). Predictive

validity refers to how accurately an assessment can predict future behaviour. Criterion validity would require a large sample as well as criterion data, neither of which were within the scope of this study.

Content validity is the extent to which the content of the assessment accurately measures all aspects of the construct or behavioural domain it has set out to measure (Foxcroft & Roodt, 2018). Construct validity determines the extent to which the assessment measures the intended theoretical construct (Foxcroft & Roodt, 2018). Factorial validity is used to analyse the interrelationships of variables. This study assessed construct validity using exploratory factor analysis (EFA) as it is the most popular method for examining construct validity and equivalence in personality assessment (Laher, 2010). Exploratory factor analysis is useful as it provides information on a factor structure for a particular group (Laher, 2010).

Factor extraction was done using the Eigenvalues-greater-than-one rule, looking at the scree plots, Parallel Analysis and Velicer's minimum average partial (MAP) test as these are the more commonly used methods of extracting factors (Laher, 2010). Laher (2010) notes that researchers often use the K1 rule alongside the scree plot visual analysis as the scree plot does not always provide a clear demarcation between the Eigenvalues, and the K1 rule tends to overestimate factors.

Laher (2010) identifies six methods of factor extraction that are generally advised: the Guttman-Kaiser eigenvalue greater-than-one rule (K-1 rule); Cattell's scree test; parallel analysis; Velicer's minimum average partial (MAP); Bartlett's test for equality of Eigenvalues; and maximum likelihood tests. The reason for multiple factor extraction techniques is that each has its own drawbacks, for example, the scree plot requires visual searches for demarcations which may not exist, and often presents with multiple bends (Laher, 2010).

This study made use of Guttman-Kaiser eigenvalue greater-than-one rule (K-1 rule), Cattell's scree test, parallel analysis and Velicer's minimum average partial (MAP) as factor extraction methods.

2.14.3 Adverse Impact

Fairness and bias are important issues in many countries and when using psychological assessment measures for selection purposes. Adverse impact is not only important to consider, but also necessary (Moerdyk, 2022). When members of one group (usually an advantaged group) have a higher likelihood of being selected for positions and promotions over members of another group (usually a minority or disadvantaged group), adverse impact

has occurred (Foxcroft & Roodt, 2018; Moerdyk, 2022). Poor performance on tests can severely limit a respondent's future employment prospects, while performing well can create opportunities for the respondent (Burgoyne et al., 2021). Thus, it is imperative that there is no bias in these procedures.

Although the term "adverse impact" originated in America in 1978 (Morris & Dunleavy, 2017), it is relevant in South Africa as adverse impact contradicts local legislation as adverse impact examines a respondent's performance in high-stakes assessments such as those for selection which, in turn, have an impact on future professional opportunities (Burgoyne et al., 2021). The PVQ is an example of an assessment that is designed to be used in high-stakes assessments therefore the potential for adverse impact must be explored.

Differences in scores pertaining to adverse impact are not necessarily a reflection of biased techniques and/or assessments as real-world differences do occur (Moerdyk, 2022). Morris and Dunleavy (2017) determine adverse impact to be a statistical result that quantifies the magnitude of the disparities between groups. As race, sex, and language often present with differences in mean scores (Burgoyne et al., 2021), it was necessary to do mean score comparisons for these groups. Therefore, mean differences were compared using t-tests to explore bias that has potential to create adverse impacts. These are presented in Chapter 4.

2.15 Conclusion

This chapter began by contextualising the PVQ within psychology and psychological assessment. The PVQ is an etic instrument developed according to the lexical approach to personality in a Eurocentric context. It has its roots in the Five Factor Model of personality, with the inclusion of values scales. The Big Five personality traits emanated from the lexical approach, leading to the FFM. The FFM has been criticised for being atheoretical and lacking an explanation for the development of personality across the lifespan. These critiques lead to the development of the Five Factor Theory. The FFM has been shown to be replicable in a South African context, with additional elements or factors being found, suggesting the need for this model to be extended to include factors of individualism and collectivism. This study considers the psychometric properties of the PVQ, and the impact of its use in a South African context.

CHAPTER 3: METHODS

3.1 Introduction

This chapter discusses the research methods that were utilised and followed for this study. First, the research questions for the study are presented. Following this, the research design and rationale are presented and discussed. Next, the sample information and sampling procedure, instruments used, as well as the psychometric properties of the PVQ in the UK are discussed. This includes the reliability analyses, validity analyses, and t-tests for adverse impact. Thereafter, the procedure followed for research and statistical analyses is discussed. Finally, the ethical considerations and a summary conclusion are provided. This research aimed to assess the applicability of the Personality and Values Questionnaire (PVQ) for use within a sample of the South African population. As such, the internal consistency reliability, construct validity, and issues of adverse impact of the PVQ were explored.

3.2 Research Questions

The main research question was: Is the PVQ appropriate for use in the South African population? This will be established using the following questions:

3.2.1 Questions pertaining to reliability

Do the PVQ scales demonstrate acceptable internal consistency reliability coefficients on this sample of the South African population?

3.2.2 Questions pertaining to validity

Do the personality traits and values dimensions load independently of one another?

Do the personality scales of the factor into a five-factor solution?

Do the values dimensions show three separate types of values?

Does the PVQ factor into a five-factor solution in a sample of the South African Population?

How does a five-factor solution on PVQ of this sample compare to a five-factor exploratory factor analysis on an international sample?

3.2.3 Questions pertaining to adverse impact

Does the PVQ show evidence of adverse impact due to differences in gender groups?

Does the PVQ show evidence of adverse impact due to differences in first language?

Does the PVQ show evidence of adverse impact due to differences in race?

3.3 Research design

This study took the form of a quantitative, non-experimental cross-sectional design, as this study did not look at cause and effect but rather at relationships between variables. According to Field (2018), correlational research observes what happens naturally in the world without directly interfering with it. Thus, there was no attempt to control extraneous variables. Since respondents completed the questionnaire in a natural setting at a single point in time, no variables were manipulated or controlled, and there was no random assignment.

In a cross-sectional research design, data come from people of different ages, with different people representing each age point (Field, 2018). This was a convenience sample, as respondents were from an available and willing population as the selection of participants for a cross-sectional study is based on certain inclusion and exclusion criteria (Setia, 2016b). Cross-sectional design studies tend to be inexpensive and quicker to complete than other research designs as they allow for data to be collected at one point in time (Setia, 2016b). Therefore, the choice of research design was adequate for this study.

3.4 Sample and sampling

Perspective participants were sourced through non-probability, convenience sampling between 20 September 2020 and 15 June 2021. This was done by approaching people in-person and by sharing the request for participation on social media channels such as Facebook, WhatsApp, and LinkedIn. A request for volunteers was posted to the researcher's WhatsApp, Facebook, and LinkedIn accounts, as well as to the Facebook group called "Psychometrists in South Africa". A bulk email was sent out to psychology professionals on Psytech, South Africa's mailing list, about completing the questionnaire. It was made clear that the questionnaire was available for completion should anyone want to volunteer themselves or share the information with others who met the inclusion criteria.

The inclusion criteria to qualify to participate in the data collection process required

respondents to be 18 years of age or older, to have completed school in English at a Grade 12 level and have access to a computer with a stable internet connection and Flash Player, which is free software available for download from the internet.

Interested parties were asked to share the information to reach a larger audience. All questionnaires were competed online using Psytech International's online system: GeneSys online. A deadline of June 2021 was set for data collection in order for this study to continue. At this point, the data were requested from Psytech International in an anonymised format, leaving only the relevant biographical information required for analyses for this study. The data request to Psytech International specified that all duplicate and demo or test/dummy cases be removed. This left a total of 289 usable cases. Upon inspection of the data, there was a case of a respondent who was younger than 18 years of age, which was removed as the respondent did not meet the age inclusion criteria. This left 288 usable cases. The inclusion criteria were explained in the demographics section. The sample consisted of individuals from South Africa.

3.4.1 Descriptive statistics: Demographic information

Table 3.1 presents the frequency statistics for the biographical information collected on the sample, namely, gender, age, race, and first language. These data were collected during the consent phase of the study. As is evident from the table, the majority of the sample was female (N=225) representing 78% of the sample, with males (N=61) representing 21% of the sample, the other 1% (N=2) declined to disclose their gender.

Race subtotals were 39.58% (N=114) White respondents and 43.47% (N=126) Black respondents while 16.67% (N=48) of respondents declined to disclose their race. For the purposes of this paper, the population groups of Coloured, Indian, and Black were combined and labelled Black, as per the Employment Equity Act's (Act 55 of 1998) definition of Black people which is "a generic term which means Africans, Coloureds and Indians". Descriptive statistics on age showed that participants ranged from 18 years to 70 years, with a mean age of 32 (SD=11). Twenty-two participants declined to provide this information.

The missing cases represent respondents who did not complete those categories of biographical information. For group language comparison, respondents were divided into "English first language" and "English second language" groups. English, as a first language, accounted for the majority of participants in this group (N=161). All other official South African languages were grouped in the English second language category. South Africa has

11 official languages, nine of which are Bantu languages spoken as a first language by the respective subgroups of the Black group (Fetvadjiev et al., 2015).

Table 3.1

Demographic information of the sample

Variable		Frequency	Percentage
Gender	Female	225	78.13
	Male	61	21.18
	Missing	2	0.70
Race	White	114	39.58
	Black	126	43.47
	Missing	48	16.67
First Language	English – First Language	161	55.90
	English – Second Language	92	31.94
	Missing	35	12.15

Table 3.2

Descriptive statistics for age

Variable	Descriptive Statistics: Age					
	Mean	Std.Dev	Minimum	Maximum	N	No. cases Missing
Age	32.23308	11.02408	18.00000	70.00000	266	22

3.5 Instruments

The assessment process took place in four stages: 1) obtaining informed consent (Appendix E); 2) a demographics section (Appendix B); 3) the personality and values questionnaire (PVQ) (Appendix B); and 4) feedback. Informed consent was discussed under procedure (section 3.8).

3.5.1 Demographics section

The demographic section of the process consisted of the respondents completing the relevant biographical information required for evaluation in this study, as well as the consent form which they completed in phase 1 (see Appendix B). The information used to describe the sample was collected using the GeneSys online platform. Upon opening the assessment link, participants were required to complete the relevant demographic sections as agreed to during the consent phase. This included their name and surname, date of birth, gender, first language, and race. This was explained in greater detail in paragraph 3.4.1.

3.5.2 The PVQ

The PVQ is a self-report assessment that was created by Psytech International in March 2017 as an assessment of personality, values, and individual differences (Paltiel, 2017). The assessment consists of 210 items, it is untimed and takes approximately 30–45 minutes to complete. The PVQ is only available online using Psytech International's Genesys online assessment platform (https://genesys2020.com/). None of the items were changed for the purpose of this study.

The PVQ measures the five factors presented in the FFM, namely, Conscientiousness, Agreeableness, Neuroticism, Openness to Experience and Extraversion. It incorporates aspects from multiple already established assessments of personality and values, and also provides a type as per Jungian Theory. The number of items per scale varies. Participants respond on a 5-point Likert scale ranging from 1 – Strongly Agree to 5 – Strongly Disagree. In addition to the 34 bipolar personality and values scales (presented in Appendix A), there are four response style indicators, namely, Social Desirability, Infrequency, Acquiescence, and Central Tendency. Analyses were not run on the response-style scales. According to Paltiel (2017), the response style scales are incorporated into the assessment as validation scales to address some limitations of self-report personality tests such as response bias and acquiescence. The scales of the PVQ are listed and explained in detail in Appendix A.

Various assessments were combined to create a robust assessment of individual differences. In the case of the PVQ, the scales were sourced from the Fifteen Factor Questionnaire (15FQ+), the Occupation Personality Profile (OPPro) and the Values and Motives Inventory (VMI) (Paltiel, 2017).

The PVQ reports on a respondent in terms of four major behavioural clusters, namely, Interpersonal Style, Thinking Style and Motivators and Drivers (Paltiel, 2017). The motivators

and Drivers are the Interpersonal, Professional and Personal Values. The first three aspects cover personality, Motivation and Drivers, and values. Interpersonal Style is how one interacts with other people. Thinking Style is how one works. Coping Style is how one will manage in a tough situation. Motivators and Drivers are one's interpersonal, professional, and personal values (Paltiel, 2017).

The psychometric properties of the PVQ in an international sample, as reported in the PVQ technical manual, are available under the reliability and validity sections (section 3.7) below. A subset of the items of the PVQ is presented in Appendix F.

3.5.2.1 Global Factors

The PVQ follows the theory of the FFM. The global factors are: Agreeableness; Conscientiousness; Neuroticism; Openness to Experience; and Extraversion. These Global factors are measured by the 34 bipolar personality and values scales, which are discussed in further detail below, and are further defined in Appendix A.

3.5.2.2 The Scales of the PVQ

The PVQ consists of 34 bipolar personality and values scales, as well as four response style indicators, which are both dedicated and non-dedicated validation scales. The response style indicators are: Central Tendency; Infrequency; Social Desirability; and Acquiescence. The other 34 scales comprise the Five Factor Model and are shown in a five-factor exploratory factor analysis in Chapter 4 (Table 4.10). The facets of the FFM are discussed in more detail in Chapter 1.

3.5.2.3 Scoring information

Scoring of assessments is a function provided by GeneSys online. It is an automated process that is the protected intellectual property of Psytech International. Raw scores are presented in reports as standardised scores in the form of Sten scores. The history of the assessments used in the development of the PVQ are discussed in Chapter 1 of this study.

3.6 Psychometric properties of the PVQ in an international sample

According to the PVQ technical manual (Paltiel, 2017), the international sample consisted of 3197 working age adults who took the test in "real-life settings", in English. Unfortunately, the exact demographic locations of the respondents are not available. Assessments were

completed between January 2017 and March 2020 by persons trained according to the British Psychological Society's Level B Certificate of Competence in Occupational testing. The sample consisted of 47.5% males (N=1677) and 52.5% females (N=1520), with an age range of 16–70 years of age and a mean age of 31.49 (SD=11.15).

Table 3.3 shows the reliability statistics of the PVQ for the international sample. This was retyped from the PVQ manual. Two tables in the manual were combined; the scale statistics table (pg. 15), and the two reliability coefficients tables (Table 8 and Table 9). The 22 personality trait scales were listed first, followed by the 12 value dimensions.

Table 3.3

PVQ Scale statistics and reliability coefficients – International sample

Scale Type	Scale Name	S.E.	Skewness	Kurtosis	Cronbach's α	McDonald's ω
Personality scales	Empathy	0.06	0.6	0.99	0.78	0.79
	Social-Boldness	0.07	0.29	-0.08	0.73	0.74
	Group-Orientation	0.07	0.08	-0.08	0.74	0.75
	Intellectance	0.06	0.36	0.31	0.74	0.74
	Assertiveness	0.07	0.08	0.3	0.61	0.62
	Diplomacy	0.06	0.64	0.83	0.65	0.66
	Persuasiveness	0.07	0.18	0.05	0.74	0.75
	Trust	0.06	0.1	-0.18	0.73	0.73
	Enthusiasm	0.06	0.05	0.22	0.64	0.64
	Conscientiousness	0.07	0.75	0.96	0.79	0.79
	Tender-mindedness	0.08	0.29	0.37	0.68	0.70
	Objective Thinking	0.04	0.09	0.52	0.55	0.59
	Abstract Thinking	0.06	0.25	0.78	0.53	0.56
	Radical Thinking	0.06	-0.27	0.15	0.64	0.65
	Self-Discipline	0.07	1.03	2 .1	0.77	0.78
	Long-term Orientation	0.05	0.73	0.67	0.74	0.75

	Energy and Drive	0.06	0.38	0.51	0.72	0.72
	Emotional Stability	0.07	0.5	0.06	0.75	0.72
	Confidence	0.07	0.06	0.05	0.72	0.72
	Resilience	0.07	0.16	-0.24	0.66	0.66
	Patience	0.08	0.25	-0.18	0.77	0.78
	Composure	0.07	0.47	0.32	0.72	0.73
Values scales	Altruism (Interpersonal)	0.07	0.33	0.54	0.6	0.62
	Affection (Interpersonal)	0.07	0.37	0.05	0.78	0.78
	Affiliation (Interpersonal)	0.07	0.3	0.06	0.77	0.77
	Achievement (Professional)	0.06	0.44	0.68	0.64	0.66
	Economic Status (Professional)	0.07	0.06	-0.34	0.77	0.78
	Safety (Professional)	0.06	-0.25	0.09	0.7	0.71
	Competition (Professional)	0.08	0.15	-0.35	0.76	0.76
	Aesthetics (Professional)	0.06	0.46	0.1	0.78	0.78
	Work Ethic (Personal)	0.06	0.28	0.63	0.64	0.65
	Moral Values (Personal)	0.05	0.99	1.61	0.75	0.75
	Traditional Values (Personal)	0.06	-0.31	0.12	0.67	0.67
	Independence	0.07	-0.03	0.02	0.78	0.78

Validity information on the PVQ for the international sample in the form of a five-factor exploratory analysis is presented in Chapter 4 (Table 4.9).

3.7 Ethical considerations

Ethical clearance was obtained from the Human Research Ethics Committee – Non-medical (HREC) at the University of the Witwatersrand (see Appendix G). Written permission was obtained from the organisation distributing the PVQ to use the assessment for this research, and it was facilitated through it. A cover letter was sent to all respondents via email which explained the reason for the assessment, and elaborated on the ethical considerations for this study, including the limits of confidentiality and consent. Informed consent was obtained using a Google Form (Appendix D) prior to the assessment link being sent to participants.

Participants were informed of what was required to complete the assessment, a computer, a stable internet connection and Flash Player. Participants were informed of the inclusion criteria, which were: that they needed to be 18 years or older, had been educated and/or be fluent in English, and that they may withdraw from participation at any point (up to the data request stage) with no consequences to them. Confidentiality was ensured since only the respondents would have access to the questionnaire for the time taken to complete the assessment, or for a month from the date of receipt, thereafter the link was no longer valid. Participants were informed that their data would be used for research purposes. Data were anonymised prior to the researcher receiving it. Test data is securely stored on an encrypted cloud system that only Psytech International has access to and is protected by the General Data Protection Regulation (GDPR) regulations and, as such, is compliant with the Protection of Personal Information Act (POPIA) as well as Annexure 12 of the Code of conduct for psychology professionals which requires assessment information to be treated with confidentiality (Health Professions Act, 1974 (Act No.56 of 1974)).

Participants were provided feedback on their results in the form of a narrative report if the respondent had opted to input their identifying information, specifically, their email address. The option to discuss the results was afforded to each participant, as is compliant with professional regulations and the Personal Access to Information Act (PAIA) (Act 2 of 2000). All data were collected by the researcher for the purpose of this study using social media platforms to share the information (see section 3.8). The data were anonymised and stored on a secure server for two (2) years, after which only raw scores and biographical information with no identifying information are stored to be used for research purposes. This

is in line with both GDPR protocols and POPIA, as discussed above.

3.8 Procedure

Written informed consent was collected from each respondent using Google Forms (Appendix D) prior to accessing the assessment. On the assessment platform, GeneSys online, consent was again requested. This is standard practice for this platform as it conforms to The European Union's (EU) General Data Protection Regulations (GDPR). This was followed by a biographical/demographics section in which respondents were required to enter their name and surname, date of birth, gender, first language, and race in order for validation and bias analyses to be performed. Following this, respondents were directed to a webpage to complete the PVQ. Once the assessment was completed, and if respondents had consented to feedback, a feedback report was sent to respondents with the offer to discuss the results in a telephonic feedback session as this is a right afforded to respondents who complete psychometric assessments (see PAIA, Act 2 of 2000).

Data were collected using non-probability convenience sampling. This means that the sample was based on the accessible population (Setia, 2016a). The data were collected by the researcher, using the test distributor's online assessment platform. The researcher contacted each participant individually by telephone, and explained the assessment process, limits of confidentiality and informed consent. After the telephonic conversation, the researcher sent an email to each participant with the consent form and the list of instructions that were provided during the telephonic conversation. After receiving the completed consent form, the researcher sent the assessment link via email to the participant. Administration was standardised in that instructions were compiled prior to assessment commencing and used solely by the researcher for administration.

Data were collected on 289 people sourced through online channels, such as groups on Facebook (e.g., psychometrists in South Africa), and posted to the researcher's status on WhatsApp, Facebook, and LinkedIn, encouraging others to share the information. A request was sent out to the clients of Psytech South Africa as well, inviting them to complete the assessment and inviting them to forward the information to anyone who meets the inclusion criteria. Some lecturers asked their classes to complete the assessment should they be interested but there was no incentive or coercion. The respondents were required to have a minimum education level of Grade 12 and be over the age of 18 years to be included. Respondents also needed to be South African, computer literate, and have access to a computer with a stable internet connection and the programme Flash Player, which was a

GeneSys online system requirement at the time.

Participants used the GeneSys online system, Psytech South Africa's online assessment platform, to complete the assessment. The platform was used to capture the biographical data of participants and consent, and to provide a platform on which to complete the assessment. The candidate received a link set up by the researcher and then sent from the system. This link was followed to a secure webpage that hosted the assessment. The candidates completed the assessment, after which the system scored the assessment and provided a report for the registered professional as the use of tests in South Africa is controlled and limited to use by HPCSA registered psychology professionals (Regulation 993 of the Health Professions Act, Act 56 of 1974) to download and use for further interpretation. In the case of this research, the feedback report was used. The feedback reports contain only narrative text, and no scores of any kind are present. Feedback is presented in terms of the four behavioural clusters: Thinking Style, Coping Style, Interpersonal Style and Values and Motives. Once GeneSys online (the new platform) was launched at the end of 2020, the requirement for Flash Player fell away and respondents could more easily access the assessment.

Once all the data were collected, the raw data to be used for analysis were requested from Psytech International with no identifying information such as name, surname, or identity number. Once the datafile was received, cases where respondents did not fit the inclusion criteria were deleted prior to analysis. Frequency statistics were calculated, and one case was removed due to the 18-year-old age limitation, leaving 288 cases. Thereafter, the data was analysed using Statistica (version 14). McDonald's Omega was calculated using JASP (open-source computing software) Version 0.16.3.

Even though the final number of participants was 288, more would have been preferred. According to Field (2018), 300 participants are required for stable results, but it is necessary to consider the number of variables. Common practice is 10–15 participants per variable. As there were 34 variables used in the analysis, it would have been preferable to have at least 300 participants, but preferably between 340 and 510 respondents, erring on the side of caution and leaning towards the latter. However, due to time constraints and availability of participants, a cut-off date of mid-June 2021 was implemented for the research to continue. Where biographical data had not been completed on the GeneSys online platform used for assessments, the results show that information is missing for that number of respondents.

Van de Vijver and He (2012) identify several types of bias including: construct bias; method

bias including sample bias; instrument bias; response styles and administration bias; and item bias. Construct bias occurs when the construct being measured is not the same across different groups. Method bias consists of sample bias, instrument bias and administration bias. Sample bias exists when samples cannot be compared to each other. Instrument bias occurs when the instrument is problematic and item bias exists when there are differences at an item level.

Additional consideration was taken to contain method bias, specifically administration bias, although this was not the main focus of this study. Administration bias is a type of bias that can come from differing administration conditions, differing administration instructions, communication problems or interactions between the administrator and the respondent (Van der Vijver & He, 2012). Attempts were made to control administration bias by standardising the administration instructions – the researcher used the same instructions for each case of assessment administration of the PVQ. These instructions were set and followed so all respondents had similar experiences during administration.

3.9 Data analysis

The appropriate statistical analysis is determined by its assumptions, which includes the level of measurement for the variables, sample size, and variance information. Analyses for this paper were performed by the researcher in multiple software programmes developed for statistics in the social sciences: TIBCO's Statistica (version14), JASP (version 0.18), jamovi (version 2.3.28) and SPSS (version 29).

Several of the questions were answered through multivariate statistics (specifically the EFAs done on Questions 2 through 5). Question 1 was answered by doing internal consistency reliability analysis. Question 7 used Tucker's phi (φ) coefficient of congruence, and Questions 8 through 10 were answered using bivariate statistics in the form of t-tests.

Data were described using descriptive statistics to analyse demographic information (Table 3.1). This research also investigated the descriptive statistics for the scales scores, i.e., means, standard deviations, minimum and maximum scores, and skewness and kurtosis coefficients in order to fulfil the relevant assumptions required for inferential statistics. These are presented in Table 4.1 in Chapter 4. Frequency statistics were used to describe categorical variables such as gender, first language, and race. Descriptive statistics (means, standard deviations) were used to analyse age. These, as well as minimum and maximum values, and coefficients of skewness were used to analyse the PVQ scale scores.

Internal consistency reliability was calculated for the scales of the PVQ. Forms of internal consistency reliability were Cronbach's Alpha (α) and McDonald's Omega (ω). This is discussed in further detail in section 3.9.1. Construct validity was examined by means of an exploratory factor analysis, using principal components analysis. Both varimax and oblimin rotation were used as varimax assumes that the scales would only load on one factor, and there was cross-loading. There was little difference between the two. The number of factors to extract was determined using various techniques, namely, Kaiser-Guttman's Eigenvalues-greater-than-1 rule (K-1 rule), Cattell's scree plots, Horn's parallel analysis and Velicer's minimum average partial (MAP). Only factors with loadings of ± 0.4 and larger were retained. A comparison of congruence in factor structure between this South African sample and an international sample was done using Tucker's phi (φ) – a coefficient of Congruence – to assess to what extent the factor structure of the international sample was replicated in a South African sample.

3.9.1 Examining the Reliability of the PVQ

The most commonly used method of calculating internal consistency reliability for psychological assessment is the Kuder-Richardson (KR-20) formula (Foxcroft & Roodt, 2018). Other methods of calculating reliability were discussed in further detail in Chapter 2. In this study, internal consistency reliability was calculated using Cronbach's Alpha, Standardised Alpha, and McDonald's Omega, as the KR-20 method was designed for use on dichotomous scales, and the PVQ uses a 5-point Likert response scale.

In order for tests scores to be meaningful, there needs to be consistency of measurement. According to Foxcroft and Roodt (2018), unreliable tests can lead to incorrect decisions because these tests contain errors ("noise"). Because the PVQ uses a 5-point Likert response scale, Cronbach's Alpha was used to calculate inter-item consistency. Standardised Alpha was calculated as Cronbach's Alpha requires that scales are the same length and in the PVQ they are not. McDonald's Omega was also calculated as this form of reliability analysis is less sensitive to deviations from the assumptions required to run that analysis.

3.9.2 Examining the Validity of the PVQ

Construct validity for the PVQ was examined used exploratory factor analysis, a technique commonly used to identify commonalities in a related set of variables (Foxcroft & Roodt, 2018). Multiple Exploratory Factor Analyses (EFA) were done in order to determine the

construct validity of the scales of the PVQ. EFAs were run to explore the factor structure of the PVQ. This was evaluated with the following questions in mind:

- Do the values scales show up independently of the personality scales in the PVQ?
- Are there three distinct types of values as indicated in the manual?
- Does the FFM still appear if the personality scales are explored independently of the values scales?
- How does the factor structure of this sample compare to the international sample as presented in the PVQ manual?

The three main groupings of EFAs run were: all the scales of the PVQ together; only the personality scales; and then only the values scales. All three categories of the exploratory factor analyses were done using Principal Components Analysis, with varimax normalised rotation on all the scales of the PVQ. Multiple factor extraction techniques were used. Factor extraction methods assist in determining the number of factors that should be extracted, thereby accounting for the most amount of variance. The extraction techniques used included Kaiser-Guttman's Eigenvalues-greater-than-1 rule (K1 rule), Cattell's Scree Plots, Parallel Analysis (Horn's), and Velicer's MAP (minimum average partial). The latter was done for the personality and values (independently) only.

The exploratory factor analyses, Eigenvalues, and scree plots were done in Statistica (version 13.5), a statistical programme designed for use in the social sciences. The Horn's parallel analysis and Velicer's MAP were done in SPSS (version 29).

An 8-factor rotation was done on all the PVQ scales to determine if the FFM is present in the personality scales, as well as the three types of values as named in the PVQ manual. A 5-factor rotation was done on the personality scales only. And finally, a 3-factor rotation was done on the values scales only. Once the analyses were run, the results were inspected. They are presented and discussed in Chapter 4.

Once the numbers of factors to be extracted was assessed, multiple EFAs were run to explore the various options. For all the scales, an 8-factor rotation, 6-factor rotation, a 5-factor rotation, and a 4-factor rotation were done. The 8-factor rotation is presented in Table 4.4, the 6-factor and 4-factor rotations are presented in Appendix H.

Upon inspection of the results of the exploratory factor analysis done only on the personality scales of the PVQ, using the abovementioned factors' extraction techniques, a 5-factor

rotation was done on the personality scales. The factor loadings are presented in Table 4.6 in Chapter 4. A 6-factor rotation, and a 2-factor rotation were also done, and are presented in Appendix I.

Upon inspection of the results of the exploratory factor analysis done on the values scales, using the abovementioned factor extraction methods, a 2-factor, 3-factor, and 4-factor rotation was done on only the values scales of the PVQ as the technical manual describes three types of values, namely, Interpersonal Values, Intrapersonal Values, and Professional Values. The factor loadings for 3-factor rotation are presented in Table 4.8 in Chapter 4. The 2-factor and 3-factor rotations are available in Appendix J.

In addition to the aforementioned EFAs, a 5-factor rotation was done on all the PVQ scales for the purposes of comparing this to the 5-factor rotation done in the PVQ manual in order to calculate Tucker's phi (φ) – a Coefficient of Congruence. Tucker's phi (φ) was calculated for the overall factors of the FFM between the two samples, as well as the scales themselves. This is discussed in Chapter 5. However, as there was not congruence for all factors or all the scales, a qualitative comparison was also done. The results of these analyses are presented in Chapter 4.

3.9.3 Examining the potential for adverse impact in the PVQ

Examining the potential for adverse impact in the PVQ was done by exploring construct bias in the form of mean differences between groups. Adverse impact occurs when one group of members is disproportionally selected over another during high-stakes assessment (Burgoyne et al., 2021). Although this tends to refer to the selection of personnel, this potential for error would be equally as devastating should some respondents not be chosen for development or team-building experiences, or negatively impact career counselling.

Adverse impact is commonly calculated in two different ways. These are the four/fifths rule and looking at statistical significance that quantifies the size of group disparities (Morris & Dunleavy, 2017). As there was no criterion information against which to calculate adverse impact by the four-fifths rule, this paper explored the potential for adverse impact by looking at significant differences in mean score differences between various groups by means of t-tests. The groups were first language, gender, and race. T-tests were done for each group pair and are presented with 0.05 and 0.01 levels of significance in Chapter 4. Cohen's d for effect size was also calculated to assess the practical effects of these significant findings and is presented alongside the t-tests in Chapter 4.

3.10 Conclusion

This chapter presented the methods used in this study. The research questions and research design were presented first. This was followed by the research rationale. The composition of the sample and sampling methods were then discussed followed by the PVQ. The psychometric properties of the PVQ in an international sample were presented. Then, the Ethical considerations and procedure were discussed. Finally, the data analysis section was presented. The next chapter presents the results obtained for this study.

CHAPTER 4: RESULTS

4.1 Introduction

This chapter of the study explains the sample information and the results obtained for the analyses done on the Personality and Values Questionnaire (PVQ) data collected for the purposes of this research. Descriptive statistics were presented first as they provide information about the sample and the distribution of the data. Thereafter, the inferential statistics were presented that included reliability, validity, and analyses for adverse impact. The reliability coefficients, Cronbach's Alpha coefficients, Standardised alpha coefficients, and McDonald's Omega coefficients, were calculated. Construct validity was presented in the form of an exploratory factor analysis (EFA). Adverse impact was analysed by comparing mean differences using t-tests in the relevant groups of gender, language, and race.

4.2 Descriptive Statistics for the PVQ

Table 4.1 presents the means, minimum and maximum scores, standard deviations, standard error, skewness, and kurtosis coefficients for the 34 scales of the PVQ, separately presented as Personality Scales and Values Scales. From the table, it is evident that all the variables were normally distributed as they are within the range of -1 to +1 (Field, 2018). The presented Kurtosis coefficients range between -1 and +1, however, ±2 is usually acceptable (Field, 2018). The full definitions for the scales of the PVQ are available in Appendix A.

Table 4.1

Descriptive Statistics for the PVQ Scales

Scale Type	Scale Name	Valid N	Mean	Min	Max	Std.Dev.	Std (Error)	Skewness	Kurtosis
Personality Scales	Empathy	288	22.80	8	28	4.21	0.25	-0.97	0.84
	Social-boldness	288	11.59	0	24	4.99	0.29	0.10	-0.53
	Group-orientation	288	8.57	0	20	4.29	0.25	0.24	-0.36
	Intellectance	288	20.25	10	28	3.91	0.23	-0.10	-0.55
	Assertiveness	288	14.26	1	30	5.04	0.30	0.08	0.10
	Diplomacy	288	17.09	3	28	4.84	0.29	-0.49	-0.11
	Persuasiveness	288	12.88	1	27	5.19	0.31	0.27	-0.32
	Trust	288	13.03	0	26	5.51	0.32	-0.03	-0.75
	Enthusiasm	288	15.07	0	28	4.82	0.28	-0.05	-0.22
	Conscientiousness	288	22.30	4	32	5.51	0.32	-0.55	0.10
	Tender-mindedness	288	27.76	6	44	6.84	0.40	-0.22	0.11
	Objective Thinking	288	11.56	2	24	4.09	0.24	0.28	-0.31
	Abstract Thinking	288	18.12	7	28	4.28	0.25	-0.28	-0.39
	Radical Thinking	288	14.44	2	26	4.39	0.26	0.23	-0.26
	Self-discipline	288	25.48	11	32	3.98	0.23	-0.76	0.87
	Long-term Orientation	288	12.95	3	20	3.94	0.23	-0.38	-0.36
	Energy and Drive	288	16.49	0	28	4.86	0.29	-0.47	0.45
	Emotional Stability	288	11.53	0	23	4.90	0.29	-0.25	-0.44
	Confidence	288	10.76	0	28	5.50	0.32	0.34	-0.52

	Resilience	288	21.09	9	29	3.25	0.19	-0.31	0.46
	Patience	288	12.92	1	24	5.08	0.30	0.03	-0.62
	Composure	288	15.44	2	27	5.09	0.30	-0.25	-0.44
Values Scales	Need for Altruism (Interpersonal)	288	20.11	3	30	5.19	0.31	-0.44	0.09
	Need for Affection (Interpersonal)	288	16.00	1	24	4.41	0.26	-0.37	-0.03
	Need for Affiliation (Interpersonal)	288	13.23	0	26	5.56	0.33	0.04	-0.59
	Need for Achievement (Extrinsic)	288	21.99	12	31	4.25	0.25	-0.18	-0.35
	Need for Economic Status (Extrinsic)	288	13.45	0	24	5.33	0.31	-0.22	-0.46
	Need for Safety (Extrinsic)	288	13.69	1	27	5.33	0.31	0.06	-0.19
	Need for Competition (Extrinsic)	288	16.44	4	28	5.41	0.32	-0.06	-0.73
	Need for Aesthetics (Extrinsic)	288	15.32	2	24	4.81	0.28	-0.42	-0.28
	Work Ethic (Intrinsic)	288	22.76	9	32	4.47	0.26	-0.30	-0.11
	Moral Values (Intrinsic)	288	19.41	7	24	3.13	0.18	-0.98	1.52
	Traditional Values (Intrinsic)	288	15.59	2	27	4.78	0.28	-0.39	-0.32
	Independence (Intrinsic)	288	24.08	8	40	6.49	0.38	0.01	-0.47

4.3 Internal Consistency

Internal consistency reliability was calculated for the scales of the PVQ. Cronbach's Alpha was used in preference to the Kuder-Richardson (KR-20) formula, as it was created for use on non-dichotomous scales such as is the case in the PVQ. McDonald's Omega was done because it is less sensitive than Cronbach's Alpha to deviations from the assumptions. As such, Cronbach's Alpha, Standardised alphas, and McDonald's Omega were calculated for each of the scales in the PVQ and are presented in Table 4.2. With the exception of the Resilience scale (alphas = .58, omega= .59), all alpha and omega coefficients are above .60, with a range of .64 to .86. The acceptable coefficients for internal consistency reliability for exploratory research is .60 to .70 (Nunnally & Bernstein, 1994).

Table 4.2

Reliability coefficients for the PVQ scales

Internal Consistency Reliability coefficients for the PVQ scales				
Scale Type	Variable	Cronbach's Alpha	Standardised Alpha	McDonald's Omega
Personality Scales	Empathy	0.84	0.86	0.85
	Social-boldness	0.80	0.80	0.81
	Group-Orientation	0.79	0.79	0.80
	Intellectance	0.72	0.73	0.72
	Assertiveness	0.73	0.73	0.73
	Diplomacy	0.74	0.75	0.75
	Persuasiveness	0.78	0.78	0.78
	Trust	0.83	0.83	0.83
	Enthusiasm	0.74	0.74	0.72
	Conscientiousness	0.81	0.81	0.82
	Tender-mindedness	0.74	0.74	0.72
	Objective Thinking	0.65	0.65	0.67
	Abstract Thinking	0.67	0.67	0.69
	Radical Thinking	0.76	0.75	0.77
	Self-discipline	0.77	0.78	0.78
	Long-term Orientation	0.78	0.78	0.79
	Energy and Drive	0.76	0.77	0.76
	Emotional Stability	0.75	0.75	0.76
	Confidence	0.79	0.79	0.79
	Resilience	0.58	0.58	0.59
	Patience	0.76	0.76	0.76
	Composure	0.70	0.69	0.76
Values Scales	Need for Altruism (Interpersonal)	0.72	0.72	0.68
	Need for Affection (Interpersonal)	0.79	0.79	0.79
	Need for Affiliation (Interpersonal)	0.82	0.82	0.83
	Need for Achievement (Extrinsic)	0.64	0.65	0.59
	Need for Economic Status (Extrinsic)	0.86	0.86	0.87
	Need for Safety (Extrinsic)	0.80	0.80	0.80
	Need for Competition (Extrinsic)	0.81	0.81	0.82
	Need for Aesthetics (Extrinsic)	0.82	0.82	0.82
	Work Ethic (Intrinsic)	0.70	0.70	0.72
	Moral Values (Intrinsic)	0.76	0.76	0.77
	Traditional Values (Intrinsic)	0.79	0.79	0.79
	Independence (Intrinsic)	0.80	0.80	0.80

4.4 Construct Validity

The results for construct validity, by means of exploratory factor analysis, are presented in this section. An exploratory factor analysis was done on all the scales together, the personality scales separately, and then the values scales separately. Multiple factor rotations were done, with the most suitable presented below, and the remainder in the appendices. The EFAs for all scales are presented in Appendix H, the EFAs for the personality traits are presented in Appendix I, and the EFAs for the values dimensions are presented in Appendix J. A five-factor rotation exploratory factor analysis was also done and compared to the 5-factor rotation presented in the PVQ manual. Tucker's phi (φ) – a coefficient of congruence – was then calculated to compare the developer's 5-factor exploratory factor analysis to the 5-factor exploratory factor analysis of this sample. This was done for the scales scores, and for the overall five factors of the FFM. This is presented in Tables 4.9 and 4.10 respectively.

4.4.1 Exploratory Factor Analysis for all PVQ Scales

An exploratory factor analysis using Statistica was conducted using all the scales of the PVQ to determine the construct validity of the scales. Principal components analysis was used, with varimax normalised rotation. The factor extraction techniques used were the Eigenvalues-greater-than-1 rule (K1 rule), Cattell's Scree Plots, and a Horn's parallel analysis. The Eigenvalues for all the PVQ scales are presented in Table 4.3. Using the Eigenvalues-greater-than-1 rule (K1 rule), eight factors are identified, thereafter the values fall below one. The percentage of the variance explained with the eight factors is 69.85%.

The scree plot in Figure 4.1 indicates three elbow bends, indicating either two, four or six factors before the bends. After six factors, the values appear to drop below one. Eigenvalues tend to overestimate the number of factors, and scree plots tend to underestimate the number of factors (Field, 2018). Consequently, a parallel analysis was also calculated. The results from the parallel analysis indicated that six factors should be extracted. Horn's accounts for 62.76% of the explained variance. The 6-factor rotation is in Appendix H.

The PVQ technical manual (Paltiel, 2017) mentions three types of values: professional, interpersonal, and intrapersonal values. Using this information as a guideline, along with the FFM, the researcher did an 8-factor rotation on all the PVQ scales. This is presented in Table 4.4 and explained thereafter.

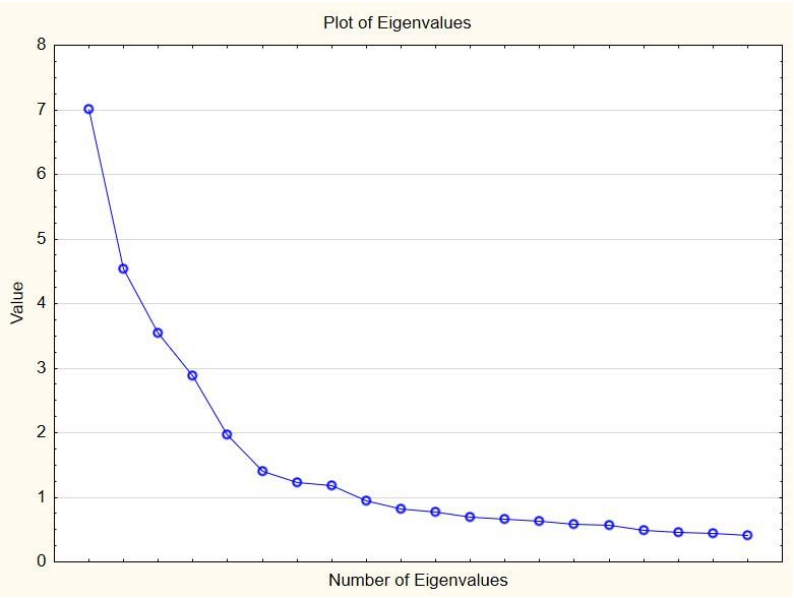
Table 4.3

Eigenvalues for all Scales of the PVQ

Factor	Random Eigenvalue - Horn's	EFA Eigenvalue	% Total (variance)	Cumulative (Eigenvalue)	Cumulative (%)
1	1.7135	7.007694	20.61086	7.00769	20.61086
2	1.6239	4.537113	13.34445	11.54481	33.95531
3	1.5522	3.5371	10.40324	15.08191	44.35855
4	1.4896	2.882048	8.47661	17.96395	52.83516
5	1.4355	1.972474	5.80139	19.93643	58.63656
6	1.3844	1.401419	4.12182	21.33785	62.75838
7	1.3844	1.236807	3.63767	22.57466	66.39604
8	1.3004	1.175359	3.45694	23.75001	69.85298
9	1.2571	0.946855	2.78487	24.69687	72.63785

Figure 4.1

Scree Plot of all PVQ Scales



As shown in Table 4.4, the scales that had high positive loadings on Factor 1 are Emotional

Stability (.64), Confidence (.60), Composure (.72), and Long-term Orientation (.63). The scales that had moderately-high positive loadings are Diplomacy (.47), Energy and Drive (.52), and Objective Thinking (.55). Resilience also loaded on Factor 1 at .43 but was excluded from this factor because it had a higher loading on Factor 8. It is noted that Objective Thinking had a moderate positive loading (.55) but was excluded from this factor in favour of factor 4 as this fits the theory better. These are all personality scales. Factor 1 comprises scales that speak to emotional stability and can therefore be named Neuroticism.

The scales that had high positive loadings on Factor 2 were Trust (.81), and Patience (.64) while Independence (-.87) and Need for Competition (-.84) had high negative loadings. Emotional Stability (.47) had a moderately high positive loading on Factor 2 but was excluded as it had a higher loading (.64) on Factor 1. Trust, Group-orientation, and Patience are personality scales. Independence and Need for Competition are values scales. This factor comprises scales that denote affiliation and belonging, therefore, this factor could be named Agreeableness.

Self-discipline and Moral Values both had positive, high loadings on Factor 3 of .92 and .94 respectively. Self-discipline is a personality scale, and Moral Values is an interpersonal value. Factor 3 comprised scales that denote self-control, therefore, this factor can be named Self-Control.

Abstract Thinking (.51) had a moderately-high positive loading on Factor 4, and on Factor 7 (.51). Objective Thinking (-.53) had a moderately-high negative loading on Factor 4 as well as on Factor 1 (.55). However, it was retained with Factor 4. High positive loadings were seen for Need for Aesthetics (.86), and Tender-mindedness (.92). Abstract Thinking, Tender-mindedness, and Subjective (-Objective) Thinking are personality scales, and Need for Aesthetics is a values scale. Factor 4 comprised scales that suggest openness to experience and can therefore be named Openness to Experience.

Factor 5 had the following high positive loadings: Enthusiasm (0.71), Social-boldness (0.83), Need for Affiliation (0.87), Group-orientation (0.64), and Persuasiveness (0.65). Assertiveness (0.51) had a positive, moderately-high loading. Need for Safety had a negative, moderately-high loading on both Factor 5 (-.41) on Factor 7 at (-.45) and was retained here. Energy and Drive loaded here at above the .40 cut-off but was excluded because it had a higher loading on Factor 1 (.52). Enthusiasm, Social-boldness, Group-orientation, and Persuasiveness are personality traits. Need for Affiliation and Need for Safety are values dimensions. The scales in this factor appear to measure group leadership,

assertiveness, and boldness, and can therefore be named Extraversion.

The scales that positively loaded on Factor 6 at above .40 are Need for Economic Status (.68) and Need for Affection (.57). Need for Achievement had a moderately-high positive loading on Factor 6 (.54), and on Factor 8 (.54), and was retained here. Need for Achievement and Need for Economic Status are both extrinsic, professional values, and Need for Affection is an Interpersonal Value. These are all values scales. Factor 6 comprised scales that measure approval seeking and status seeking.

Intellectance (.59) had a moderately-high positive loading on Factor 7. Radical Thinking (.87) loaded positively on Factor 7 with a high loading. Traditional Values (-.84) had a high negative loading and Need for Safety (-.45) had a moderately-high negative loading. Abstract Thinking (0.51) had moderately-high positive loadings on Factor 7 and on Factor 4 (.54) but has been retained here. Intellectance, and Radical Thinking are personality scales. Traditional Values and Need for Safety are values scales. This factor appears to measure intellectualism and thinking.

The scale that had a high positive loading on Factor 8 was Work Ethic (0.84). Moderately-high loadings included Conscientiousness (.49), and Resilience (.53). All these scales had a positive loading. It is noted that Assertiveness (.41) was excluded as it had a higher loading on Factor 5 at .51. Need for Achievement (.54) had the same loading on both Factor 6 and Factor 8 but was excluded from this factor because it fits better on Factor 6.

From the above, it is evident that an 8-factor solution does not show the personality traits and values dimensions as independent from each other. Neither Empathy nor Need for Altruism loaded on any of the factors.

Table 4.4

Factor Loading Table for all PVQ Scales – 8-factor solution

Scale	Factor (1)	Factor (2)	Factor (3)	Factor (4)	Factor (5)	Factor (6)	Factor (7)	Factor (8)
Composure	0.72	0.12	-0.01	-0.03	0.13	0.11	-0.06	-0.03
Emotional Stability	0.64	0.47	-0.06	0.04	0.24	-0.04	-0.04	0.17
Long-term Orientation	0.63	-0.04	0.08	0.1	0.25	0.12	0.01	0.3
Confidence	0.60	0.22	-0.02	-0.08	0.39	-0.38	0.15	-0.01
Energy and Drive	0.52	0.24	0.03	0.19	0.41	-0.04	0.11	0.37
Diplomacy	0.47	0.33	-0.02	0.10	-0.13	0.37	-0.23	0.05
Independence	-0.09	-0.87	0.13	-0.11	-0.29	-0.04	-0.02	-0.01

Need for Competition	-0.02	-0.85	0.09	-0.09	0.04	0.17	-0.10	0.01
Trust	0.14	0.81	-0.07	0.13	0.05	-0.07	0.1	0.12
Patience	0.23	0.64	-0.1	-0.04	0	-0.04	0.03	-0.36
Moral Values	0.01	-0.13	0.94	-0.05	0.00	0.08	-0.14	0.09
Self-discipline	0.03	-0.21	0.92	-0.07	0.01	0.12	-0.21	0.08
Tender-mindedness	-0.16	0.24	-0.04	0.92	0.01	0.06	0.02	0.05
Need for Aesthetics	0.24	0.06	-0.07	0.86	0.07	-0.05	0.10	0.09
Objective Thinking	0.55	-0.33	-0.01	-0.54	0.06	-0.15	0.08	0.02
Need for Affiliation	0.17	0.23	0.01	0.00	0.87	0.13	-0.01	0.01
Social-boldness	0.31	0.13	0.01	-0.05	0.83	0.03	0.06	0.11
Enthusiasm	0.17	0.00	0.06	0.18	0.71	0.14	0.09	0.16
Persuasiveness	0.16	-0.17	0.00	0.02	0.65	-0.06	0.26	0.29
Group-orientation	-0.09	0.52	-0.08	0.03	0.64	0.15	-0.05	-0.14
Assertiveness	-0.10	-0.12	-0.08	-0.15	0.51	-0.32	0.31	0.41
Need for Safety	-0.11	0.19	-0.03	-0.06	-0.41	0.2	-0.45	0.09
Need for Economic Status	0.05	-0.37	0.00	-0.17	0.08	0.68	0.03	-0.02
Need for Affection	-0.08	0.15	0.28	0.24	0.14	0.57	-0.05	0.04
Need for Achievement	0.18	-0.15	0.11	0.11	0.18	0.54	0.01	0.54
Radical Thinking	-0.07	0.18	-0.21	0.05	0.09	0.02	0.87	0.02
Traditional Values	0.09	-0.23	0.3	-0.01	-0.03	0.02	-0.84	0.03
Intellectance	0.25	-0.07	0.13	0.07	0.10	-0.07	0.59	0.4
Abstract Thinking	0.09	-0.21	-0.04	0.51	0.13	0.08	0.51	0.15
Work Ethic	0.04	0.04	0.03	0.07	0.12	0.06	0.06	0.84
Resilience	0.43	0.07	0.17	0.08	0.18	0.05	0.2	0.53
Conscientiousness	0.17	-0.16	0.07	0.03	-0.03	-0.1	-0.36	0.49
Empathy	0.19	-0.13	0.14	0.21	0.32	0.33	-0.03	0.12
Need for Altruism	0.03	0.25	0.06	0.20	0.04	-0.08	0.04	-0.01
Expl.Var	3.246488	4.075448	2.098799	2.513528	4.035392	1.826272	2.818689	2.460383
Prp.Totl	0.095485	0.119866	0.061729	0.073927	0.118688	0.053714	0.082903	0.072364

4.4.2 Exploratory Factor Analysis for the Personality Scales of the PVQ

An exploratory factor analysis using principal components analysis with varimax rotation was done using Statistica for the personality scales of the PVQ. The parallel analysis and Velicer's MAP (minimum average partial) calculations were done in SPSS. The factor

extraction techniques used were the Guttman-Kaiser Eigenvalues greater-than-1 rule (K1 rule), Cattell's Scree Plot, Horn's parallel analysis and Velicer's MAP.

Table 4.5 shows the Eigenvalues for the personality scales of the PVQ. The Eigenvalues greater-than-1 (K1 rule) shows 5 factors for the personality scales of the PVQ. A sixth value has been presented in order to demonstrate where the Eigenvalues fall below 1. The scree plot in Figure 4.3 shows 5 factors before the last elbow bend, there is also a bend at 2 factors, but this is far above the cut-off of the K1 rule. The Parallel Analysis and Velicer's MAP indicate 6 factors for retention. From these extraction techniques, a 5-factor exploratory analysis with Varimax rotation was conducted, the factor loading table is presented in Table 4.6.

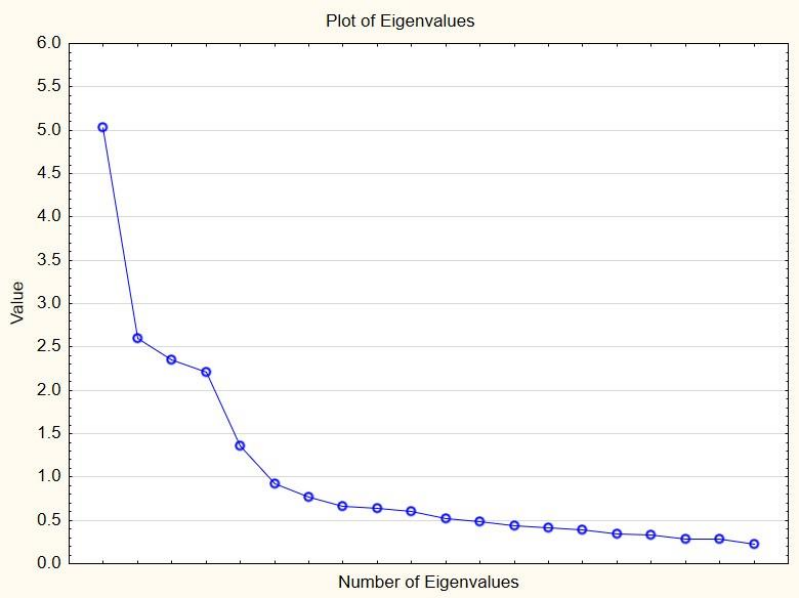
Table 4.5

Eigenvalues for the PVQ Personality Scales

Factor	Random Eigenvalue - Horn's	EFA Eigenvalue	% Total (variance)	Average Squared Partial	Averaged 4th Power
1	1.5385	5.037655	23.98883	0.0722	0.0225
2	1.4359	2.595011	12.35719	0.0598	0.0153
3	1.3701	2.353786	11.2085	0.0585	0.0141
4	1.3112	2.208044	10.5145	0.0556	0.0123
5	1.2545	1.358133	6.4673	0.052	0.0101
6	1.2087	0.921357	4.38742	0.0513	0.0103

Figure 4.2

Scree Plot of PVQ Personality Scales – 5 factor Solution



As shown in Table 4.6, the scales that load positively on Factor 1 with high loadings were Diplomacy (0.63), Trust (0.63), Emotional Stability (0.79) and Composure (0.64). Moderately-high positive loadings were found for Energy and Drive (0.55), Confidence (0.56), and Patience (0.60). Long-term Orientation (0.46) had a positive loading above the .40 cut-off but was excluded as it had a higher loading on Factor 2 at .48. Factor 1 comprises scales that contain emotional control. Therefore, this factor can be named Self-control, the inversion of Neuroticism.

Positive, high loadings were found for Empathy (.62), Conscientiousness (.65), and Self-discipline (.64). Long-term Orientation had a positive, moderately-high loading (.48) on Factor 2. This factor can therefore be named Conscientiousness.

The scales that load on factor 3 with high positive loadings were Intellectance (0.78) and Abstract Thinking (.73). Radical Thinking (.55) and Resilience (.49) had moderately-high positive loadings. Persuasiveness (.43) had a moderately-high positive loading but was excluded as it had a higher loading on Factor 5 at .67. This factor can therefore be named Intellectualism.

Hard-headedness (the opposite end of the bipolar scale of Tender-mindedness) had a high negative loading on Factor 4 at -.87 and Objective Thinking had a high positive loading at .86. Two scales are too few for a factor. This factor appears to measure unsentimental and independent thinking.

The factors that had a high, positive loading on Factor 5 were Social-boldness (0.80), Group-orientation (0.62), Enthusiasm (0.76) and Persuasiveness (0.67). Assertiveness had a positive, moderately-high loading at .59. Energy and Drive (0.47) were loaded here but were excluded as they had a higher loading on Factor 1 at .55. This factor appears to measure social elements and can be named Openness to Experience.

Table 4.6

Factor Loadings Table for the Personality Scales of the PVQ

Scale	Factor (1)	Factor (2)	Factor (3)	Factor (4)	Factor (5)
Emotional Stability	0.79	-0.04	0.08	0.12	0.28
Composure	0.64	0.26	0.06	0.20	0.10
Diplomacy	0.63	0.40	-0.10	-0.24	-0.17
Trust	0.62	-0.27	0.03	-0.30	0.08
Patience	0.60	-0.42	-0.25	-0.13	-0.03
Confidence	0.56	-0.17	0.18	0.36	0.40
Energy and Drive	0.55	0.14	0.33	0.01	0.47
Conscientiousness	0.10	0.65	0.10	0.03	-0.03
Self-discipline	-0.20	0.64	-0.16	0.12	0.06
Empathy	0.12	0.62	0.17	-0.32	0.30
Long-term Orientation	0.46	0.48	0.33	0.11	0.25
Intellectance	0.10	0.03	0.78	0.11	0.15
Abstract Thinking	-0.07	0.00	0.73	-0.30	0.12
Radical Thinking	0.05	-0.55	0.55	-0.13	0.14
Resilience	0.36	0.31	0.49	0.08	0.22
Tender-mindedness	0.09	0.01	0.21	-0.87	0.01
Objective Thinking	0.14	0.12	0.11	0.86	0.04
Social-boldness	0.33	0.07	0.10	0.09	0.80
Enthusiasm	0.13	0.23	0.16	-0.15	0.76
Persuasiveness	-0.01	0.14	0.42	0.13	0.67
Group-orientation	0.28	-0.24	-0.30	-0.28	0.62
Assertiveness	-0.19	-0.21	0.37	0.29	0.59
Expl.Var	3.490451	2.567456	2.571175	2.314596	3.159574
Prp.Totl	0.158657	0.116703	0.116872	0.105209	0.143617

4.4.3 Exploratory Factor Analysis for the Values Scales of the PVQ

An exploratory factor analysis was done on the Values Scales of the PVQ. The extraction method used was Principal Components Analysis, using Varimax rotation in Statistica (version 14). The extraction techniques used were the Eigenvalues-greater-than-1 rule (K-1), Cattell's Scree Plots, Horn's parallel analysis and Velicer's MAP (minimum average partial) (the latter two being calculated in SPSS).

Table 4.7 shows the Eigenvalues for the values scales of the PVQ. Using the Eigenvalues-greater-than-1 rule (K-1), it is evident that there are three factors. This method of factor extraction tends to overestimate the number of factors for retention. The scree plot in Figure 4.4 indicates four values before the elbow bend. Both the Parallel Analysis and Velicer's MAP suggest the retention of two factors.

Due to the PVQ technical manual mentioning three distinct types of values, namely, Interpersonal Values, Intrapersonal Values, and Professional Values, the researcher had expected to see three distinct values factors emerge. Based on these extraction methods, an exploratory factor analysis using Principal Components Analysis with a Varimax (normalised) rotation was conducted for 2 factors, 3 factors and 4 factors. The 3-factor rotation factor loadings are presented in Table 4.8, the others can be found in Appendix J.

Table 4.7

Eigenvalues for the PVQ Values Scales

Factor	Random Eigenvalue - Horn's	EFA Eigenvalue	Average Squared Partial	Averaged 4th Power
1	1.3452	2.606	0.0507	0.0076
2	1.2465	2.086	0.0356	0.0037
3	1.1808	1.529	0.0344	0.0027
4	1.1177	1.063	0.0432	0.0052
5	1.0629	0.937	0.0573	0.0095

Figure 4.3

Scree Plot of PVQ Values Scales

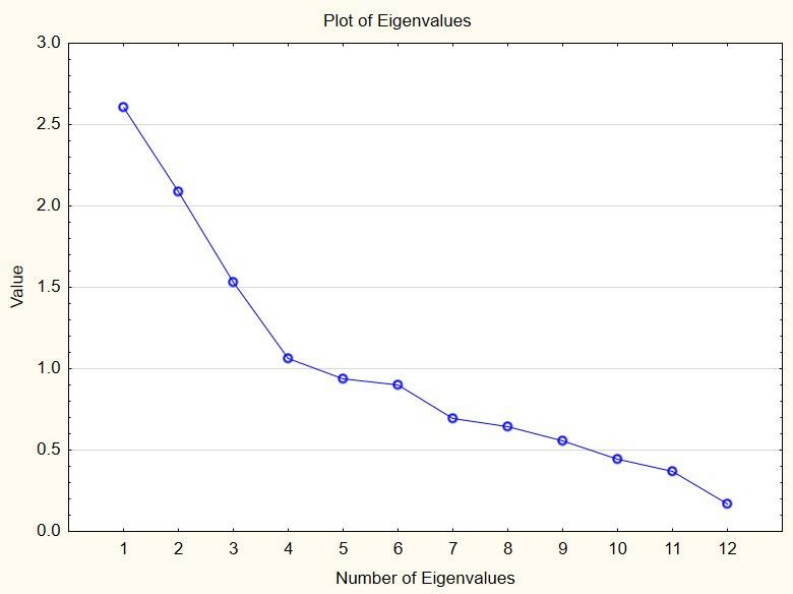


Table 4.8

Factor Loadings table for the PVQ Values Scales

Variable	Factor (1)	Factor (2)	Factor (3)
Need for Competition	0.85	0.09	0.12
Independence	0.81	-0.20	0.20
Need for Altruism	-0.57	0.20	0.24
Need for Economic Status	0.55	0.33	0.09
Need for Achievement	0.25	0.78	0.10
Work Ethic	-0.01	0.59	0.01
Need for Affiliation	-0.24	0.58	-0.26
Need for Affection	-0.16	0.51	0.39
Need for Aesthetics	-0.40	0.40	-0.06
Traditional Values	0.20	-0.01	0.73
Need for Safety	-0.21	-0.23	0.69
Moral Values	0.22	0.24	0.61
Expl.Var	2.44	2.04	1.74
Prp.Totl	0.20	0.17	0.14

The PVQ technical manual mentioned three groups for the values: Interpersonal, Personal (Intrapersonal) and Professional Values. Table 4.8 shows the factor loadings for the 3-factor rotation values exploratory factor analysis done.

From the table, it is evident that the scales that loaded positively on Factor 1 are Need for Economic Status (.55), with a moderately-high loading, and Need for Competition (.85) and Independence (.81) with high loadings. Need for Altruism (.57) had a negative, moderately-high loading. It is noted that Need for Aesthetics had a moderate negative loading on Factor 1 (-.40), however it is excluded here in favour of a moderate positive loading on Factor 2 (.40). Need for Economic Status, and Need for Competition are professional (extrinsic) values. Independence is a personal (intrinsic) value. Need for Altruism is an interpersonal value.

The scales that loaded positively on Factor 2 with moderately-high loadings were: Need for Affection (.51); Need for Affiliation (.58); Need for Aesthetics (.40); and Work Ethic (.59). Need for Achievement (.77) had a positive, high loading on Factor 2. Need for Affection and Need for Affiliation are interpersonal values. Need for Aesthetics and Need for Achievement are professional (extrinsic) values. Work Ethic is a personal (intrinsic) value.

The scales that loaded on Factor 3 with high positive loadings were: Need for Safety (.69); Moral Values (.61); and Traditional Values (.73). Need for Safety is a professional (extrinsic) value. Moral Values and Traditional Values are personal (intrinsic) values. The values scales did not load into the expected three separate types of values according to this exploratory factor analysis.

4.4.4 Comparison of the Paltiel's 5-factor EFA to a 5-factor EFA on this South African Sample

According to the PVQ technical manual (Paltiel, 2017), the developers expected to find five factors as the assessment follows the FFM. They then did an exploratory factor analysis to determine the viability of this expectation. Table 4.9 shows the factor loadings for the PVQ from the technical manual (page 20). The factor loadings are emboldened as per the technical manual. This is then followed by Table 4.10 showed the factors loadings for the South African sample for a five-factor rotation. Loadings of above .40 are in bold.

Table 4.9

PVQ 5-factor rotation on the Paltiel's Sample

Scale	Agreeableness	Contentiousness	Neuroticism	Openness	Extraversion
Trust	0.73	-0.02	0.12	0.20	0.13
Patience	0.69	-0.06	-0.08	0.08	0.18
Emotional Stability	0.50	0.34	-0.21	0.06	0.45
Diplomacy	0.41	0.47	0.08	-0.20	0.18
Independence	-0.81	0.06	-0.06	-0.11	-0.38
Competition	-0.82	0.10	0.00	-0.15	0.00
Need for Economic Status	-0.43	0.04	0.05	0.16	0.17
Need for Altruism	0.37	0.23	0.44	0.00	0.09
Self-Discipline	-0.14	0.78	0.16	-0.13	-0.06
Moral Values	-0.09	0.77	0.17	-0.10	-0.07
Conscientiousness	-0.04	0.69	-0.03	-0.10	0.15
Work Ethic	-0.01	0.58	0.02	0.28	0.08
Long-term Orientation	0.15	0.57	-0.08	0.20	0.40
Need for Achievement	-0.28	0.53	0.09	0.15	0.27
Resilience	0.37	0.46	-0.08	0.49	0.11
Composure	0.34	0.42	0.05	-0.09	0.22
Empathy	0.01	0.44	0.49	0.01	0.28
Tender-mindedness	0.03	-0.08	0.86	0.11	0.03
Need for Affection	-0.10	0.12	0.61	-0.17	0.06
Aesthetics	0.06	0.27	0.61	0.20	0.28
Objective Thinking	0.02	0.42	-0.55	0.08	0.29
Intellectance	0.12	0.53	0.05	0.50	0.24
Abstract Thinking	-0.11	0.25	0.44	0.51	0.10

Radical Thinking	0.28	-0.23	-0.01	0.77	0.13
Traditional Values	0.32	-0.35	-0.06	-0.73	0.08
Need for Safety	0.18	-0.08	-0.04	-0.52	-0.26
Assertiveness	-0.04	0.12	-0.28	0.41	0.45
Group-Orientation	0.53	-0.06	0.07	-0.02	0.62
Need for Affiliation	0.25	0.10	0.15	0.05	0.85
Social Boldness	0.16	0.16	0.08	0.15	0.82
Enthusiasm	0.08	0.07	0.31	0.23	0.63
Persuasiveness	-0.15	0.29	0.11	0.33	0.58
Confidence	0.38	0.20	-0.37	0.12	0.51
Energy and Drive	0.40	0.39	0.05	0.34	0.47

Table 4.10

Factor Loading Table for a 5-factor EFA on a South African Sample

Variable	Conscientiousness	Agreeableness	Openness	Neuroticism	Extraversion
Long-term Orientation	0.71	0.09	0.15	-0.03	0.22
Resilience	0.70	0.05	-0.06	0.00	0.17
Energy and Drive	0.63	0.3	-0.1	-0.02	0.38
Intellectance	0.59	-0.09	-0.41	0.03	0.05
Work Ethic	0.59	-0.11	-0.07	0.16	0.08
Conscientiousness	0.50	-0.09	0.38	0.08	-0.14
Need for Achievement	0.49	-0.3	0.12	0.19	0.26
Composure	0.48	0.34	0.23	-0.19	0.15
Empathy	0.43	-0.13	0.27	0.38	0.31
Emotional Stability	0.46	0.60	0.05	-0.18	0.28
Need for Competition	0.05	-0.80	0.11	-0.21	-0.03
Independence	0.01	-0.79	0.06	-0.23	-0.4
Trust	0.11	0.76	-0.09	0.21	0.13
Patience	-0.18	0.71	0	-0.06	0.11
Need for Economic Status	0.01	-0.45	0.15	-0.03	0.22
Confidence	0.39	0.43	-0.19	-0.43	0.32
Diplomacy	0.34	0.42	0.45	0.2	-0.02
Self-discipline	0.17	-0.44	0.60	0.00	0.12
Traditional Values	0.00	-0.19	0.82	-0.09	-0.03
Radical thinking	0.08	0.12	-0.8	0.12	0.10
Moral Values	0.18	-0.38	0.55	0.05	0.10
Need for Safety	-0.12	0.14	0.5	0.19	-0.33
Assertiveness	0.24	-0.19	-0.5	-0.24	0.37
Abstract thinking	0.39	-0.18	-0.45	0.41	0.05

Need for Aesthetics	0.42	0.19	-0.17	0.61	-0.03
Tender-mindedness	0.09	0.19	-0.13	0.87	-0.03
Objective thinking	0.34	-0.10	0.02	-0.75	0.01
Need for Affection	0.07	-0.07	0.29	0.52	0.29
Need for Altruism	0.22	0.28	0.12	0.42	-0.01
Persuasiveness	0.46	-0.17	-0.27	-0.03	0.53
Need for Affiliation	0.18	0.19	-0.01	0.02	0.88
Social boldness	0.34	0.14	-0.07	-0.12	0.80
Group-orientation	-0.18	0.39	-0.03	0.16	0.72
Enthusiasm	0.35	-0.04	-0.08	0.15	0.68

4.4.4.1 Tucker's coefficient of congruence

Table 4.11 shows Tucker's Coefficient of Congruence comparing the researcher's exploratory factor analysis to the developer's sample to the sample from this study. "Factor congruence coefficients are computed to quantify the degree to which a factor structure is replicated" (Laher, 2010). According to Laher (2010), there are several congruence coefficients proposed in literature, the most widely used being Tucker's phi (φ) coefficient of agreement (or coefficient of proportionality), which was the method chosen for this study. Other types of coefficients are the identity coefficient, the linearity coefficient, and the additivity coefficient.

Laher (2010) summarises the existing literature in the field for determining level of agreement for factor congruence as values of 0.90 and above will show adequate levels of fit, a coefficient of 0.85 and below demonstrates incongruence. As such, coefficients of 0.85 and above were explored as moderate fit, and coefficients of 0.90 were considered to indicate an acceptable level of agreement and were indicated in bold. McCrae et al. (1996, as cited in Laher, 2010) advocate for the .90 cut-off point because these values are almost never produced by chance.

The majority of the personality scales indicated an acceptable level of agreement, ranging from .90 for Empathy to .98 for Patience. The personality scales that showed a moderate level of agreement were: Diplomacy; Enthusiasm; Objective Thinking; and Energy and Drive. There was no congruence between the samples for Contentiousness, Self-discipline, Long-

term Orientation, and Resilience. Similarly, most of the values scales indicated an acceptable level of fit, with a range for the values scales was .90 for Need for Affection, to .98 for Need for Affiliation and Independence. No congruence was found for Need for Economic Status, Need for Aesthetics, Moral Values, and Traditional Values.

Table 4.12 presents the coefficients for the five factors according to the FFM. From this table, it is evident that factor congruence was found for Factor 1, Factor 3, and Factor 5. The average is arguable borderline. The implications of these findings are discussed in Chapter 5.

Table 4.11

Comparing the EFAs using Tucker's phi - Coefficient of Congruence

	Scale Name	Tucker's Coefficient of Congruence
Personality Scales	Empathy	0.90
	Social Boldness	0.95
	Group-Orientation	0.96
	Intellectance	0.92
	Assertiveness	0.95
	Diplomacy	0.87
	Persuasiveness	0.95
	Trust	0.97
	Enthusiasm	0.88
	Conscientiousness	0.77
	Tender-mindedness	0.97
	Objective Thinking	0.89
	Abstract Thinking	0.97
	Radical Thinking	0.90
	Self-Discipline	0.42
	Long-term Orientation	0.84
	Energy and Drive	0.89
	Emotional Stability	0.95
	Confidence	0.93
	Resilience	0.68
	Patience	0.98

	Composure	0.90
Values Scales	Need for Altruism (Interpersonal)	0.96
	Need for Affection (Interpersonal)	0.90
	Need for Affiliation (Interpersonal)	0.98
	Need for Achievement (Extrinsic)	0.91
	Need for Economic Status (Extrinsic)	0.79
	Need for Safety (Extrinsic)	0.93
	Need for Competition (Extrinsic)	0.96
	Need for Aesthetics (Extrinsic)	0.88
	Work Ethic (Intrinsic)	0.91
	Moral Values (Intrinsic)	0.41
	Traditional Values (Intrinsic)	0.72
	Independence (Intrinsic)	0.98

Table 4.12

Tucker's Coefficient for FFM Factors

FFM Factor	TCC
Agreeableness	0.91
Conscientiousness	0.84
Neuroticism	0.92
Openness to Experience	0.80
Extraversion	0.93
Average	0.88

4.5 Adverse Impact

This section shows the results of the t-tests done to compare mean differences between groups. This was done to establish if there is potential for adverse impact present for different groups, namely, gender (male and female), first language (English as a first language and English as a second language), and race (Black and White). These were calculated using the different groupings that were discussed earlier, determined by using the biographical information that was collected during the consent phase of the data collection

process.

Adverse impact can occur as a result of bias in an assessment. One of the ways of exploring adverse impact is to calculate mean differences in scores between groups to determine if there are significant differences in mean scores between groups, and then to calculate the effect size to determine the extent to which that significant finding has practical implications, calculated using Cohen's d. A commonly used interpretation is to refer to effect sizes as small (d = 0.2), medium (d = 0.5), and large (d = 0.8) based on benchmarks suggested by Cohen (1988).

4.5.1 Language: English First Language and English Second Language

Table 4.12 shows the t-test for first language, using the groupings of English as a first language and English as a second language. The sample consisted of 161 English first language speakers, and 92 English second language speakers. Significant findings are presented in bold. According to Table 4.12, significant differences were found between language groups on the following scales: Intellectance; Radical Thinking; and Traditional Values. At the 0.05-significance level, differences were found for Intellectance and Radical Thinking. At the 0.01-significance level, there was a difference for Traditional Values. There were no other significant differences between the language groups for the PVQ.

When evaluating the practical implications of these differences, using Cohen's d, small effect sizes were found for: Need for Safety; Self-discipline; Traditional Values; Radical Thinking; Abstract Thinking; Intellectance; and Empathy. There were no moderate effect sizes nor large effect size differences.

Table 4.13

T-test: First Language

Variable	t-value	df	p-value	Mean - First Language	Mean - Second Language	Cohen's d
Need for Affection	0.3395	251	0.735	15.94	15.74	0.04
Work Ethic	-0.32	251	0.749	22.66	22.85	-0.04
Need for Safety	-1.61	251	0.109	13.39	14.51	-0.21
Resilience	0.2042	251	0.838	21.1	21.01	0.03
Persuasiveness	0.8066	251	0.421	12.8	12.25	0.11
Objective Thinking	-0.7616	251	0.447	11.27	11.67	-0.1
Long-term Orientation	-1.0791	251	0.282	12.63	13.18	-0.14
Need for Economic Status	-1.5291	251	0.128	13	14.07	-0.2
Energy and Drive	-0.2378	251	0.812	16.39	16.54	-0.03
Patience	1.4562	251	0.147	13.4	12.42	0.19
Need for Competition	-0.8491	251	0.397	16.14	16.74	-0.11
Need for Altruism	0.8384	251	0.403	20.35	19.78	0.11
Tender-mindedness	-0.2195	251	0.826	27.8	28	-0.03
Need for Aesthetics	-0.9453	251	0.345	15.07	15.67	-0.12
Need for Achievement	-0.8828	251	0.378	21.73	22.22	-0.12
Composure	-1.0766	251	0.283	15.02	15.75	-0.14
Moral Values	-1.2357	251	0.218	19.22	19.74	-0.16
Self-discipline	-1.8182	251	0.07	25.14	26.09	-0.24
Group-orientation	0.0632	251	0.95	8.5	8.47	0.01
Traditional Values	-2.9591	251	0.003**	14.83	16.65	-0.39
Radical Thinking	2.0309	251	0.043*	14.94	13.78	0.27
Confidence	-1.437	251	0.152	10.39	11.43	-0.19
Diplomacy	-0.5208	251	0.603	16.94	17.27	-0.07

Abstract Thinking	-1.627	251	0.105	17.84	18.76	-0.21
Independence	-0.136	251	0.892	24.02	24.14	-0.02
Trust	0.4277	251	0.669	13.12	12.82	0.06
Need for Affiliation	-0.4293	251	0.668	12.8	13.11	-0.06
Social-boldness	-0.3521	251	0.725	11.28	11.51	-0.05
Conscientiousness	0.2282	251	0.82	22.11	21.95	0.03
Enthusiasm	-0.025	251	0.98	15.01	15.02	0
Assertiveness	0.9035	251	0.367	14.37	13.77	0.12
Emotional Stability	-0.6148	251	0.539	11.43	11.84	-0.08
Intellectance	2.0741	251	0.039*	20.69	19.62	0.27
Empathy	-1.753	251	0.081	22.34	23.3	-0.23

* $p<0.05$

** $p<0.01$

4.5.2 Gender: Males and Females

Table 4.13 shows the t-test for gender, for males and females. This biographical information was captured during the consent phase. The sample consisted of 225 females and 61 males. According to Table 4.13, significant differences were found between genders for some scales. At the .05-significance level, differences were found for Need for Achievement and Objective Thinking. At the .01-significance level, there were differences for Empathy, Conscientiousness, Diplomacy, Need for Aesthetics, Tender-mindedness, Need for Altruism, Need for Safety, and Need for Affection. There were no other significant differences between the language groups for the PVQ.

When evaluating the practical implications of these differences, using Cohen's *d*, small effect sizes were found for: Enthusiasm (*d* =.27); Diplomacy (*d* =.47); Confidence (*d* =-.27); Radical Thinking (*d* =0.21); Traditional Values (*d* =.22); Need for Achievement (*d* =.34); Patience (*d* =.25); Objective Thinking (*d* =.29); Need for Safety (*d* =.34); and Need for Affection (*d* =.29). Moderate effect sizes were found for: Conscientiousness (*d* =.68); Need for Aesthetics (*d* =.58); Tender-mindedness (*d* =.58); and Need for Altruism (*d* =.57). A large effect size difference was found for Empathy (*d* =.95).

Table 4.14

T-test: Gender

Variable	t-value	Mean (F)	Mean (M)	df	p	Cohen's d
Empathy	6.55855	23.57	19.85	284	< .001**	0.95
Intellectance	-0.95071	20.13	20.67	284	0.343	-0.14
Emotional Stability	-1.06417	11.4	12.15	284	0.288	-0.15
Assertiveness	-0.29124	14.21	14.43	284	0.771	-0.04
Enthusiasm	1.86498	15.36	14.07	284	0.063	0.27
Conscientiousness	4.71545	23.08	19.46	284	< .001**	0.68
Social-boldness	0.35769	11.64	11.38	284	0.721	0.05
Need for Affiliation	1.03542	13.39	12.56	284	0.301	0.15
Trust	-0.0852	13.08	13.15	284	0.932	-0.01
Independence	-1.01433	23.82	24.77	284	0.311	-0.15
Abstract Thinking	-1.10935	17.97	18.66	284	0.268	-0.16
Diplomacy	3.27882	17.55	15.3	284	0.001**	0.47
Confidence	-1.89068	10.47	11.97	284	0.06	-0.27
Radical Thinking	-1.48356	14.28	15.21	284	0.139	-0.21
Traditional Values	1.51226	15.78	14.74	284	0.132	0.22
Group-orientation	1.08802	8.72	8.05	284	0.278	0.16
Self-discipline	0.73033	25.55	25.13	284	0.466	0.11
Moral Values	0.48345	19.45	19.23	284	0.629	0.07
Composure	1.13295	15.6	14.77	284	0.258	0.16
Need for Achievement	2.32201	22.24	20.84	284	0.021*	0.34
Need for Aesthetics	3.99421	15.87	13.16	284	< .001**	0.58
Tender-mindedness	4.00777	28.57	24.7	284	< .001**	0.58
Need for Altruism	3.9565	20.73	17.84	284	< .001**	0.57
Need for Competition	0.38209	16.46	16.16	284	0.703	0.06
Patience	-1.72624	12.67	13.93	284	0.085	-0.25
Energy and Drive	0.49408	16.58	16.23	284	0.622	0.07
Need for Economic Status	-0.86921	13.27	13.93	284	0.385	-0.13
Long-term Orientation	1.20707	13.08	12.39	284	0.228	0.17
Objective Thinking	-1.98127	11.29	12.46	284	0.049*	-0.29
Persuasiveness	-0.00698	12.88	12.89	284	0.994	-0.00

Resilience	0.19157	21.11	21.02	284	0.848	0.03
Need for Safety	2.34354	14.09	12.3	284	0.02**	0.34
Work Ethic	1.30567	22.92	22.08	284	0.193	0.19
Need for Affection	1.98555	16.26	15	284	0.048*	0.29

* p<0.05

** p<0.01

4.5.3 Race: Black and White

Table 4.14 shows the t-test for race: Black and White. This biographical information was captured during the consent phase. The sample consisted of 114 White and 126 Black respondents. At the .05-significance level, differences were found for Self-discipline and Composure. At the .01-significance level, statistically significant differences were found for: Empathy; Conscientiousness; Trust; Independence; Diplomacy; Radical Thinking; Traditional Values; Group-orientation; Need for Altruism; Competition; Need for Economic Status; Long-term Orientation; and Objective Thinking. There are no other significant differences for race and the PVQ.

When evaluating the practical implications of these differences, using Cohen's *d*, small effect sizes were found for: Work Ethic (*d*=-.23); Need for Economic Status (*d*=.42); Patience (*d*=-.24); Composure (*d*=.33); Group-orientation (*d*=-.42); Radical Thinking (*d*=-.43); Diplomacy (*d*=.37); and Enthusiasm (*d*=.22). Moderate effect sizes were found for: Objective Thinking (*d*=.54); Long-term Orientation (*d* = .68); Need for Competition (*d*=.56); Need for Altruism (*d*=.52); Traditional values (*d*=.54); Independence (*d*=.50); Trust (*d*=-.51); Conscientiousness (*d*=.59); and Empathy (*d*=.58). There are no large effect size differences.

Table 4.15

T-test: Race

Scale	t-value	df	p	Mean (Black)	Mean (White)	Cohen's d
Need for Affection	-0.0332	238	0.974	15.85	15.87	0.00
Work Ethic	-1.7855	238	0.075	22.28	23.28	-0.23
Need for Safety	1.0455	238	0.297	14.01	13.28	0.14
Resilience	0.8468	238	0.398	21.23	20.88	0.11
Persuasiveness	1.3197	238	0.188	13.45	12.55	0.17
Objective Thinking	4.1565	238	< .001**	12.71	10.54	0.54
Long-term Orientation	5.2581	238	< .001**	14.12	11.55	0.68
Need for Economic Status	3.2694	238	0.001**	14.59	12.44	0.42
Energy and Drive	1.0296	238	0.304	16.68	16.04	0.13
Patience	-1.8658	238	0.063	12.21	13.45	-0.24
Need for Competition	4.3438	238	< .001**	17.9	14.96	0.56
Need for Altruism	3.9877	238	< .001**	21.11	18.53	0.51
Tender-mindedness	-1.4573	238	0.146	26.86	28.13	-0.19
Need for Aesthetics	1.4512	238	0.148	15.57	14.68	0.19
Need for Achievement	0.8044	238	0.422	22.2	21.77	0.10
Composure	2.5287	238	0.012*	16.03	14.36	0.33
Moral Values	1.515	238	0.131	19.76	19.13	0.20
Self-discipline	2.3835	238	0.018	26.13	24.88	0.30
Group-orientation	-3.2279	238	0.001**	7.62	9.4	-0.42
Traditional Values	4.1647	238	< .001**	16.78	14.25	0.54
Radical Thinking	-3.3589	238	< .001**	13.58	15.46	-0.43
Confidence	1.1159	238	0.266	11.01	10.24	0.14
Diplomacy	2.8416	238	0.005**	17.92	16.14	0.36
Abstract Thinking	0.3212	238	0.748	18.23	18.05	0.04

Independence	3.8779	238	< .001**	25.72	22.52	0.50
Trust	-3.9283	238	< .001**	11.71	14.39	-0.51
Need for Affiliation	0.3882	238	0.698	13.25	12.97	0.05
Social-boldness	1.2303	238	0.22	11.9	11.1	0.16
Conscientiousness	4.5858	238	< .001**	23.83	20.66	0.59
Enthusiasm	1.7072	238	0.089	15.48	14.44	0.22
Assertiveness	-1.1505	238	0.251	13.88	14.62	-0.15
Emotional Stability	0.0583	238	0.954	11.48	11.44	0.01
Intellectance	-1.5291	238	0.128	19.92	20.7	-0.20
Empathy	4.4489	238	< .001**	23.9	21.52	0.58

* $p<0.05$

** $p<0.01$

4.6 Conclusion

In this chapter, the results were presented for the descriptive statistics relating to the scales. This was followed by the reliability results and then the results of the exploratory factor analyses run for construct validity. Following this, t-tests and Cohen's d were presented for adverse impact. Tucker's phi for congruence was then calculated for two samples, this sample and the developer's sample. The descriptive statistics for the PVQ were adequate, with all the scales being normally distributed. The internal consistency reliability coefficients were adequate, with only one scale (Resilience) being below the .60 cut-off. Construct validity results using exploratory factor analysis with varimax rotation demonstrated appropriate validity for the PVQ. Tucker's coefficient of congruence indicated adequate for some factors and scales, and borderline fit for others. The chapter concluded with t-tests for mean differences to demonstrate whether there is potential for adverse impact. All these results are discussed in Chapter 5.

CHAPTER 5: DISCUSSION

5.1 Introduction

This chapter presents a discussion of all the results in this study in the order in which they were reported in Chapter 4. Thus, the descriptive statistics for the scales of the PVQ are presented first. Then, internal consistency reliability is discussed. This is followed by exploratory factor analyses for construct validity, and a congruence comparison between the Paltiel's sample and this South African sample. Thereafter, t-tests for mean group comparison are presented for an evaluation of potential for adverse impact. Finally, the limitations and recommendations for future research are presented, followed by the conclusion.

5.2 Internal consistency reliability

5.2.1 Do the PVQ scales demonstrate acceptable internal consistency reliability coefficients on this sample of the South African population?

Internal consistency reliability for the scales of the PVQ was explored using Cronbach's Alpha and McDonald's Omega coefficients. The coefficients are reported in Table 4.2 for this sample. These results reflect what was seen in the developer's sample (Table 3.3). The reliability coefficients for the South African sample were above the .60 cut-off by Nunnally and Bernstein (1994) for exploratory analyses, and most were above the .70 cut-off for personality scales in general (Field, 2018). Most of the scales had a better reliability coefficient in the South African sample than in the international sample. The local sample was very small, so this needs to be borne in mind when evaluating these differences or generalising these findings to the population at large.

Internal consistency reliability for the scales of the PVQ with coefficients below .70 were: Objective Thinking (alpha=.65, omega=.67); Abstract Thinking (alpha=.67, omega=.67); Resilience (alpha=.58, omega=.59); and Need for Achievement (alpha=.64, omega=.59). Only the Resilience scale was arguably below the cut-off of .60.

This discussion reported only on the alpha values, as there were no significant differences in the alpha and omega coefficient values. Most of the personality scales had similar internal consistency reliability coefficients. In almost all the cases where there were appreciable differences, the reliability coefficients were better in the South African sample. The scales were: Social-boldness SA=.80 (UK=.73); Group-orientation SA .79 (UK=.73); Assertiveness

SA=.73 (UK=.61); Trust SA=.83 (UK=.73); Enthusiasm SA=0.74 (UK=.64); Tender-mindedness SA=0.74 (UK=.68); Objective Thinking SA=.65 (UK=.55); Abstract Thinking SA=.67 (UK=.53); Radical Thinking SA=.76 (UK=.64); and Confidence SA=.79 (UK=.72). The only scale where the coefficient was higher in the developer's sample was for Resilience SA=.58 (UK=.66).

The values scales with appreciable differences also saw higher coefficients for the South African sample. The scales were: Altruism SA=.72 (UK=.60); Economic status SA=.86 (UK=.77); Safety SA=.80 (UK=.70); Competition SA=.81 (UK=.76); Work Ethic SA=.70 (UK=.64); and Traditional Values SA=.79 (UK=.67).

High scorers on the trait Resilience tend to have a strong belief in their ability to face difficulties (Paltiel, 2017). Data for this study were collected during the levels four and five of hard lockdown in South Africa due to the COVID-19 global pandemic, and this could have impacted how capable respondents felt they were in terms of facing this unprecedented difficulty, a global pandemic. The Need for Achievement coefficient could be low because South Africa is experiencing huge economic strain, political tension, and low employment rates. It is conceivable that the Need for Achievement would become less of a focus in preference for, possibly, the Need for Safety.

Research on studies in Africa and South Africa tend to find lower reliability coefficients than those found in this sample. This may be due to lower quality data from these countries (Laher, 2013b) therefore this is not necessarily indicative of inconsistency in measurement. Better coefficients here could be attributed to a mostly English, mostly Western sample of a mostly post-graduate cohort.

5.3 Construct Validity for the PVQ

Construct validity of the PVQ was examined using exploratory factor analysis with varimax rotation. With the first exploratory factor analysis using all of the PVQ scales together, eight factors were retained as the technical manual of the PVQ describes the assessment theory in terms of the five factors of the FFM and mentions three distinct types of values. The second aspect of construct validity looked at whether the personality scales of the PVQ factored into a five-factor rotation. Then, the values scales were explored to see if they factored into a three-factor solution as proposed by Paltiel (2017). Thereafter, the researcher explored whether all the scales of the PVQ factored into a five-factor rotation which was then compared to Paltiel's five-factor rotation. And finally, the five-factor rotation done on this sample was compared to a five-factor rotation done on Paltiel's sample. This was done using

Tucker's phi, which was calculated for the overall factors of the FFM between the two samples, as well as the scales themselves. However, as there was not congruence for all factors or all the scales, a qualitative comparison was also done.

The first aspect of construct validity was to consider whether the personality traits and value dimensions load independently as postulated by the researcher from the information in the PVQ technical manual (see Paltiel, 2017). This was done with an 8-factor exploratory factor analysis using varimax rotation.

A study by Fischer and Boer (2015), with participants from 14 different countries, using both a FFM personality measure and the Schwartz's values assessment, found strong associations between personality scales and values dimensions, with the strongest being between Agreeableness and the Self-Transcendence value, and between the Conservation value and Openness traits. The Agreeableness FFM factor and the Agreeableness and the Self-Transcendence value from Schwartz are characterised by concern for the well-being of others, and ideas of universalism. This fits in with what the researcher found with the PVQ.

Research by Fischer and Boer (2015) suggests that threats to the environment have an impact on both personality and value correlations. Additionally, economic, social, financial and ecological threat factors can cause variations in the correlations between personality and values, and stronger the variations in the strength of the correlations in the absence of these threats (Fischer & Boer, 2015). This provides strong evidence for correlation between personality and values (Czerniawska & Szydło, 2021).

Neuroticism, or Self-Control, as these scales suggest, presents as someone who is likely to be emotionally stable, presenting with strength and confidence, composed in social situations and with sufficient drive and stamina to reach their goals. Neuroticism holds up to what is expected, according to the FFM, as does Agreeableness in this factor rotation. However, Factor 3 has too few scales to measure a factor. Factor 4 resembles Openness, with the addition of objective thinking, which loaded on Neuroticism in a 5-factor rotation. The low need for safety loading on Extraversion could be an result of the hard lockdown as it shows that participants wanted to go out and be social but that this had not been allowed during the lockdown.

Factor 6 appears to measure extrinsic values like Schwartz's Self-enhancement value, which is characterised by power and achievement. These elements were also present in the 5-factor rotation of all the scales. Factor 7 appeared to measured Intellectualism and Thinking, with the exception of Objective Thinking (.08). Factor 8 presents as meticulous individuals

who set high standards for themselves, have a strong work ethic, believe work is quite important, and have a strong belief in their ability to face difficulties. This is also similar to Hill et al. (2013) and Fetvadjiev et al. (2015), who found that strong associations between conscientiousness, integrity and social-relational positive factors implied an underlying "norm-driven, effortful self-regulation" (Fetvadjiev et al., 2015, p.4), which is described as "communality between an individual's level of conscientiousness and the extent to which such an individual engages in positive interpersonal contexts."

Based on the results that were found on the 8-factor solution, it is evident that values do not lie outside personality as separate constructs. Rather, personality and values scales appear to be related. The researcher had expected to see the FFM of personality and the three independent types of values load separately if values and personality were to be considered separate elements. However, it is evident that behaviour and the motivation for that behaviour are intrinsically linked.

Table 5.1

Summary of 8-factor loadings of all scales of the PVQ

Factor	Scale loadings
1. Neuroticism	Emotional Stability, Confidence, Composure, and Long-term Orientation, Diplomacy, and Energy and Drive.
2. Agreeableness	Trust, Patience, Group-orientation (negative Independence) and low Need for Competition
3. Self-control	Self-discipline and Moral Values
4. Openness to Experience	Abstract Thinking, Objective Thinking, Need for Aesthetics, and Tender-mindedness.
5. Extraversion	Enthusiasm, Social-boldness, Need for Affiliation, Group-orientation, and Persuasiveness, Assertiveness, and a low Need for Safety
6. Approval and Status	Need for Economic Status, Need for Affection, and Need for Achievement
7. Intellectualism and thinking	Intellectance, Radical Thinking, Traditional Values, low Need for Safety, and Abstract Thinking
8. Regulation	Work Ethic, Conscientiousness, and Resilience

The next aspect of construct validity was whether the personality scales of the PVQ factored

into a 5-factor solution as inferred from the theoretical underpinnings. The findings from this sample are summarised in Table 5.2. Openness and Neuroticism appear to function as expected in the FFM. Openness is replicating consistently in this sample, in contradiction to what research usually finds, as Openness is not usually replicable in communal cultures. However, Valchev et al. (2013) found in Openness replicable in Africa.

Factor 1 has scales often found in the Neuroticism factor. High positive loadings of Emotional Stability, Composure, Diplomacy, Confidence, Energy and Drive, and Patience indicate the polar-opposite of the scale: Emotional Stability (Soto & Jackson, 2020), or Self-Control.

Empathy loading on the Conscientiousness factor echoes findings in the SAPI that linked to Social-relational positive and Conscientiousness which could suggest, as discussed earlier, a link between how conscientious someone is and how much they engage in positive intersocial contexts (Morton et al., 2019). Factor 3 appears to measure thinking styles. Factor 4 only has two scales loading on it. This bears resemblance to the FFM, but lacks the breadth found when doing a 5-factor rotation on all the scales of the PVQ which is discussed in detail in this chapter.

Table 5.2

Summary of 5-factor loadings of personality scales of the PVQ

Factor	Scale loadings
Factor 1: Self-Control	Emotional Stability, Composure, Diplomacy, Trust, Patience, Confidence, Energy and Drive
Factor 2: Conscientiousness	Conscientiousness, Self-discipline, Empathy, Long-term Orientation
Factor 3: Intellectualism	Intellectance, Abstract Thinking, Radical Thinking, Resilience
Factor 4: Unsentimental	Hard-headedness (negative Tender-mindedness), and Objective Thinking
Factor 5: Openness	Social-boldness, Enthusiasm, Persuasiveness, Group-orientation, Assertiveness

The third aspect of construct validity was explored with a five-factor rotation on all the scales of the PVQ. The findings for this exploratory factor analysis are summarised in Table 5.2.

These findings are similar to the findings for a 5-factor exploratory factor analysis done by Paltiel. A qualitative overview of the comparison between Paltiel's five-factor EFA to a five-factor EFA for this sample is discussed below.

Agreeableness, in this sample, saw the addition of Self-Discipline and Confidence. The overall concept in this factor relates to togetherness, understanding, and trust. They represent a need to work together, unconcerned with one's own view, having high trust in others, being nonmaterialistic, and having a desire not to offend others. This is similar to findings on research with SAPI which found the social-relational positive scale correlates with agreeableness (Valchev et al., 2014), and there is evidence that Agreeableness has a communal element to the NEO, as found with the PVQ.

Openness to Experience is usually the least replicable of the five factors in the FFM. In this sample, in addition to the usual factors that underlie Openness, such as self-direction, hedonism, pursuing new and stimulating ideas, and Intellectualism, it also had Self-discipline and Moral Values loading, implying that Openness also includes social and cultural interests. This is similar to Asian and African cultures around traditionalism and inter-personal relatedness. Research on the SAPI by Valchev et al. (2014) has demonstrated that traditionalism/religiosity positively correlates with interpersonal-relatedness, which has shown to load on Openness, adding to the individualistic elements of the factor.

The Empathy scale loaded on the Conscientiousness factor. The SAPI found conscientiousness linked to pro-social behaviour (Valchev et al., 2014), which could include Empathy. This supports findings in the South African context that the degree to which a person is persevering and is responsible for is linked to their consideration for those around them.

From the above, we can see that the FFM holds elements of collectivistic and individualistic traits in a South African context. These traits also come through in the rotations done on the personality scales and values dimensions when explored separately. These findings are supported by work done on the FFM of personality in South Africa, African countries and Asian countries (Cheung et al., 2011; Laher et al., 2020; Valchev et al., 2013).

Table 5.3

Summary of 5-factor loadings of all scales of the PVQ

Factor	Scale loadings
Agreeableness	Emotional Stability, low Need for Competition, low Need for Independence, Trust, Patience, low Need for Economic Status, Confidence, and Diplomacy.
Conscientiousness	Long-term Orientation, Resilience, Intellectance, Work Ethic, Conscientiousness, Need for Achievement, Composure, and Empathy.
Openness to Experience	Self-discipline, Traditional Values, Conventional (negative Radical) thinking, Moral Values, Need for Safety, Accommodating (negative Assertiveness), Concrete (negative Abstract) thinking
Neuroticism	Need for Aesthetics, Tender-mindedness, Sentimental (negative Objective) thinking, Need for Affection, and Need for Altruism
Extraversion	Persuasiveness, Need for Affiliation, Social boldness, Group-orientation, and Enthusiasm

The next aspect of construct validity was around the values scales, and whether they factor into three separate factors as presented in Paltiel (2017). This question was explored with a three-factor rotation on the values scales of the PVQ using principal components analysis with varimax rotation. The expectation was that there would be three distinct types of values: intrinsic, extrinsic, and interpersonal values, as presented in the PVQ manual.

Factor 1 appeared to be extrinsic as it measures an individualistic, externally motivated value system. This factor appeared to have attributes similar to Self-enhancement by Schwartz (2012), which is characterised by achievement and power, hedonism in part, and an emphasis on the pursuit of one's own interest and success, as well as dominance over others.

The scales that load on Factor 2 appeared to measure a softer approach, more intrinsic or internal, a need for belonging. This factor appeared to tap the same constructs as Self-transcendence by Schwartz (2012), which is characterised by universalism – appreciation and tolerance, and benevolence – enhancing and preserving the welfare of those around us (Schwartz, 2012). There is a distinct emphasis on concern for the wellbeing of others.

Factor 3 appeared to measure communal, socially relevant elements. This factor resembles

Schwartz's value of Conservation. Conservation refers to "security, conformity and tradition, and emphasises order, self-restriction, preservation of the past, and resistance to change" (Schwartz, 2012). It consists of Conformity (controlling one's own impulses), respecting tradition, and the safety that comes from keeping up with one's own image (Giménez & Tamajón, 2019).

Self-enhancement values, such as power and achievement, are often in conflict with Self-transcendence values. These values are in conflict because they are polar opposites on the Transcendence dimension, both are poles on one continuum. It would be interesting to know whether the Conservation value, with focus on tradition, security and conformity, moderates behaviour between these opposing values.

Although the scales did not load into the three expected value types, there was harmony among the scales in the factors. The factors resemble Schwartz's more contemporary and culturally universal theories of values because Schwartz built on the work of Rokeach but focused on cross-cultural applications of the values dimensions. Research conducted by Schwartz in multiple countries supports the idea that this theory has universal applicability, which seems to hold true in this sample, to some extent, implying that Schwartz's values are suitable for a South African context.

Table 5.4

Summary of 3-factor loadings of the values scales of the PVQ

Factor	Scales
1	Need for Competition, Independence, Low (negative) Need for Altruism, and Need for Economic Status
2	Need for Achievement, Work Ethic, Need for Affiliation, Need for Affection, and Need for Aesthetics
3	Traditional Values, Need for Safety, and Moral Values

The final aspect of construct validity was exploring how a five-factor rotation done on this sample compared to a five-factor rotation done by Paltiel, on an international sample. Tucker's phi, a coefficient of Congruence, was calculated for the overall factors of the FFM between the two samples, as well as the scales themselves. However, as there was not congruence for all factors or all the scales, a qualitative comparison was also done.

A visual overview of the differences in scale loadings on the factors of the FFM saw that the Agreeableness factor in Paltiel's sample comprised: Trust; Patience; Emotional Stability; Diplomacy; low need for independence; low need for competition; low need for Economic Status; and a high need for Altruism. When looking at the Agreeableness factor in this sample, the majority of the scales were the same, however, the developer's sample included a high Need for Altruism in this factor that was not present in this sample, and this sample saw the addition of Self-Discipline and Confidence. The overall concept in this factor is represented by togetherness, understanding, and trust. They represent a need to work together, unconcerned with one's own view, high trust in others, unmaterialistic, and a desire not to offend others.

The following scales were present in both samples for Conscientiousness: Self-discipline; Moral Values; Conscientiousness; Work Ethic; Long-term Orientation; Need for Achievement; Resilience; and Composure. In addition to these scales, this sample also had Energy and Drive, Intellectance, and Empathy loads on this factor. However, Self-discipline, and Moral Values loaded elsewhere. The implications of this are discussed above.

Neuroticism in Paltiel's sample and this sample shared the scales of Empathy, Tender-mindedness, a high Need for Affection, a high Need for Aesthetics, and Subjective (negative Objective) thinking. This sample also saw the loading of Confidence, and a high Need for Altruism, but did not have Empathy.

There were differences in the factor loadings for Openness to Experience. The scales this sample has in common with Paltiel's analysis are: Intellectance; Abstract thinking; Radical thinking; a low Need for Traditional Values; and a low Need for Safety. This sample also had loadings from Self-discipline, Diplomacy, Moral Values, and Accommodating (negative assertiveness). Openness is widely considered the most controversial scale in terms of content interpretation.

The Extraversion factor loaded with the following common scales: Assertiveness; Group-orientation; Affiliation; Social-boldness; Enthusiasm; Persuasiveness; and Confidence. This sample had no scales loading on this factor and did not load on the Paltiel's sample, however, it also did not have Energy and Drive, Confidence, or Assertiveness. From this overview, it appears that there were many similarities in the loadings, but they were not identical.

The personality scales that had high congruence at .90 and above were: Empathy; Social Boldness; Group-Orientation; Intellectance; Assertiveness; Persuasiveness; Trust; Tender-

mindedness; Abstract Thinking; Radical Thinking; Emotional Stability; Confidence; Patience; and Composure. A moderate or borderline fit was found for: Diplomacy; Enthusiasm; Objective Thinking; and Energy and Drive. No fit or an inadequate fit was found for Resilience. In this sample, resilience also had the lowest coefficient alpha, which was postulated to have been an effect of COVID-19.

The values scales that had high congruence were: Need for Altruism (Interpersonal); Need for Affection (Interpersonal); Need for Affiliation (Interpersonal); Need for Achievement (Extrinsic); Need for Safety (Extrinsic); Need for Competition (Extrinsic); Work Ethic (Intrinsic); and Independence (Intrinsic). A moderate fit was found for Need for Aesthetics (Extrinsic), and an inadequate fit was found for Moral Values (Intrinsic), and Traditional Values (Intrinsic).

When considering Tucker's for the FFM, high congruence was found for Agreeableness, Neuroticism and Extraversion, the scales that are most commonly found to be in different cultural and language groups. There was no fit for Conscientiousness, and Openness to Experience, with an average overall coefficient of .88, which is moderate. No fit for Conscientiousness was an unusual finding as it usually replicates well in an African context (Laher, 2013b). This could possibly be explained by the small sample size. Although there are a significant number of similarities in the factors and subscales, there are some nonnegligible noncongruence findings. This suggests that, although the FFM is present in this sample, it does not provide a complete picture of personality within this context.

5.4 Adverse Impact

The potential for adverse impact was explored through analysing construct bias. T-tests were conducted for gender groups, first language, and race because research has found that mean scores on high-stakes assessments often differ by gender, race, and language/ethnicity (Burgoyne et al., 2021). As is evident from Table 4.1, all the PVQ scales were normally distributed as the skewness and kurtosis coefficients were within the range of -1 to +1 (Field, 2018). The scales demonstrated adequate homogeneity of variance, as such, the assumptions for running these analyses were met.

5.4.1 Does the PVQ show potential for adverse impact due to differences in gender groups?

The T-test results examining gender differences for the scales of the PVQ are presented in Table 4.13 From these results, it is evident that significant differences with small to moderate

effect sizes were found for the personality scales of Enthusiasm, Diplomacy, Confidence, Radical Thinking, Patience, Objective Thinking and the values scales of Traditional Values, Need for Achievement, Need for Safety, and Need for Affection. Moderate effect sizes were found for Conscientiousness and Tender-mindedness, which are personality scales, and a Need for Aesthetics and a Need for Altruism, which are values scales. A large effect size difference was found for Empathy, a personality scale. From all these differences, men scored higher for Objective Thinking only.

These results suggest that females are more likely to be focused on consideration for others, be concerned with how they appear to others, be more nurturing, require connection with others, and be fearful and actively avoid danger. To a slightly lesser extent, females are more likely to appear to be behaving by the rules, be more restrained, patient, value progress and change and present as self-assured. Men are more inclined to focus on logic and analyses, tending to avoid subjectivity where possible.

This is consistent with Costa et al.'s (2001) findings that women tend to be consistently more concerned with feelings than ideas, have a higher in negative affect, nurturance, and submissiveness. It has been widely established that females tend to innately be more empathic than males and score higher on nurturing aspects (Costa et al., 2001; Laher & Croxford, 2013).

Research by Laher and Croxford (2013) reflects these findings in gender differences of the factors and facets of the NEO-PI-R where significant differences were found for: Neuroticism; anxiety; depression; self-consciousness; vulnerability; warmth; positive emotions; aesthetics; feelings; agreeableness; straightforwardness; altruism; modesty; assertiveness; ideas; compliance; tender-mindedness; order; and achievement striving. Males scored higher on assertiveness and ideas only, females scored higher on all the rest (Laher & Croxford, 2013).

A difference in Need for Safety could be explained as South Africa was in varying stages of hard lockdown during this time, and there was a surge in Gender-Based Violence. The researcher suspects that the difference was higher than indicated herein, as the numbers reported during this time were shocking, 87 000 GBV complaints in the first week of the hard lockdown in 2020 (Tshangela, 2020).

Laher et al. (2020) provide a broad overview of findings for gender differences in personality and summarised that, with some differences, males tend to score higher in Extraversion, females tend to score higher in Agreeableness and Neuroticism (Laher et al., 2020). This is

supported by literature internationally that suggests differences like Neuroticism and Agreeableness are innate (Laher & Croxford, 2013).

Gender differences in personality assessments differ in the literature, differences in Western cultures tend to be greater than those found in non-western cultures (Laher et al., 2020). Costa et al. (2001, as referenced in Laher et al., 2020) found that gender differences found in Zimbabweans and Black South Africans evidenced very little difference in gender.

McCrae et al. (2005, as cited in Laher et al., 2020) found no significant gender differences in other African countries, including Nigeria, Botswana and Ethiopia, or in India, but did find the most significant differences in the United Kingdom, where females scored higher on all of the factors of the FFM. Gender differences for White South Africans found females scoring higher on Neuroticism, Agreeableness, Extraversion and Openness (Laher et al., 2020).

Cohen's d in the PVQ technical manual (Paltiel, 2017, p.21) reported small effect sizes between genders for: Safety; Altruism; Tender-mindedness; Patience; Persuasiveness; Assertiveness; Empathy; Resilience and Objective Thinking. Females scored higher on Patience; Persuasiveness; Assertiveness; Resilience; and Objective thinking. Males scored higher on: Safety; Altruism; Tender-mindedness; and Empathy.

From the above, it appears that the gender differences found in the mean scores of the scales for the PVQ were in line with international research and research in Africa.

5.4.2 Does the PVQ show potential for adverse impact due to differences in first language?

Table 4.12 presented the t-test results examining first language differences for the scales of the PVQ. The results show that significant differences with small effect sizes were found for the scales: Traditional Values; Radical Thinking; and Intellectance. There were no Moderate effect sizes nor large effect size differences.

English second language speakers scored higher on Traditional values. This suggests that English second language speakers tend to be more conventional in their approach to tradition and maintaining the status quo, may present with a warm and friendly demeanour and be generous in interpersonal relationships than English first language speakers.

English first language speakers scored higher only on Radical thinking and Intellectance. This suggests that English first language speakers are more inclined to openly express confidence in their own intellectual abilities and may have a stronger dislike for bureaucratic

process than English second language speakers.

There appeared to be a limited body of knowledge on the impact of language on performance in personality assessments. The lack of terminology in target languages (e.g., translation) may also impact how users view the terms when being assessed in English, thereby impacting responses. Further, the group of English second language speakers includes all other official languages that are not English, which does not consider the impact of socio-economic status or education.

Research by Laher (2013b) concluded that English second language speakers were lower on Openness to Experience. This could be because of the individualistic element to the constructs found in Openness. Therefore, future research is needed.

5.4.3 Does the PVQ show potential for adverse impact due to differences in race?

T-test results examining race differences for the scales of the PVQ are presented in Table 4.14. The groups used were Black and White as defined by the Employment Equity Act. This meant that all non-White races, i.e., Indian, Coloured, and Black were collapsed into one subgroup. From the results in Table 4.14, it is evident that significant differences with small to moderate effect sizes were found for Openness (Radical Thinking, and Traditional values), Conscientiousness (Work Ethic, Composure, Long-term Orientation, Conscientiousness, and Empathy), Extraversion (Group-orientation, and Enthusiasm), Agreeableness (Need for Economic Status, Patience, Diplomacy, Need for Competition, Independence, and Trust) and Neuroticism (Objective Thinking, and Need for Altruism). There were no large effect size differences.

Black participants scored higher on: Objective thinking; Long-term orientation; Need for Economic Status; Need for Competition; Need for Altruism; Composure; Traditional Values; Independence; Conscientiousness; and Empathy. This suggests that, to a small extent, Black participants were more likely to be driven by the accumulation of wealth, while maintaining soft-heartedness and harmony in interpersonal relationships. This is similar to findings by Valchev et al. (2013) that there was a slight overrepresentation of Relationship Harmony and Soft-Heartedness in Black participants.

White participants scored higher on Group-orientation, Radical thinking, and Trust. This suggests that, to a small extent, White participants were slightly more likely to appreciate making decisions in consultation, give others the benefit of the doubt, and value progress and innovation. These findings are in contrast with Valchev et al. (2013) who found that

White participants endorsed traits that were more individualistic in nature.

Race and language are conflated constructs therefore combining this with unequal sample sizes made the analysis of race and language difficult. There were almost no similarities in what was found in the factor loadings. Literature indicated clear connections with the White population group and English first language speakers endorsing individualistic ideas, and the Black population group endorsing collectivistic ideas. Future research could enter a discussion as to whether race and language are proxies for culture and research in the South African context.

5.5 Limitations

Limitations of this study in terms of methodology, sample, statistical procedures, and the interpretation of results have been briefly mentioned in previous chapters. This chapter serves to highlight some of the noteworthy limitations of this study. Recommendations for future research are presented thereafter.

5.5.1 Limitations of a quantitative study

One of the more prominent limitations of this study was its location within the quantitative paradigm. With a quantitative study the researcher was able to explore personality within the multicultural context of South Africa. However, this was only considered within the theoretical framework of the FFM and the FFT. In addition, the PVQ is a self-report questionnaire that captures data at one point in time; there is no elaboration on the participants' responses. A quantitative study can reduce large sets of data but does not factor in personal experience or other contextual factors. Conceptually, quantitative studies are able to be generalised to the population due to their capacity for large samples and large amounts of data that are (ideally) randomly selected (Rahman, 2016). This method of sampling was not used in this study and is discussed below. However, quantitative research does not consider underlying meanings and explanations for behaviour (Rahman, 2016), this information would be best gleaned from qualitative research. As such, a mixed-methods approach is likely to provide a more holistic picture.

5.5.2 Limitations in terms of sampling

The sample consisted of 288 respondents. The sample size for the reliability calculations for the group as a whole were therefore adequate. It would have been better with a large enough sample to explore the reliability coefficients within the subgroups. The sample sizes

for the t-tests were adequate. The sample size for the factor analyses was on the small side. Although it meets the assumption, according to Field (2018), a larger sample size would have been preferable. The exploratory factor analyses were conducted on the group as a whole as the subgroups were far too small to allow for further analyses.

From Table 3.1, it is apparent that the gender groupings, race groupings and first language groupings were unequal. Much of the sample was female. This is an artefact of using a convenience sample within social science research where the field is generally occupied by women. The sample was overwhelmingly White, even having collapsed the subgroupings for race, as explained before. In addition, more than 20% of the sample declined to disclose their race. English first language speakers represented more than half of the sample. The researcher had to rely on the charity of people willing to take time to complete the assessment and had no access to more respondents within the timeframe that was afforded for the study.

In the most recent census data (Statistics South Africa, 2022), 51% of the population is female, and 49% is male. English, as a first language, is spoken by 8.7% of the population (Statistics South Africa, 2022). isiZulu is the most commonly spoken first language in South Africa. Whites represent 7.3% of the population (Statistics South Africa, 2022) that means that the Black population, as per the collapsed groupings, would then consist of 93% of the population. This lack of representation in these splits limits the generalisability of the results to the population.

Despite the lack of adequate representation in this study, it should be borne in mind that studies of this nature tend to start with small and unrepresentative samples as most personality research takes place using undergraduate samples. In order for transformation to take place in South Africa, there needs to be an adequate body of knowledge on personality in South Africa. Studies of this nature are essential to the development of this body of knowledge. This study therefore has value in terms of its contribution and creates a foundation for further research with more representative samples.

The sample size for the exploratory factor analysis was on the small side; future studies could benefit from a larger sample size in order to do analyses on all subgroups. The use of non-probability convenience sampling meant that not everyone had an equal chance of being selected to do the assessment, therefore the sample was not representative of South Africa. The sample consisted of small subgroups, not large enough for any analyses on their own and, as a result, was collapsed into composite groups. A valid rationale was provided

for doing this; however, the result was that the population validity is limited.

5.5.3 Limitations pertaining to psychometric properties

This research was limited in terms of the procedures undertaken to explore reliability. Reliability, as discussed previously, comes in many forms. This study did not do test-retest reliability due to time constraints, and due to the logistics of confidentiality, data were anonymised. In addition, it was a challenge to get participants to complete the questionnaire once, let alone a second time. As there is no alternative form for this assessment therefore parallel/alternate form reliability could not be done. Split-half reliability was not done as the scales are too short to facilitate this. Inter-rater reliability was not relevant for this measure as it is a quantitative measure. This study assessed inter-item consistency reliability because it was the only option available to determine consistency of the measure.

In terms of validity, only construct validity was explored. As with reliability, there are many types, and therefore, more information is needed. Face validity was not addressed in this study. When developing a psychological assessment, face validity is usually determined in the beginning of the process when content experts are called in to look at the items for the assessment and various scales and determine whether they appear to measure what they should be measuring. Although face validity is considered weak validity (Tanner, 2018), the researcher believes that the importance lies in the buy-in from participants when completing the questionnaire. If participants do not believe that the assessment measures what it claims to measure, this could introduce bias. Criterion validity and predicative validity would require a large sample as well as criterion data, neither of which were in the scope of this study. Content validity also could not be explored. Therefore, criterion validity and content validity are considerations for future research.

Adverse impact is a complex issue, and construct bias is not the only form that can be explored. More studies on bias are needed. Bias, i.e., systematic differences across groups (Van der Vijver & He, 2012), is an important concept in psychological assessment in South Africa. Bias and issues of cross-cultural assessment are linked (Van der Vijver & He, 2012), and this study used groupings that do not accurately reflect cultural considerations. Although the reasons for using these groupings were justified in Chapter 2 and are commonplace in personality psychology and psychological assessment research, so is the recommendation that subgroups are explored independently to gain a better understanding into personality in South Africa. There is a need to examine different groupings instead of using composite groups divided by race or language as cultural proxies, as this may not be appropriate.

5.5.4 Theoretical limitations

The theory underpinning the PVQ is not explicitly stated in the technical manual. The researcher assumed the FFM and Rokeach's value theory from the technical manuals of the assessments which comprise the PVQ: the 15 Factor Questionnaire Plus (15FQPlus), and the Values and Motives Inventory (VMI). Given the findings from the exploratory factor analyses done, it may be more suitable for Paltiel to consider Schwartz's values as they seemed to underlie the factors found when doing rotations on the values scales of the PVQ. The five-factor rotations done on the personality scales also illustrated that the FFM did not conclusively explain the variation found in the factors. For comprehensive use in South Africa, Paltiel might want to consider variations in the FFM that are more culturally transferable.

5.6 Recommendations for future research

Based on the literature review, the results of this study, and the limitations discussed, the following recommendations for future research are presented:

The sample needs to be larger and more representative of the South African population so that analyses on language and race subgroups can be done without the need to collapse the groupings.

Given the findings of this study, a recommendation for future research is a qualitative study where the researcher speaks to people and attempts to understand their responses and their personalities using a mixed-methods approach to allow for qualitative information to be added for a more robust understanding of personality in South Africa.

Reliability needs to be calculated for each sample, or subgroup, because reliability needs to be interpreted within the particular sample from which it is drawn and does not automatically apply to other groups (Gignac, 2009). Additionally, more types of reliability need to be explored. Face validity from respondents could be considered. Face validity affects buy-in from respondents except if respondents do not believe that the assessment is measuring what it claims to measure, it could cause bias in responding. Test-retest validity should also be considered to determine the temporal stability of the instrument.

A confirmatory factor analysis should also be done to confirm which factor rotation best explains the PVQ in South Africa to verify the theory for the assessment. In addition, validation data, such as criterion data, should be collected alongside assessment data to ensure that the assessment is measuring what it claims to measure. From the discussion, it

is clear that there are similarities between what was found in this sample and what was found elsewhere in Africa and around the world, which lends some strength to the validity of the instrument.

Congruence coefficients are estimates of agreement. Van de Vijver and Leung (1997, as cited in Laher, 2010) propose that multiple congruence coefficients be calculated to ensure a more reliable conclusion of agreement.

Items level analysis was not conducted in this study. Item bias needs to be evaluated; differential item functioning can be analysed and qualitatively evaluating participant understanding and appropriateness of language of the items.

The grouping of race and language as it was done in this study did not take into consideration many important elements outside of such broad labels. It makes no allowance for cultural differences; multiple races are lumped together in one large group. Further to that, there are religious considerations and others that need to be borne in mind for which this grouping does not account. A recommendation for future research would be that these differences need to be explored to see whether these constructs are generalising across groups or not, and to what extent.

5.7 Conclusion

The PVQ adds to the existing information on the FFM in South Africa, especially as it contains values dimensions, as values have been linked to personality. Personality traits illustrate and explain a person's behaviour, and values tell you why they behave that way. This study has demonstrated that this instrument has value in the South African context. It incorporates both values and personality constructs into one instrument. Literature shows that these constructs are linked, and the results from this study support this. The reliability coefficients for this sample were acceptable according to theoretical cut-offs and were higher than those found in Paltiel's sample. Differences in mean scores for subgroups illustrate the need for additional data to be collected and for more bias and validity to be done to ensure that these aspects are more thoroughly investigated. In addition, this research has demonstrated support for some findings in a South African context. Specifically, the need to extend the FFM to encapsulate aspects of social-relatedness, and togetherness.

The mean score differences were found for the various subgroups, most of which were consistent with what has been found in other studies on FFM personality assessments in South Africa. Construct validity illustrated that, while the FFM holds for this sample, there are

variations in how it presents. Research on similar personality assessments in South Africa has found that there are constructs beyond the FFM that include elements of inter-personal relationships, togetherness, community, and trust. This was echoed in the findings of the PVQ.

Results from the differences between race groupings and language groupings were minimal, indicating that South Africa is developing a cohesive identity. Evidence suggests that socio-economic threats are more relevant indictors of differences in a population and should be considered as groupings instead of the existing conflated groups. The results suggest that the PVQ would have some suitability for use in the South Africa depending on context and sample. More research with larger and more diverse samples is needed. This study served as a preliminary exploratory study therefore, further research on this instrument is needed. It would be beneficial to add emic concepts, adjusting to a combined emic-etic approach, and allowing for a deeper understanding of personality in South Africa.

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Appendix A – PVQ Scales and Definitions

Scale Name	Scale Definition
Distant – Empathic	Low scorers are naturally private individuals who prefer to keep a clear distinction between their personal and work lives. Scoring in this range, they prefer friendships of depth and longevity, rather than accumulating a lot of superficial acquaintances. Individuals who score high on this scale have a naturally warm, friendly demeanour and are likely to enjoy the company of others. In line with this, they are likely to be generous in their interpersonal relationships and attentive to the needs of others.
Shy – Socially Bold	Individuals who score low on this scale are prone to feel ill at ease in social settings and are rather lacking in social confidence. They are unlikely to make the first move and may feel discomfort if made the focus of group attention. Inclined to feel quite uncomfortable in group settings, they may wish to avoid presentations and public speaking if at all possible. With a high level of social confidence, individuals who score low on this scale should enjoy meeting new people. Confident communicators, they should feel at ease in social situations, yet may run the risk of coming across as too over-the-top, particularly in the company of more low-key individuals.
Self-sufficient - Group-oriented	Individuals who score low on this scale are very autonomous and self-sufficient. With such a strong preference for individual activity, they may not always see the need to keep others informed and may prefer to make their own decisions rather than consult with others. Individuals who score high on this scale should appreciate making decisions in consultation with others and are likely to seek the input of colleagues before committing themselves to a course of action. More team orientated than the average person, individuals who score low on this scale are likely to thrive on group recognition and want to feel a sense of belonging. On the downside, they may dislike working on their own.
Low Intellectance - High Intellectance	Individuals who score low on this scale lack confidence in their intellectual abilities and may talk themselves out of more intellectually demanding tasks on the grounds that they are beyond them. They may also avoid situations in which they have to explain complex concepts or ideas, or at least be well prepared in advance of having to do this. Individuals who score high on this scale are extremely confident in their intellectual ability and, as a result, should enjoy working on tasks that offer a high degree of intellectual challenge and stimulation. At times, people with this profile may not relate so well to less intellectually confident colleagues and can be intimidating to others.

Accommodating - Assertive	Individuals who score low on this scale have a naturally obliging, cooperative nature and may prefer to support others from behind-the-scenes. Disliking confrontation, they should be effective in smoothing over interpersonal conflict and maintaining harmony in a team. Presenting themselves as a very assertive individual, individuals who score high on this scale are likely to face conflict and adversity head-on, they should be happy taking an unpopular stand if necessary. At times, they may need to consciously step back, so as to ensure that other less assertive individuals can have their say.
Direct - Diplomatic	Individuals who score low on this scale are direct and to the point in their communications. While some situations may call for a more open and forthright approach, they may distance others unnecessarily by coming across as excessively blunt and off-hand. Probably tending to speak first and think later, they may be seen as lacking tact. High scorers are particularly restrained individuals who should monitor their behaviour closely to ensure they do not upset or offend others. Typically, people with this profile think before speaking, yet may struggle to convey the importance of a message in their desire to communicate it tactfully.
Weak interest in persuasion - Strong interest in persuasion	Individuals who score low on this scale are less interested than most people about working in situations that require selling to either individuals or groups or having to constantly convince them of the benefits of what they have to offer. They are likely to need to believe in the ideas, products or services they are offering in order to effectively influence others. Confident of their ability to bring others around to their point of view, high scorers are likely to be particularly persuasive speakers who enjoy negotiating with others and influencing their decisions.
Suspicious - Trusting	Low scorers are more sceptical than most, they may be slow to trust others until they have hard, irrefutable evidence of their trustworthiness and/or ability to deliver on a task. Individuals who score high on this scale are more trusting than the average person and should be prepared to give others the benefit of the doubt. While they are likely to delegate tasks and empower colleagues with responsibility, they may sometimes over-estimate someone’s capability and end up feeling let down if they don't deliver.
Sober - Enthusiastic	Low scorers present themselves as naturally sober and serious individuals. They are likely to have little time for light-hearted entertainment, preferring instead to engage in more serious activities. Lacking a sense of playful spontaneity, they may appear somewhat constricted or stiff in social settings. Having said this, colleagues should see them as sensible individuals who are

	disinclined to act on impulse. Individuals who score high on this scale should be motivated to seek out excitement and stimulation, and quick to act in response to opportunities that come their way. Fun-loving and carefree, they should be able to generate excitement and enthusiasm in others. They might, however, be prone to become bored quickly if there is not enough activity to maintain their interest and attention.
Expedient - Conscientious	Individuals who score low on this scale are spontaneous, expedient and may have difficulty adhering to strict procedures. Tending to solve problems as they arise rather than follow a detailed plan of action, they are likely to work the most productively with others who can “dot the i's and cross the t's” on their behalf. High scorers are very conscientious and meticulous individuals who are likely to take their work obligations seriously and set high standards for themselves and others. In striving for perfectionism, however, their work output may sometimes appear low.
Hard-headed - Tender-minded	Low scorers are rarely moved by feelings of beauty, wonderment or awe – adapting rather a tough-minded, no-nonsense approach to life. They are likely to enjoy working with their hands and fixing things, participating in, and watching, sports and other physical activities. Others may see them as lacking refinement, culture or sophistication. Individuals who score high on this scale often respond to situations and events at an intuitive, emotional level. Unlikely to approach problems in a particularly task-focused way, they will generally have little interest in working with their hands, or in fixing or repairing things.
Sentimental - Rational	For individuals who score low on this scale, sentimentality and subjectivity will be paramount and they will place very little value on ‘cold’, objective analysis. They will not be influenced by the logical, analytic arguments of other people if these are not in accord with their more subjective view of a situation. When dealing with other people, they will be very concerned to know in what ways other people might be affected as a consequence of a particular proposal or course of action which has been suggested. For individuals who score high on this scale, logic and analysis are pre-eminent and they will try to avoid subjectivity wherever possible. They will analyse almost all situations in a highly logical manner and will disregard any of their feelings and intuitions which are not consistent with their logical analysis of the facts of a situation. Furthermore, they will also tend to ignore such subjective processes in other people and will prefer to deal with people in terms of what they consider to be fair and just.
Concrete / sensing - Abstract / intuitive	Low scorers are down-to-earth, practical individuals who are more likely to concentrate on ensuring that things work rather than explore how they work. Colleagues are likely to see them as

	sensible pragmatists, yet on the downside, they may run the risk of sometimes coming across as being too literal in their thinking. Individuals who score high on this scale are creative and imaginative. They should have a strong interest in abstract ideas and look beyond the obvious when problem-solving. While effective at brainstorming, they may need the input of more practically-minded colleagues to translate their creative ideas into reality.
Conventional - Radical	With a highly conventional outlook on life, individuals who score low on this scale are likely to value tried and tested ways of working and avoid change simply for change's sake. They are more likely than most to question the benefits of innovation or new ways of working and may feel uncomfortable in rapidly changing environments that demand adjustment. Individuals who score high on this scale value progress innovation and change. They have a strong dislike for what they see as bureaucratic process and may be ideally suited to working in a role that provides the latitude to work through issues in their own way. Likely to favour new, radical approaches, they may frustrate others by being overly quick to reject existing systems and processes.
Informal - Self-disciplined	Low scorers have a 'take me as I am' attitude and are likely to be very free-thinking, open-minded individuals. In line with this, they should be prepared to stand up for their views and believe that respect has to be earned, rather than simply given as a consequence of one's position or rank. High scorers are concerned about maintaining their social standing and reputation. As such, they are likely to place considerable value on self-control and self-discipline and take care not to do or say anything that would seem inappropriate. They are likely to have a well-defined set of Moral Values yet may at times come across as being inflexible in their approach.
Short-term focus - Long-term focus	Combined with resilience and energy and drive, the scales are strong predictors of the Duckworth and Peterson Grit scale. Low scorers are strongly focused on the 'here and now' and consider fulfilling immediate obligations more important than long-term fulfilment. Individuals who score high on this scale are strongly focused on the future, where they are willing to delay short-term success and gratification in order to prepare for the future.
Lacking energy and drive - Energetic	Combined with long-term focus and energy and drive, the scales are strong predictors of the Duckworth and Peterson Grit scale. Individuals who score low on this scale do not have much personal drive and energy. Considerably less enthusiastic about work than most, they are likely to lack the stamina to meet work demands.

	Having high levels of drive and activity, individuals who score high on this scale are likely to have sufficient energy and stamina to meet the most demanding work schedules.
Emotionally unstable - Emotionally stable	Likely to have a strong emotional side to their nature, individuals who score low on this scale may be prone to mood swings. When faced with prolonged pressure and/or setbacks, it may be difficult for them to mask their feelings, and not let their upset, frustration, or anxiety show. High scorers should be stable, emotionally strong individuals. With sufficient energy to cope with life's challenges, they should be able to take things in their stride and face emotionally demanding situations without showing undue angst. Typically, people with this profile will be a calming influence on others.
Self-doubting - Confident	Individuals who score low on this scale are more apprehensive than most and may not always give themselves credit for their achievements. Likely to be their own worst critics, they may feel considerable self-doubt if required to face new, unexpected challenges and find themselves dwelling on imagined failures and past mistakes. For some people, this insecurity can also act as a positive force, and spur them onto higher levels of self-improvement and growth. High scorers are highly confident, self-assured individual who should expect success more than failure when it comes to dealing with life's challenges. Secure and convinced of their abilities, they are unlikely to worry about facing potential challenges or difficulties yet may lack insight into any personal shortcomings.
Resigned - Resilient	Combined with long-term focus and energy and drive, the scales are strong predictors of the Duckworth and Peterson Grit scale. Individuals who score low on this scale are less resilient than most. As a result, they may see some tasks or challenges as being beyond their ability and may not be motivated to persevere in the face of challenges. Having a strong belief in their ability to face difficulties, individuals who score high on this scale are likely to be quite resilient and strive to overcome setbacks and challenges.
Impatient/Restless - Patient	Presenting themselves as very impatient, hard-driving and eager to get things done, low scorers may believe that the only way to ensure something is done properly is to do it themselves. Scoring in this range, they may struggle to switch off from work and relax. Individuals who score high on this scale are unlikely to become impatient when trying to get things done. They should find it easy to relax and unwind after a demanding day yet may come across as being too laid-back.
Irritable - Calm	More composed than the average person, individuals who score low

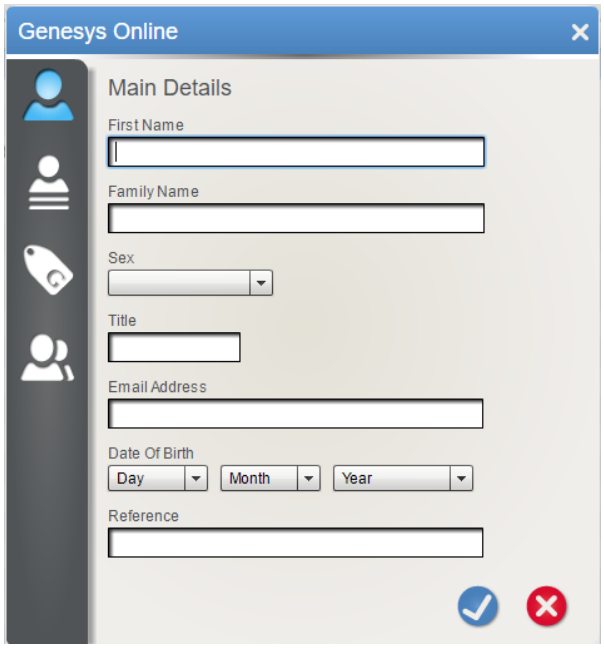
	on this scale are unlikely to become short-tempered or irritable when things go wrong. Presenting themselves as a tense and temperamental, individuals who score high on this scale may have little tolerance for petty inconveniences. Scoring in this range, they are more likely than most people to become annoyed or irritable when things go wrong.
Low Need for Altruism - High Need for Altruism	Individuals who score low on this scale rate altruism as being of very low importance. This would indicate that they may be somewhat unsympathetic towards those who are less fortunate than themselves and believe that people are better served if they take responsibility for their own lives rather than rely on others for support. Individuals who score high on this scale rate altruism as being of very high importance. As such, they consider it very important to be helpful and considerate to those in need and wherever possible will attempt to alleviate their suffering.
Low Need for Affection - High Need for Affection	Low scorers have no particular wish to get too close to people. Having no particular desire for others to show sympathy or concern towards them they will be unlikely to display these sentiments towards others. High scorers have a tendency to want to get close to people, liking others to show warmth and affection. With a need to be able to share feelings and emotions with sympathetic others high scorers will tend to fairly empathic.
Low Need for Affiliation – High Need for Affiliation	Low scorers tend to be much more self-sufficient with little need for the companionship of others. Tending to prefer solitary pursuits they will be comfortable with their own company. Those people scoring highly on need for affiliation require a great deal of contact with other people. High scorers will go out of their way to meet people, feeling at their most comfortable when engaged in activities involving other people. With a need for the companionship of other people, friends and associates play a very important role in their life.
Low Need for Achievement – High Need for Achievement	Individuals who score low on this scale place very low emphasis on achieving difficult and challenging tasks and see very little reason to set themselves demanding standards of work achievement. Given the choice, they will prefer to set their sights at a realistic, attainable level. High-scorers rate high achievement as being of overriding importance. In line with this, they will want to excel in everything they do. People with this profile routinely set themselves difficult targets, finding great satisfaction from succeeding in the most difficult tasks.
Low Need for	Placing a very low value on economic status and wealth, individuals

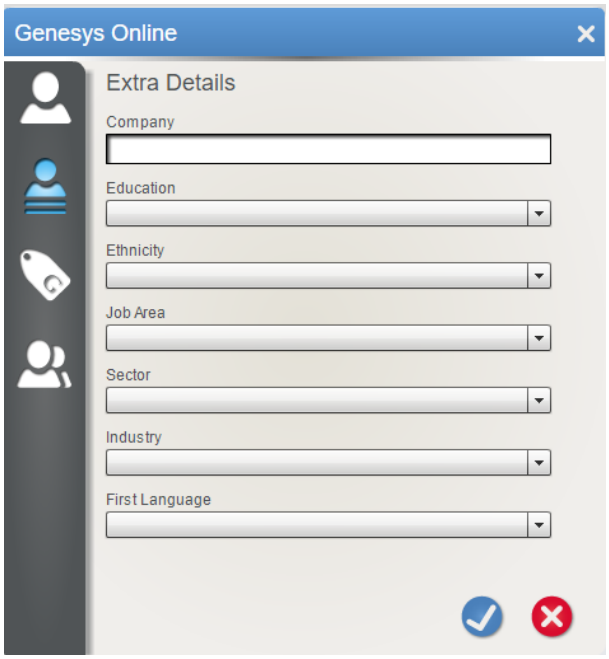
Economic Status – High Need for Economic Status	who score low on this scale will see very little point in pursuing further financial gain once they have achieved a comfortable lifestyle. Not in the least materialistic, they will be unimpressed by the sheer accumulation of wealth. Individuals who score high on this scale place a high value on economic status and wealth and are very likely to be impressed by and aspire to the accumulation of wealth.
Low Need for Safety – High Need for Safety	Low scorers express limited concern for safety and security and are risk-takers who are driven to experience life in all its variety. They express a very strong need for stimulation and excitement. Individuals who score high on this scale express a very strong need for safety and security and may be very concerned about steering clear of situations in which there is an element of risk or danger. The thought of confronting danger or engaging in hazardous pursuits is likely to be uncomfortable for them.
Low Need for Competition – High Need for Competition	Not at all motivated by competition, individuals who score low on this scale are unlikely to be happy working in competitive environments. Individuals who score high on this scale are motivated by competition and a desire to win at any cost. As a result, they are likely to enjoy working in highly competitive environments.
Low Need for Aesthetics – High Need for Aesthetics	Individuals who score low on this scale have very little interest in artistic or cultural pursuits and will much prefer to deal with concrete issues. They will have little time for 'airy-fairy' abstract notions outside their usual realm of experience. Individuals who score high on this scale express a very strong appreciation for aesthetics and cultural activities such as art, music and literature and have the view that they are worth following for their own sake. Often people with this profile enjoy discussing issues which appear to have little bearing on everyday life.
Low Work Ethic – High Work Ethic	The work ethic of individuals who score low on this scale is likely to be significantly weaker than that of most other people. As a result, they are unlikely to fit into working environments that have a long-hours culture. Moreover, they are likely to prefer settings where there is not an excessive amount of work to do and where they are not kept too busy. High scorers have a very strong work ethic. They are likely to believe work is quite important and, as a consequence, they would be expected to be much more committed to work than most other people. As a result, they are likely to fit quite well in working environments that have a long-hours culture. They are likely to prefer settings where there is a lot to do and where they are kept very busy.
Low Moral Values	Low scorers on Moral Values do not particularly believe in a

– High Moral Values	fundamental set of principles which dictate the way one should live one's life. With no rigid moral code to guide them, they will be more inclined to view their own, and others, behaviour in the light of the circumstances at the time. For high-scorers truthfulness and personal integrity are of the highest importance in living one's life. Having a belief in basic principles of right and wrong, they tend to measure their own, and others, actions in terms of these fundamental principles. Thus, high scorers would conduct their affairs in line with a strict code of Moral Values and expect those around them to do the same.
Low Traditional Values - High Traditional Values	Low scorers, on the other hand, will be more inclined to challenge existing traditional way of doing things, believing that changes to existing laws and rules are not only possible, but desirable. Believing that one should follow the spirit, rather than the letter, of the law such people will show little hesitation in breaking an existing rule if they think the rule unjust. High scorers on traditional values tend to believe that rules and laws are meant to be obeyed and not broken. They will be inclined to believe that the status quo is to be maintained and be firm defenders of all that is traditional.
Low Independence – High Independence	Low scorers are not particularly concerned with putting their own views across, being fairly content to let others have their way. Tending to believe that those in authority are just doing their job they will generally accept the rulings of such people quite happily. High scorers on independence will believe in standing up for their own views regardless of what others might think. Individualists, they will be very suspicious of others. Being totally committed to their own viewpoint they will treat the views of others with some suspicion, being on their guard against attempts to persuade them to adopt a different position.

Appendix B – PVQ Questionnaire Sample and Biographical Information

Below are screenshots of the biographical information requested when a respondent completes an assessment on the GeneSys online platform. The only compulsory information required is name, surname and gender (which has a ‘not specified’ option).





Appendix C – Participant Information Sheet

Psychology

School of Human & Community Development

University of the Witwatersrand

Private Bag 3, Wits, 2050

Tel: 011 717 4503

Dear Sir / Madam

Good day! I am currently completing my postgraduate degrees at the University of the Witwatersrand. My research focuses on exploring personality and values, and the dimensions associated with them. The assessment is called the PVQ, which stands for Personality and Values Questionnaire. As the name suggests, the assessment focuses on personality and values. These are things that make you, you. There are many ways to look at personality, and we are going to look at it in terms of four elements: Interpersonal Style, Thinking Style, Coping Style, and Motivators and Drivers.

Interpersonal Style – how you interact with other people

Thinking Style – how you work

Coping Style – how you will manage in a tough situation

Motivators and Drivers – your interpersonal, professional and personal values

Part of this research requests your responses on the questionnaire that I will send to you. It

should take you approximately 25 - 30 minutes on average to complete, however, you can take as long as you like. A secure, strong internet connection and computer are required for the assessment. Please be sure to complete the assessment yourself, on your own.

I understand that this is a substantial investment of your time. However, your response is valuable as it will contribute towards a broader study on the understanding of personality and values in assessment in a South African context and will impact on research nationally and internationally. I would therefore like to invite you to participate in this research.

In order to provide feedback of your results, your name and email address is needed. Should not want to put your identifying information, for any reason, please feel free to fill the name and surname blocks with ‘Anon’. please note that by doing this I am unable to provide you with feedback. Please be assured that if you do fill in your name and surname, they will not be linked to your data.

Before I receive the data, all identifying information will be removed so I will not know whose responses are present. I am using the other biographical information to do comparisons for bias and fairness. Psytech SA may use the data at a later stage for norming, should the instrument become commercially available. This will not breach your confidentiality. Your responses will remain confidential throughout the process. There are no risks associated with participating in this research. The benefit is getting feedback and learning about yourself.

Feedback will be given on an international norm. An international norm consists of people all around the world. Usually, in South Africa, we only include people for South Africa in our norms. However, as this is a pilot study, we have no South African norms. A norm is a pattern or trait taken to be typical in the behaviour of a social group that is used as a basis for comparison. This allows for meaningful feedback to be given to respondents.

Completing the Google Form indicates that you give consent for me to use your data for

research purposes. This means that your responses will be used for analyses and may be used by Psytech SA in the future for creating norms. This will not breach your confidentiality in any way. Any identifying information is removed prior to me receiving the data, and identifying information is not used in norming. Should you choose not to participate, this will not be held against you in any way. If you have any further questions or require feedback on the progress of the research, please feel free to contact me on the details provided below.

Thank you for considering taking part in the research project. Please keep this sheet for future reference.

Ms. C. Clack (Researcher)

crystal@psytech.co.za

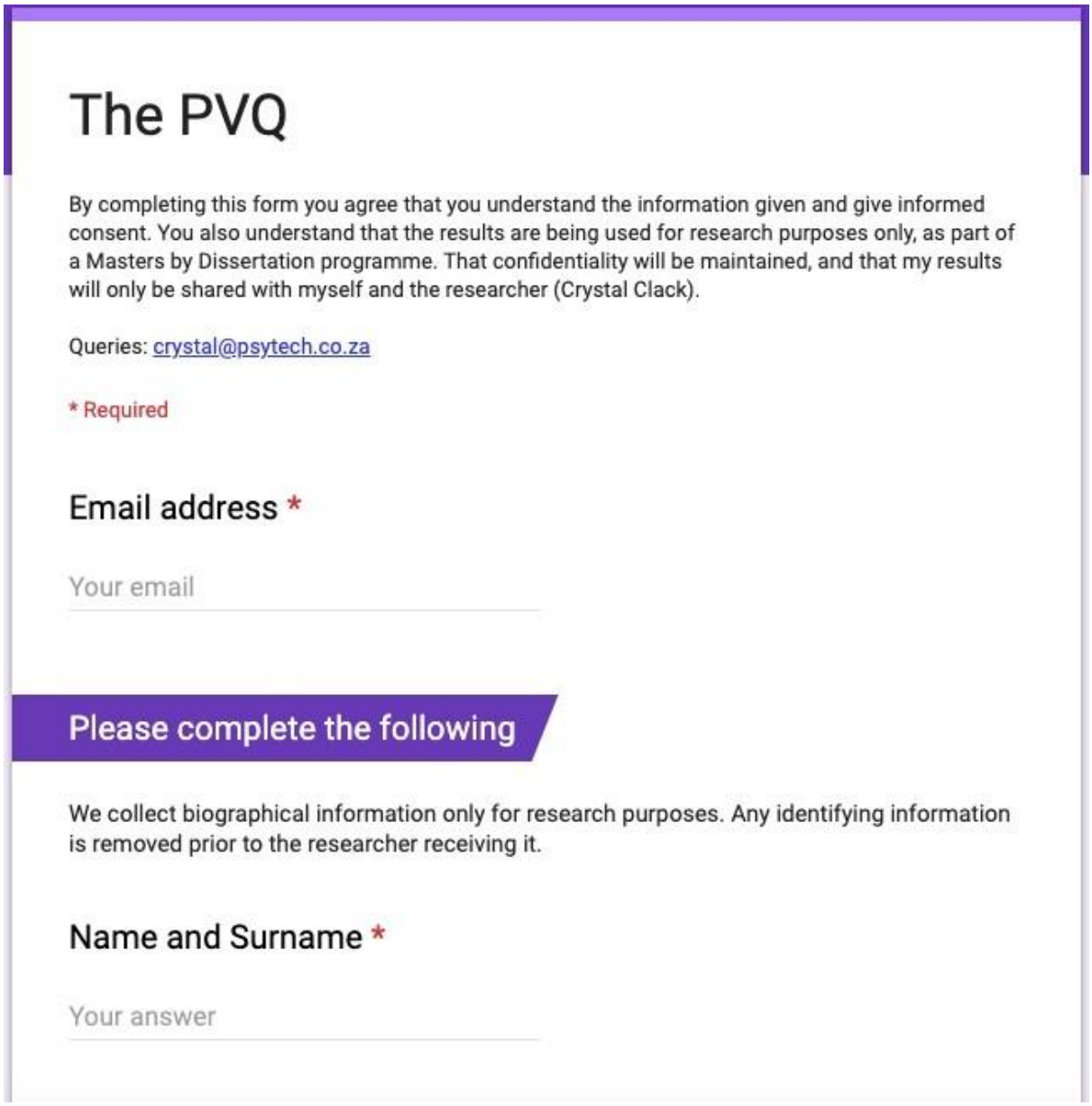
Prof. S. Laher (Supervisor)

Sumaya.laher@wits.ac.za

Shaun Schoeman (Wits ethics committee)

Shaun.schoeman@wits.ac.za

Appendix D – Google Form



The PVQ

By completing this form you agree that you understand the information given and give informed consent. You also understand that the results are being used for research purposes only, as part of a Masters by Dissertation programme. That confidentiality will be maintained, and that my results will only be shared with myself and the researcher (Crystal Clack).

Queries: crystal@psytech.co.za

* Required

Email address *

Your email

Please complete the following

We collect biographical information only for research purposes. Any identifying information is removed prior to the researcher receiving it.

Name and Surname *

Your answer

Consent

By completing this form I consent to understanding that Ms Crystal Clack will be emailing an assessment to me that needs to be completed. I know that the assessment will take approximately 30 minutes to complete and is voluntary. I know I will be completing a personality and values questionnaire, and that there is nothing to prepare. I understand that the biographical information is important and needs to be completed, and that I will receive feedback.

*

☐ I have read and understood the conditions for participation in Ms Clack's project and hereby grant consent for my responses to be used in her study.

A copy of your responses will be emailed to the address you provided.

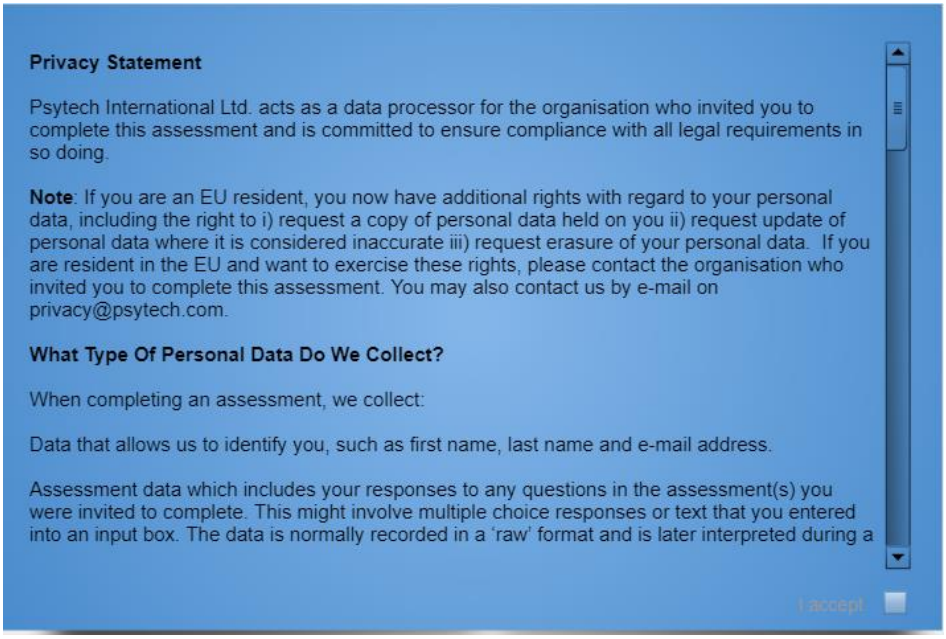
SUBMIT

Page 1 of 1

Never submit passwords through Google Forms.

Appendix E – Online Consent





reporting process requested by the organisation inviting you.

Biographical data, such as gender, age, ethnicity and qualification level. Submitting such data is optional and does not form part of the assessment. It is used purely for research purposes and enables us to ensure that our assessments are fair and of a high quality. This is considered best practice. When we use this data for research purposes, it is anonymized and aggregated.

How We Use Your Personal Data

Your information will be passed to the Psytech secure servers where it will be processed. The processing will involve scoring the responses on a number of measurable characteristics of relevance to the organisation who arranged the assessment. The results will then be referenced against either a representative sample of a relevant population group or standard established by that organisation. Psytech will present this information to the organisation in either graphic or narrative format or both to enable its fair and accurate interpretation by the organisation who will advise you as to their policies in this respect.

How We Protect Your Personal Data

We take the protection of personal data very seriously. All interaction with our system is done through an encrypted HTTPS channel and data is always password protected. Our databases are hosted with Microsoft Azure which has a reputation for excellence with regard to security and

I accept

robustness.

Data Transfers

Your data is held on secure servers within the EU and is never transferred outside of the EU.

Who Do We Share Your Personal Data With?

We process the data on behalf of the organisation which invited you to complete the assessment. This organisation will have access to your data through a password protected login. We do not share the data with any other third party and we do not host any form of advertising for third parties.

How Long Will We Keep Your Data?

Whenever your data is collected or processed, it will only be kept as long as required for the purposes for which it was collected. When data is no longer needed, it will be anonymized and stored in an aggregated form. There will be no way to identify you from data held in this anonymized format.

In order to proceed with the questionnaire, **please confirm** your understanding and acceptance of the above, by clicking 'I accept'.

I accept

Appendix F – Subset of the PVQ items

Below is a subset of the items is provided. The entire questionnaire could not be provided due to copyright.

1	I would enjoy being a counsellor or psychologist; helping people to sort out their personal problems.
2	I find myself worrying about what the future may hold.
3	I can think of occasions when I have done things that I really shouldn't have done.
4	I achieve a great sense of satisfaction from work.
5	I'm happy to let other people take charge.
6	Financial help should be given only to the most deserving cases.
7	I dislike making decisions for other people
8	Money is an important source of motivation for me.
9	I usually double-check things; just to make sure.
10	People find it easy to open up to me.

Appendix G – Ethics Certificate

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

Research Office

HUMAN RESEARCH ETHICS COMMITTEE (NON-MEDICAL)
R14/49 Clack

CLEARANCE CERTIFICATE	**PROTOCOL NUMBER: H19/11/06**
PROJECT TITLE	A study of the Personality and Values Questionnaire's psychometric properties within the South African context
INVESTIGATOR(S)	Miss C Clack
SCHOOL/DEPARTMENT	Psychology/
DATE CONSIDERED	15 November 2019
DECISION OF THE COMMITTEE	Approved Risk Level: Low
EXPIRY DATE	11 May 2023
DATE 12 May 2020	**CHAIRPERSON** (Professor J Watermeyer)

cc: Supervisor : Professor S Laher

DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and **A SIGNED COPY** returned to the Secretary electronically. Unreported changes to the application may invalidate the clearance given by the HREC (Non-Medical)

I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure be contemplated from the research procedure as approved I/we undertake to submit an amendment of the protocol to the Committee. **I/we agree to completion of a regular progress report. For Minimal and Low Risk studies, this is due annually on 31 December. For Medium and High Risk studies, this is due twice annually on 30 June and 31 December.**

Signature

16 / 02 / 2024
Date

PLEASE QUOTE THE PROTOCOL NUMBER ON ALL ENQUIRIES

Appendix H – Alternative factor rotations for all PVQ scales

Factor Loadings Table for All scales 6-factor rotation

Variable	Factor Loadings Table for All scales 6-factor rotation					
	Factor (1)	Factor (2)	Factor (3)	Factor (4)	Factor (5)	Factor (6)
Empathy	0.20	-0.24	0.22	0.45	0.29	0.35
Intellectance	0.72	-0.02	-0.15	0.02	0.04	0.07
Emotional Stability	0.20	0.45	-0.06	-0.12	0.31	0.58
Assertiveness	0.57	0.01	-0.13	-0.29	0.36	-0.29
Enthusiasm	0.33	-0.08	0.02	0.17	0.67	0.14
Conscientiousness	0.30	-0.04	0.47	0.12	-0.16	0.31
Social-boldness	0.28	0.08	-0.01	-0.10	0.81	0.23
Need for Affiliation	0.12	0.11	0.00	0.04	0.89	0.17
Trust	0.04	0.74	-0.15	0.22	0.16	0.20
Independence	0.10	-0.73	0.18	-0.23	-0.43	-0.19
Abstract Thinking	0.51	-0.21	-0.33	0.40	0.05	-0.01
Diplomacy	-0.13	0.16	0.13	0.30	0.00	0.70
Confidence	0.33	0.38	-0.15	-0.41	0.34	0.34
Radical Thinking	0.37	0.11	-0.69	0.08	0.13	-0.20
Traditional Values	-0.29	-0.16	0.75	-0.04	-0.06	0.20
Group-orientation	-0.19	0.34	-0.10	0.15	0.74	-0.01

Self-discipline	0.11	-0.20	0.84	0.00	0.06	-0.08
Moral Values	0.16	-0.11	0.81	0.04	0.05	-0.11
Composure	0.10	0.09	0.01	-0.09	0.17	0.71
Need for Achievement	0.34	-0.38	0.17	0.24	0.24	0.28
Need for Aesthetics	0.35	0.13	-0.18	0.63	-0.02	0.22
Tender-mindedness	0.12	0.22	-0.13	0.86	-0.02	-0.06
Need for Altruism	0.10	0.29	0.10	0.44	0.00	0.17
Need for Competition	0.06	-0.82	0.18	-0.20	-0.06	-0.08
Patience	-0.32	0.56	-0.24	-0.04	0.15	0.23
Energy and Drive	0.51	0.25	-0.02	0.02	0.40	0.42
Need for Economic Status	-0.15	-0.67	-0.02	0.02	0.20	0.17
Long-term Orientation	0.42	-0.05	0.13	0.06	0.22	0.61
Objective Thinking	0.21	-0.21	0.01	-0.70	0.01	0.36
Persuasiveness	0.54	-0.14	-0.04	-0.03	0.52	0.05
Resilience	0.61	0.06	0.11	0.03	0.16	0.35
Need for Safety	-0.36	0.10	0.30	0.23	-0.34	0.19
Work Ethic	0.62	0.02	0.19	0.16	0.06	0.11
Need for Affection	-0.09	-0.13	0.22	0.55	0.28	0.11
Expl.Var	3.97	3.68	3.32	3.22	4.00	3.14
Prp.Totl	0.12	0.11	0.10	0.09	0.12	0.09

Factor Loadings Table for All scales 4-factor rotation

Factor Loadings Table for All scales 6-factor rotation				
Variable	Factor (1)	Factor (2)	Factor (3)	Factor (4)
Empathy	0.456513	-0.073037	0.354054	0.400058
Intellectance	0.547704	-0.149993	-0.285112	0.151038
Emotional Stability	0.494474	0.609328	0.109291	-0.109750
Assertiveness	0.513616	-0.147304	-0.447668	-0.203079
Enthusiasm	0.687938	0.078936	-0.012322	0.140086
Conscientiousness	0.245040	-0.145848	0.473603	0.162343
Social-boldness	0.764511	0.284935	-0.020436	-0.137050
Need for Affiliation	0.668495	0.363353	0.012123	-0.040726
Trust	0.109435	0.752216	-0.088853	0.242359
Independence	-0.174807	-0.859809	0.082064	-0.202421
Abstract Thinking	0.375424	-0.216456	-0.356044	0.483021
Diplomacy	0.138476	0.399666	0.500528	0.243338
Confidence	0.533390	0.440708	-0.139904	-0.358603
Radical Thinking	0.215519	0.094274	-0.772166	0.173150
Traditional Values	-0.114086	-0.153535	0.803776	-0.138327
Group-orientation	0.263931	0.560703	-0.077144	0.053544
Self-discipline	0.145553	-0.385629	0.635068	-0.026491
Moral Values	0.145134	-0.331722	0.582682	0.026264
Composure	0.427407	0.334578	0.299456	-0.114924

Need for Achievement	0.517387	-0.269297	0.223751	0.227116
Need for Aesthetics	0.263272	0.141020	-0.079327	0.690141
Tender-mindedness	-0.014304	0.180084	-0.097903	0.884307
Need for Altruism	0.091992	0.266475	0.161385	0.454466
Need for Competition	0.075719	-0.783796	0.140134	-0.224003
Patience	-0.114994	0.724113	-0.060744	-0.082208
Energy and Drive	0.718589	0.319372	0.011611	0.071159
Need for Economic Status	0.145002	-0.384647	0.159806	-0.073372
Long-term Orientation	0.660980	0.086454	0.279419	0.076058
Objective Thinking	0.333527	-0.135514	0.070542	-0.668195
Persuasiveness	0.728778	-0.096596	-0.173522	0.004714
Resilience	0.650648	0.020782	0.075600	0.114768
Need for Safety	-0.388529	0.101471	0.470240	0.176617
Work Ethic	0.508188	-0.143796	0.049857	0.257983
Need for Affection	0.149959	0.010705	0.314831	0.461627
Expl.Var	6.258876	4.736141	3.718851	3.250087
Prp.Totl	0.184085	0.139298	0.109378	0.095591

Factor Loadings Tables for all scales of the PVQ - Oblimin rotation

Scales	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Need for Competition	0.772				
Independence	0.762				
Trust	-0.709				
Patience	-0.662				
Emotional Stability	-0.561	0.476			
Diplomacy	-0.411			0.408	
Need for Economic Status					
Long-term Orientation		0.667			
Resilience		0.639			
Energy and Drive		0.583			
Intellectance		0.524			
Work Ethic		0.488			
Composure		0.463			
Conscientiousness		0.446			
Need for Achievement					
Need for Affiliation			0.945		
Social-boldness			0.79		
Group-orientation			0.715		
Enthusiasm			0.624		
Persuasiveness			0.481		

Traditional Values				0.811	
Radical Thinking				-0.781	
Self-discipline				0.574	
Moral Values				0.507	
Assertiveness				-0.446	
Need for Safety				0.436	
Tender-mindedness					0.903
Objective Thinking					-0.683
Need for Aesthetics					0.58
Need for Affection					0.417
Confidence					-0.407
Abstract Thinking					
Empathy					
Need for Altruism					

Appendix I – Alternative factor rotations for the PVQ personality scales

Factor Loadings table for PVQ personality scales - 4-factor rotation - varimax

Factor Loadings table for PVQ personality scales - 4-factor rotation - varimax				
Variable	Factor (1)	Factor (2)	Factor (3)	Factor (4)
Empathy	0.340715	0.023182	0.621788	-0.313850
Social-boldness	0.611897	0.451245	0.119627	0.142476
Group-orientation	0.156553	0.549832	-0.158722	-0.176676
Intellectance	0.675823	-0.017304	0.015029	0.000419
Assertiveness	0.684639	-0.062913	-0.298836	0.237942
Diplomacy	-0.188307	0.473505	0.577112	-0.176170
Trust	0.025264	0.688968	-0.087407	-0.251267
Enthusiasm	0.625979	0.232941	0.223329	-0.123652
Conscientiousness	0.088616	-0.109453	0.645117	0.025843
Tender-mindedness	0.090230	0.138386	0.055733	-0.882678
Objective Thinking	0.186277	0.000664	0.119049	0.844815
Abstract Thinking	0.590870	-0.125032	-0.042260	-0.408141
Radical Thinking	0.451652	0.148022	-0.534579	-0.212029
Self-discipline	-0.021649	-0.322361	0.562301	0.139505
Energy and Drive	0.558277	0.527824	0.252968	0.027341
Emotional Stability	0.235639	0.776224	0.165051	0.175015
Confidence	0.408071	0.587089	-0.042037	0.390030
Resilience	0.524677	0.214596	0.366671	0.042222

Patience	-0.248297	0.704193	-0.224668	-0.047540
Composure	0.132937	0.507356	0.414135	0.239233
Persuasiveness	0.779419	0.037532	0.083658	0.095214
Long-term Orientation	0.443697	0.290788	0.556575	0.102202
Expl.Var	4.165398	3.547581	2.709632	2.304878
Prp.Totl	0.189336	0.161254	0.123165	0.104767

Factor Loadings table – PVQ Personality scales - 6 factor rotation – varimax

Factor Loadings Table - Personality Scales - 6-factor rotation						
Variable	Factor (1)	Factor (2)	Factor (3)	Factor (4)	Factor (5)	Factor (6)
Empathy	0.308692	-0.270567	0.147428	-0.22396	0.456196	0.495113
Social-boldness	0.104671	0.241587	0.095927	0.165225	0.817911	0.034990
Group-orientation	-0.277244	0.378173	-0.195689	-0.210584	0.634198	0.027383
Intellectance	0.255967	0.034191	0.736020	0.143704	0.140469	-0.044777
Assertiveness	0.160428	0.055781	0.278607	0.186728	0.437811	-0.64918
Diplomacy	0.236914	0.252938	-0.08218	-0.09805	0.008343	0.750682
Trust	0.085756	0.727545	0.043672	-0.26426	0.069378	0.080672
Enthusiasm	0.167423	0.008615	0.143451	-0.09773	0.796202	0.054764
Conscientiousness	0.772830	-0.13664	-0.14372	-0.05654	-	0.065457

					0.015444	
Tender-mindedness	0.088637	0.133670	0.228445	-0.85814	0.046727	0.125682
Objective Thinking	0.124823	-0.03028	0.070315	0.897133	0.044746	0.037282
Abstract Thinking	0.014631	-0.13277	0.776461	-0.22769	0.161212	0.078986
Radical Thinking	-0.29762	0.277721	0.664373	-0.08430	0.085753	-0.20902
Self-discipline	0.376767	-0.47621	-0.27899	0.089516	0.118620	0.159432
Energy and Drive	0.463548	0.453139	0.229926	0.042818	0.476219	0.053074
Emotional Stability	0.287761	0.708931	0.037454	0.184517	0.296274	0.195224
Confidence	0.162482	0.566664	0.151433	0.408933	0.367728	-0.04199
Resilience	0.574683	0.183065	0.348727	0.088344	0.239582	0.081877
Patience	-0.26352	0.697340	-0.13433	-0.04254	-0.01219	0.198334
Composure	0.144908	0.279488	0.095884	0.360164	0.241669	0.603475
Persuasiveness	0.162773	-0.08878	0.395918	0.165181	0.667703	-0.10383
Long-term Orientation	0.587336	0.148011	0.207400	0.155472	0.326110	0.295211
Expl.Var	2.333575	2.887955	2.343546	2.271652	3.299283	1.891259
Prp.Totl	0.106072	0.131271	0.106525	0.103257	0.149967	0.085966

Factor loadings table personality scales – 6-factor rotation - Oblimin rotation

Factor loadings table personality scales - Oblimin rotation						
Variable	Factor (1)	Factor (2)	Factor (3)	Factor (4)	Factor (5)	Factor (6)

Energy and Drive	0.705				-0.582	
Long-term Orientation	0.696					
Resilience	0.624					
Emotional Stability	0.579	0.563			-0.457	
Conscientiousness	0.453					
Patience		0.659				
Trust		0.571				
Self-discipline		-0.481				
Abstract Thinking			-0.706			
Intellectance			-0.662			
Radical Thinking			-0.608			
Objective Thinking				-0.888		
Tender-mindedness				0.821		
Social-boldness	0.428				-0.846	
Enthusiasm	0.412				-0.723	
Persuasiveness			-0.507		-0.613	
Group-orientation		0.404			-0.592	
Confidence	0.451	0.453		-0.404	-0.475	
Diplomacy						0.756

Assertiveness					-0.407	-0.542
Empathy					-0.402	0.473
Composure	0.427					0.471

Appendix J – Alternative factor rotations for the PVQ Values scales

Factor Loadings - Values - 3-factor rotation

Factor Loadings - Values - 3-factor rotation			
Variable	Factor (1)	Factor (2)	Factor (3)
Need for Competition	0.85	0.09	0.12
Independence	0.81	-0.2	0.2
Need for Economic Status	0.55	0.33	0.09
Need for Altruism	-0.57	0.2	0.24
Need for Achievement	0.25	0.78	0.1
Work Ethic	-0.01	0.59	0.01
Need for Affiliation	-0.24	0.58	-0.26
Need for Affection	-0.16	0.51	0.39
Traditional Values	0.2	-0.01	0.73
Need for Safety	-0.21	-0.23	0.69
Moral Values	0.22	0.24	0.61
Need for Aesthetics	-0.4	0.4	-0.06
Expl.Var	2.44	2.04	1.74
Prp.Totl	0.2	0.17	0.14

Factor Loadings - Values - 2-factor rotation

Factor Loading Table for the Values Scales of the PVQ - 2-factor rotation		
Variable	Factor (1)	Factor (2)
Need for Competition	0.82	-0.13
Independence	0.76	-0.38
Need for Economic Status	0.57	0.17
Moral Values	0.51	0.29
Traditional Values	0.51	0.08
Need for Achievement	0.39	0.68
Need for Affection	0.12	0.61
Work Ethic	0.09	0.56
Need for Affiliation	-0.23	0.56
Need for Aesthetics	-0.31	0.48
Need for Safety	0.08	-0.02
Need for Altruism	-0.36	0.40
Expl.Var	2.57	2.13
Prp.Totl	0.21	0.18

Factor loadings table for Values scales - 2-factor rotation - Oblimin

Factor loadings table for Values scales - 2-factor rotation - Oblimin		
Values scales	Factor (1)	Factor (2)
Need for Competition	0.74	-0.42
Need for Achievement	0.58	0.50
Need for Economic Status	0.48	
Moral Values	0.41	
Traditional Values		
Independence	0.63	-0.66
Need for Affiliation		0.48
Need for Aesthetics		0.41
Need for Affection		
Work Ethic		
Need for Altruism		
Need for Safety		