THE IMPACT OF LANGUAGE ON PERSONALITY ASSESSMENT WITH THE BASIC TRAITS INVENTORY

by

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DECLARATION

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I, Sonja Grobler, declare that

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is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

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(Mrs)

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SUMMARY

Personality psychology became an identifiable discipline in the social sciences in the 1930s when Allport (1937) published an article on the psychological interpretation of personality. The field of personality traditionally emphasised the study of the whole person, the dynamics of human motivation and the identification and measurement of individual differences (McAdams, 1997). Since the publication of Allport's article, personality has been extensively researched and several theories exist that attempt to organise and explain the differences in human behaviour.

Personality instruments are based on personality theories and aim to assist psychologists with the prediction of human behaviour. Psychologists use personality instruments as part of a selection battery to assist organisations with the screening and selection of individuals who have the potential to be successful within a specific work environment.

The Basic Traits Inventory (BTI), a personality instrument that is based on the Five-Factor model, was developed in South Africa by Taylor and De Bruin (2006). The BTI is a valid and reliable personality instrument as indicated by results from research by Taylor (2004), Taylor and De Bruin (2006) and Taylor (2008) on its utility within the multicultural and multilingual environment of South Africa. Taylor (2008) nevertheless identified some problematic items when she analysed the construct, item, and response bias of the BTI across cultures for three language groups – Afrikaans, English and indigenous African languages – and consequently indicated the need for further research in this regard.

The current study therefore explores the possible bias of the items of the BTI, and uses a sample large enough to analyse each of the eleven of the official languages of South Africa separately. The study focuses on the impact of the eleven official languages of South Africa on assessment of the Big Five personality factors with the BTI.

The actual sample consisted of 105 342 respondents, resulting in the sub-samples per official language group being larger than 1 000. Each of the eleven official South African

language groups could therefore be analysed separately, which has not been possible in previous studies.

Analysis of the responses of the total sample to the BTI items generally yielded high reliability in terms of Cronbach alpha coefficients (α) and the Person Separation Index (PSI). The results were reported as follows: Extraversion (α=.86; PSI=.85); Neuroticism (α=.89; PSI=.86); Conscientiousness (α=.93; PSI=.88); Openness to experience (α=.90; PSI=.84); Agreeableness (α=.94; PSI=.86); and Social desirability (α=.72; PSI=.70).

MANOVA results indicated statistically significant differences between the mean values of each of the BTI factors for the different language groups. Rasch analysis methods were used to further analyse the differences in terms of item responses for each of the eleven official language groups in South Africa.

Respondents generally interpret and endorse the items of a personality instrument according to their intrinsic personality characteristics and their interpretation of the words used in the items of the personality instrument. In order to assess the respondents' understanding of the administration language, English, two English proficiency tests were administered together with the BTI. The combined English proficiency scores were used to differentiate between respondents who understood English very well (top 25% – high English proficiency group) and those who struggled to understand English terminology (bottom 25% – low English proficiency group).

Rasch analysis techniques were used to analyse the data for the whole sample as well as for the high and low English proficiency groups. Some items showed statistically significant differences for the language groups, indicating item bias in the BTI. Contrary to expectation, a larger number of biased items were indicated for the higher English proficiency group than for the total group or for the low English proficiency group. Due to the number of biased items for the high English proficiency group, it was concluded that the differences between the eleven official language groups may be a result of the differences in the intrinsic personality characteristics of the respondents, rather than

measurement errors or item bias of the BTI instrument. Further research in this regard was recommended.

The current study confirms that home language and English proficiency, as indicators of the level of understanding of the language in which the personality instrument was administered, undeniably influence the individual's response pattern. Far fewer items indicated bias than those identified in Taylor's (2008) study, where a smaller sample was used and language groups were combined. Despite some BTI items showing bias, the conclusion was reached that this personality instrument can be used with confidence to assess personality traits in persons speaking any of the eleven official South African languages.

TABLE OF CONTENT

LIST OF TABLES

LIST OF FIGURES

APPENDICES

CHAPTER 1: INTRODUCTION

1.1 BACKGROUND

Various psychologists such as Allport, Cattell, Rogers, Jung and Maslow were intrigued by the reasons for differences in human behaviour and the identification of such differences (Ewen, 2010). Even though Pervin and John (1997) concluded that all people are similar in some way, behavioural psychologists are more concerned with the way in which people differ and the reasons for these differences. Studies of behavioural differences can be traced as far back as 600 BC (Hogan & Sussner, 2001). Together with the psychologists mentioned above, researchers like Adler, Freud and Sullivan tried to explain and capture by means of theories the complexity of human behaviour and the reasons why people differ, especially in terms of personality. Even though personality theories that explain these differences in human behaviour have become more complex, the basic underlying question remains the same: Why do people act the way they do (Pervin & John, 1997)? Although many theories of personality exist, one theory should not be seen as superior to the rest and an integration of the best qualities from different theories should provide a more integrated logical description of personality as a whole and make human behaviour more understandible (Pervin & John, 1997). Ewen (2010) explained that the understanding and use of constructs from different theories can be useful and that a more flexible approach to personality theories can assist psychologists to unravel the mysteries of human behaviour.

Human behaviour is largely determined by personality characteristics (Pervin & John, 1997), which refer to important, relatively stable and long-lasting aspects that have a strong influence on human behaviour (Ewen, 2010). According to Patel (2006) it is evident from the many theories and personality instruments available that no final agreement has been reached on the identification or measurement of personality characteristics that give rise to differences in human behaviour. Patel (2006) also indicated that each of the personality theories and instruments come with its own set of strengths and weaknesses and that none of them should be classified as being better than another.

Integrating the best qualities of each theory with the personality instrument with the most strengths can assist psychologists in capturing the uniqueness of personality characteristics more accurately (Johnson, 1997).

In an attempt to measure personality characteristics in the work environment, industrial psychologists use inter alia personality instruments to assess personality characteristics and attempt to predict work-related behaviour from these personality characteristics (Ewen, 2010). Career choices and other potentially life-changing decisions (e.g. in respect of selection and/or promotion decisions; career guidance and counselling; therapeutic interventions and/or diagnoses) (Huysamen, 2002; Van der Merwe & Maritz, 2002) are often based on the results of personality instruments. Hence such instruments should provide the respondents with a fair chance to articulate their personality, and the personality instrument should provide an accurate reflection of the respondents' personality profile (Ewen, 2010).

Personality assessment in South Africa is complex as the country has a unique environment in terms of its many different cultures and eleven official languages. Various personality instruments (mostly imported and adapted for local use – referred to as the epic approach) are being used in the local working environment, but surprisingly, the diversity due to eleven official languages is not always kept in mind (Van de Vijver & Rothmann, 2004). The language diversity of South Africa is also not always accommodated in the development or research of psychometric instruments (Van de Vijver & Rothmann, 2004).

From the relevant literature and research findings it is evident that the situation in South Africa is unique and multifaceted (Meiring, 2007). It is far more complicated than merely identifying the most comprehensive personality theory and identifying the most appropriate personality instrument to accurately measure the personality characteristics to predict work behaviour (Meiring, 2007) . Approximately 25 different languages are spoken in South Africa, of which eleven have been granted official status in terms of Section 6 of the Constitution (Government Gazette, 1996) on the grounds that their users constitute about 98% of the total population.

Psychologists in South Africa are therefore faced with the challenge of not only assessing individuals speaking various of the eleven official languages, but also identifying the most appropriate personality instrument. In addition to the validity and reliability research normally done on a personality instrument, the possibility of bias with regard to different language groups also has to be investigated. The language in which a psychometric instrument is administered has a definite impact on the understanding by the respondent of what the item means and consequently on the respondents' answers, especially when the instrument has to be completed in a language that is not the individual's home language (Meiring, 2007).

For the purpose of the current study, a distinction was made between two broad categories of personality instruments, namely a general category (16PF, 16PF (SA92), 16PF5, 15FQ, 15FQ+ and SAPQ) and a category for personality instruments based on the Big Five theory and Five-Factor Model (FFM) (Comrey, NEO PI-R, BTI). The NEO PI-R will be discussed extensively as an instrument developed and used internationally, as it was the basis for the development of the BTI, which will be discussed as an instrument developed and used locally. Both these personality instruments are based on the Big Five and FFM theory.

The Basic Traits Inventory (BTI) (Taylor & De Bruin, 2006) that was used in the current study was developed in an attempt to increase the availability of locally developed and validated personality instruments. The current study also included language proficiency tests to identify the respondents' understanding of the assessment language, which was English. The current study endeavoured to promote insight into and identify the impact that home language and English language proficiency have on the assessment of personality with the BTI for all eleven official language groups of South Africa.

1.2 PROBLEM STATEMENT

The Neo-Personality Inventory Revised (NEO PI-R) (Costa & McCrae, 1992b) measures the Big Five personality factors, namely Extraversion (E), Neuroticism (N), Conscientiousness (C), Openness to experience (O) and Agreeableness (A). McCrae and Costa (1985a, 1985b, 1985c) generated a vast amount of research in respect of the Five-Factor Model (FFM)

and in the early 1980s began to develop the NEO Personality Inventory (Costa & McCrae, 1985a) based on factor analyses of the 16PF (Cattell, Eber & Tatsuoka; 1970). After revision in 1992, the NEO PI (Costa & McCrae, 1985, 1992b) became the NEO PI-R (Costa & McCrae, 1992b) and was designed specifically to measure personality in terms of the FFM. The FFM has been shown to be an applicable theory for multicultural and multilingual personality assessment (Heuchert, 1998; Heuchert, Parker, Stumpf & Myburgh, 2000) and results have been supportive of the five factors in personality measurement. The family of NEO instruments — including the 60-item NEO Five-Factor Inventory (McCrae & Costa, 2004) – appear to be the most widely used instruments internationally and have been the focus of extensive research in recent years (Boyle, 2008).

The FFM allows the domain of personality to be represented broadly and systematically (Briggs, 1992; Digman, 1990), and therefore it provides a useful structure for measurement of personality even in a multicultural and multilingual environment like South Africa (McCrae & Costa, 2004).

Internationally and locally, psychometric test development and specifically the development of personality instruments should be based on a theory (Taylor, 2004). In a multicultural and multilingual context like South Africa, evidence first needs to be gathered to determine whether the theory is appropriate and relevant for the different language groups (Taylor, 2004).

Given the limited theory-building research available in South Africa, personality researchers had to conduct their own studies to investigate whether the particular theory can be substantiated, or whether it first would need modification (Foxcroft, 2004). The disappointing results from research conducted on the suitability of personality instruments in the South African context (16PF, 15FQ+) (Abrahams, 1996; Van Eeden, Taylor & Du Toit, 1996; Wallis & Birt, 2003) highlighted the challenges in terms of compliance with the relevant legislation of South Africa (Meiring, Van de Vijver & Rothmann, 2006).

In the South African context, unsatisfactory results were reported on the construct comparability of the NEO PI-R across culture groups, namely lower reliability coefficients for

samples from the black population (Taylor, 2000). Even though the FFM structure did not emerge for the black sample, Taylor (2000) proposed that it could be due to the instrument's difficult wording, rather than to the lack of transferability of the Big Five factors of personality in South Africa. This confirms the relevance of checking English proficiency in the current study.

Theron (2007) highlighted that psychologists can avoid measurement bias through the careful selection of instruments but unfair discrimination cannot be avoided only through the use of reliable, valid and unbiased instruments. The effect of group membership methodically also impacts on the parameters measured in personality instruments and therefore all variables should be considered and negative impacts limited to ensure fair discrimination (Theron, 2007).

The need for an instrument that would be tailored to the unique South African context led to the development of the BTI (Taylor & De Bruin, 2006). Taylor (2004) confirmed the FFM as a suitable model for South Africa, and Taylor and De Bruin (2006) therefore based their development of the Basic Traits Inventory (BTI) on the FFM personality theory. The Inventory was developed to address the specific and unique features of the South African population and aimed at measuring personality more effectively in the South African context with its many indigenous languages (Taylor & De Bruin, 2006). Taylor and De Bruin (2006) developed and researched the BTI extensively to ensure that the instrument was reliable and valid and to ensure that it could be applied fairly to all South Africans as prescribed by the Employment Equity Act (Government Gazette, 1998). (The relevant South African legislation will be discussed later in this Chapter.)

Previous research on imported instruments (etic approach) indicated problematic and/or inaccurate measurement of personality characteristics for South African samples (Abrahams & Mauer, 1999a, 1999b; Foxcroft, 2004; Moyo & Theron, 2011; Meiring et al., 2006; Taylor, 2000). The apparent inaccurate measurement of personality with imported personality instruments in the multicultural context of South Africa will be discussed in Chapter 2.

Taylor (2004) investigated the construct comparability of the Big Five model and FFM for South African students using the BTI as a locally developed South African personality instrument. In terms of the reliability of the five factors of the BTI, Taylor (2004) reported Cronbach alpha coefficients above .88 for the different sub-dimensions for the total group. The alpha coefficients reported for the race groups were all above .80, for the gender groups above .85 and for the limited available language groups above .83. Satisfactory internal consistency reliabilities were reported as above .8 (Fan, 1998) and therefore the internal consistency reliabilities of the BTI are considered satisfactory, since values above .80 are generally indicated as acceptable (Kaplan & Saccuzzo, 2001).

Taylor (2004) further found that the results of the factor analysis of the BTI demonstrated a satisfactory fit with the theoretical Five-Factor Model for the total group, as well as for the available race groups (black and white), gender groups (male and female) and language groups (English, Afrikaans and indigenous African). The five factors that were extracted in the factor analysis were identifiable as the five factors expected from the FFM theory. The results in terms of the factor congruence indicated a relatively stable five-factor structure for the BTI (Taylor & De Bruin, 2006).

Further research showed that all five factors manifested similarly (shared the same meaning) across the black and white ethnic groups, with Tucker's phi coefficients for the BTI factors ranging between .95 and .98 (Taylor & De Bruin, 2004). Since Tucker's phi is used as the coefficient of agreement or congruence to investigate the factorial agreement between different groups, it was used to investigate the factorial similarity of groups. A value of .95 or above indicates factorial similarity, and values below .90 indicate incongruencies in the factor structures of the two groups that are being compared (Van de Vijver & Leung, 1997).

However, due to the small size of the black group (n=114) and the indigenous African language group (n=73), Taylor (2004) recommended that more research should be done with larger samples in order to verify the structure and the psychometric properties of the BTI. Suggestions for future research included replication of the analyses conducted, but with a larger, more representative sample (Taylor, 2004), which is addressed in the current study.

The emphasis in the development of a personality instrument should be on the validity and applicability of the theory, especially in a multicultural and multilingual environment (De Bruin, Schepers & Taylor, 2005). Comparisons with the 16PF (Fifth Edition) provided statistically significant evidence for the construct validity of the BTI (De Bruin et al., 2005).

Taylor (2008) found that, statistically, the BTI performs well in terms of little or no construct, item and response bias for the sample of students used in her study. Using the Rasch analysis model, Taylor (2008) further investigated the bias in terms of gender (men versus women), ethnicity (black versus white students) and language groups (English, Afrikaans and indigenous African languages). She found good support for the transportability of the Big Five personality constructs in the South African context, as well as support for the use of the BTI across the different subgroups.

Research by Taylor (2008) indicated that the BTI can be used in South Africa as a reliable instrument to measure the Big Five personality factors. She clearly identified a need for a larger and more representative sample, which led to the current study being done with a large sample that includes enough members in each of the eleven official language groups to analyse each language group separately and to compare response patterns across all eleven official language groups.

1.3 PURPOSE AND OBJECTIVES OF THE STUDY

Internationally, psychologists use personality instruments in the work environment to measure personality characteristics and to predict work-related behaviour based on these characteristics (Ewen, 2010). Individuals furthermore make career and other life-changing decisions based on these results and predictions (Huysamen, 2002; Van der Merwe & Maritz, 2002) and therefore personality instruments need to be properly researched in terms of reliability and validity.

The NEO PI-R has been shown through various research studies to be a valid and reliable personality instrument internationally (Costa & McCrae, 1992b; Marshall, De Fruyt, Rolland & Bagby, 2005).

Personality assessment in South Africa is mainly conducted with imported instruments from Europe and the USA and these instruments are often administered without being adapted for local use or having been thoroughly researched before use (Meiring, Van de Vijver, Rothman & Barrick, 2005). This creates various challenges with regard to potential bias and possible non-equivalence of the personality instruments, as shown in various previous studies (Abrahams & Mauer, 1999a, 1999b; Foxcroft, 2004; Taylor, 2000; Meiring et al., 2005; Meiring et al., 2006). Constricted sample sizes and the scarcity of large representative samples that include all eleven official languages of South Africa have generally hampered meaningful research with regard to the impact of language on personality profiles.

In view of the implications of the Employment Equity Act (Government Gazette, 1998), further studies need to be conducted on the comparability of the results of different indigenous groups (Van de Vijver & Rothmann, 2004), especially in terms of the comparison of psychometric properties of personality instruments for the different language groups.

The BTI was used in the current study and although extensive research has been conducted on the BTI as a South African personality instrument (De Bruin & Taylor, 2005; De Bruin et al., 2005; Taylor, 2004; Taylor 2008; Taylor & De Bruin, 2004; Taylor & De Bruin, 2006), such research focused firstly on developing and evaluating the reliability of the instrument, and secondly on its construct validity.

Research by Taylor (2008) on the response patterns of different language groups was based on a university student sample, with resulting limitations regarding the generalisation of the results as the eleven official languages of South Africa were not appropriately represented. She recommended that research be done on the BTI using samples other than students, so as to enhance the generalisability of results and to improve the understanding of bias in personality instruments due to language barriers. She also grouped languages together according to their similar origins and grammatical structure, but suggested that research is needed on a large enough sample to investigate the eleven different languages of South Africa separately.

Internationally the current study can contribute towards understanding the impact that home language and language proficiency in the assessment language have on personality assessment, since it explores the influence of all eleven South African languages in terms of the response patterns on the BTI. The potential contribution of the current study furthermore lies in the fact that large samples of adults from all the different language groups in South Africa with Grade 12 education were included, thereby addressing shortcomings of previous studies and allowing generalisation of the findings. The results can be utilised to sensitise researchers and test developers to further refine and improve the BTI and to set an example for the development of new personality or other psychometric instruments for use in South Africa in adherence to the prescriptions of the Employment Equity Act (Government Gazette, 1998).

1.4 PSYCHOMETRIC ASSESSMENT AND LEGISLATION IN SOUTH AFRICA

The International Test Commission (ITC) provides guidelines for promoting effective psychometric assessments, as well as for the development of assessment policies (ITC, 2011). The ITC is an international association of national psychological associations, test commissions, publishers and other organisations that are committed to the endorsement of effective testing and assessment policies, as well as to the proper development, evaluation and use of educational and psychological instruments (ITC, 2011). The ITC Guidelines stipulate that the reliability, validity and standardisation procedures of a psychometric instrument should be specified in the technical manual of the specific instrument (ITC, 2011). Contextual factors that have been identified in the ITC Guidelines as factors that affect psychometric assessments include social, political, institutional, **linguistic**, and cultural differences (ITC, 2011). It is therefore essential to investigate these factors extensively to ensure that their possible effect on the assessment results is taken into account during the choice of a personality instrument and the interpretation of the results obtained from that instrument.

Psychometric assessment in South Africa is regulated by various bodies that provide guidelines and legislative frameworks to ensure fair and effective assessments (Meiring et al., 2005). Within South Africa, the legal frameworks that regulate psychometric assessments are

the Constitution (Government Gazette, 1996), the Labour Relations Act (Government Gazette, 1995), the Health Professions Act (Government Gazette, 1974) and the Employment Equity Act (Government Gazette, 1998).

1.4.1 The Constitution of South Africa

In the Constitution (Government Gazette, 1996), specifically in Section 9 which focuses on equality, unfair discrimination is specifically prohibited, while fair discrimination is required to be based on valid grounds. Fair discrimination refers to any distinction, exclusion or preference in the recruitment and selection of respondents for a particular position that is in adherence to an Affirmative Action requirement (Government Gazette, 1996). To discriminate fairly, any assessment decisions must be based on inherent job requirements or *bona fide* occupational qualifications or requirements (Government Gazette, 1996).

1.4.2 The Labour Relations Act

The Labour Relations Act (Government Gazette, 1995) regulates unfair labour practices in terms of

- any unfair act or omission that arises between an employer and employee; based on any of the following grounds: race, gender, sex, pregnancy, marital status, family responsibility, ethnic or social origin, colour, sexual orientation, age, disability, religion, HIV status, conscience, belief, political opinion, culture, language or birth;
- applicants for employment; and
- implementing employment policies to achieve adequate protection and advancement of persons disadvantaged by unfair discrimination (Government Gazette, 1995).

1.4.3 The Employment Equity Act

Language diversity and its impact on psychometric assessment is further emphasised with specific legislation regulating assessments in South Africa. The demands on the appropriateness of psychometric assessment were highlighted in 1998 with the promulgation of the Employment Equity Act (Government Gazette, 1998, p. 7), which stipulates that:

Psychological testing and other similar assessments of an employee 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.

Although the section of the Employment Equity Act (Government Gazette, 1998) that deals with assessment is aimed at improving the quality of assessments in South Africa, this legislation highlights a number of dillemas. One of these is that all three requirements set out by the legislation involve the validity of tests. A test cannot in general be described as being 'valid', since a particular test can only be considered valid for certain people in certain situations at a certain time, provided that evidence in support of this interpretation can be provided (Taylor, 2004). The concept of validity relates to the interpretation of test results *within a particular context and for a particular group as well as for a specific purpose* (Prinsloo & Ebersöhn, 2002). If the test is suitable for the particular person, in the particular setting, and for the particular purpose, then the test may very well be 'fairly' applied. Validity refers less to the aspects of the test than it does to the application thereof, while interpretation is based on cumulative and ongoing scientific evidence in support of the use of test results for specific groups and for particular purposes and in specific contexts (Taylor, 2004).

The fair application of a psychometric instrument needs to be investigated even after the instrument has been found to be reliable and valid (Taylor, 2004). Bedell, Van Eeden and Van Staden (1999) emphasised that there is a need for increasing sensitivity towards the context in which individuals function and for the responsible use of psychometric instruments and other psychological assessment procedures. According to Prinsloo and Ebersöhn (2002), the fair administration of personality instruments depends on the context of application. Despite the challenges of multiple languages in South Africa, the local practice of personality testing has still largely followed international trends by importing instruments from abroad and applying these *mutatis mutandis* in all sectors of the community (Bedell et al., 1999; Foxcroft, 1997; Van de Vijver & Rothmann, 2004). Psychologists assessing personality in South Africa still mainly use the etic (imported) approach and the instruments used are often not

sufficiently researched to ensure that they are appropriate for a multilingual and multicultural society (Meiring, 2007).

To adhere to the specifications of the Employment Equity Act (Government Gazette, 1998), psychometric test users should scrutinise psychometric instruments more thoroughly for reliability, validity, fairness and bias – including fairness with regard to the different language groups of South Africa (Meiring et al., 2005). Even though this Act specifies the required psychometric properties, a very limited amount of research has been conducted on multilingual and multicultural personality assessment in South Africa (Abrahams, 1996, 2002; Abrahams & Mauer, 1999a, 1999b; Meiring, 2007; Spence, 1982; Taylor, 2000; Taylor & Boeyens, 1991; Wallice & Birt, 2003). Various personality instruments have been criticised in these studies, but due to insufficient samples and unsophisticated research methodologies such criticism should not merely be accepted without proper inspection (Prinsloo & Ebersöhn, 2002).

The Employment Equity Act (Government Gazette, 1998) indicates many types of bias that could affect instrument scores in different ways, for example constuct, method and item bias (Van de Vijver & Rothman, 2004). An instrument may have good psychometric properties, perform well across groups, but still display some bias (Van de Vijver & Rothman, 2004). The effect that a particular type of bias may have on an instrument's performance may seem insignificant, but the bias is nevertheless present (Meiring et al., 2005). Therefore, all bias effects need to be thoroughly evaluated, explained and considered during interpretation of the results to ensure the fair application of the particular instrument (Van de Vijver & Rothman, 2004).

To develop and standardise psychometric instruments that are valid, reliable and fair in the South African context, psychologists should not only reduce sources of bias or inequality, but also improve their understanding of the South African language groups and associated cultures in order to improve the quality of instruments available (Taylor, 2004).

South African legislation places enormous pressure on psychologists to use only psychometric instruments that meet the criteria specified. Consequently test developers or psychologists

are more likely to follow the emic approach (developing assessment instruments in the specific country) when developing psychological instruments for South Africa (Van de Vijver & Rothmann, 2004). One of the challenges for psychologists – specifically in the current study referring to personality instruments – is that they need to use psychometric instruments that give all South Africans (regardless of their home language) an equal opportunity to reflect their unique personality characteristics.

Since respondents become increasingly more informed about their rights, psychologists may expect to be held accountable for the improper use of psychometric instruments (Meiring et al., 2005). Van de Vijver and Rothmann (2004) anticipated that the Employment Equity Act (Government Gazette, 1998) could enhance the professional level of psychological practice by

- highlighting the importance of bias and equivalence research to improve multicultural assessment in the South African context; and
- inspiring the emic approach towards developing new psychometric instruments and standardising these for all culture groups in South Africa.

It is reasonable to consider the Employment Equity Act (Government Gazette, 1998) as an idealistic goal to be pursued by psychologists, researchers and test developers – in fact, by any person involved in psychological assessment (Taylor, 2004).

Van de Vijver and Rothmann (2004) advised that in order for psychology as a profession to meet the requirements set by all relevant legislation, much more research is needed to establish the level of equivalence and the possible impact and sources of bias on assessment tools used in South Africa. Recent studies on item bias of psychological instruments in South Africa have shown that there is little evidence of investigation into the potential impact of the eleven official languages on specific personality instruments (Meiring, 2007).

Research on the standardisation and validation of personality instruments for use in the South African context has generally involved adapting personality instruments based on Western theories, even though the latter have not been fully verified for the broader South African context (Meiring et al., 2005). This failing has most probably reduced the accuracy of

personality instruments and, as such, the quality of the decisions based on their results (Foxcroft, 2004; Meiring et al., 2005).

1.4.4 The Health Professions Act

The Health Professions Act (Government Gazette, 1974) governs and regulates the administration of psychometric instruments in terms of people who may administer psychometric instruments, the procedures prior to, during and after an assessment session and the ethical implications of psychometric assessments are concerned, in order to promote fairness. Locally the classification of psychometric instruments are done by the Health Professions Council of South Africa (HPCSA).

In view of the above, the motivation for the current study was twofold. Firstly, the need for ongoing and extensive research on personality instruments (in the case of the current study the BTI as an emic-approach South African personality instrument); and secondly, to identify the impact of the eleven official South African languages as well as English proficiency on response patterns.

1.5 PERSONALITY THEORIES

In order to conceptualise the essense of personality and personality characteristics, Allport and Odbert (1936) identified 17 953 terms, which they soon realised were too many. They combined the related terms, which resulted in a list of 4 504 personality trait names, but this was still unmanageable for any one psychologist. Through research and many debates (to be discussed in Chapter 2), these terms or personality characteristics were further reduced to 35 variables describing personality that can be measured by among others, 16 multi-dimensional scales as represented by the 16 Personality Factor questionnaire (16PF) (Cattell, 1947).

Following the earlier research by Allport and Odbert (1936) as well as Cattell (1947), and in a further attempt to measure the complexity of personality, Eysenck (1990, 1992) focused on a three-factor model for personality assessment, namely the Giant Three

(Psychoticism, Extraversion and Neuroticism (PEN)). Eysenck (1992) claimed that research has completely failed to show evidence of basic factors similar to Agreeableness, Conscientiousness and Openness – instead, three factors always emerged at the highest level in his analyses, and those factors resembled the Psychoticism, Extraversion and Neuroticism (PEN) model. He developed the Eysenck Personality Inventory (EPI) (Eysenck & Eysenck, 1965), later the short form of the revised Eysenck Personality Inventory (EPI-R) (Eysenck, Eysenck & Barrett, 1985), and ultimately the Eysenck Personality Questionnaire (EPQ) (Eysenck, 1992). These instruments were based on a three-factor theory in which it was proposed that the core of personality consists of three super traits: psychoticism; introversion/extraversion; and neuroticism/stability (PEN) (Eysenck, 1990).

McCrae and Costa (1987) followed by recommending a Five-Factor Model (FFM) to portray the essense of personality as comprising of five factors labelled as Extraversion (E), Neuroticism (N), Conscientiousness (C), Openness to experience (O) and Agreeableness (A), also referred to as the 'Big Five'. The same five factors were also identified by other researchers as they consistently emerged in personality research studies (Costa & McCrae, 1988a; 1988b; 1992a; 1992b; Digman, 1990; Goldberg, 1990; 1993; John, 1990b; McCrae, 1992; McCrae & Costa, 1987). Based on these five factors as the core of personality, different personality instruments such as the Big Five or Five-Factor Model were developed (to be discussed in detail in Chapter 2).

1.6 MULTICULTURAL AND MULTILINGUAL PERSONALITY ASSESSMENT

The wide distribution of the eleven official languages is confirmed in the 2011 census results and highlights the cultural diversity of South Africa (Statistics South Africa, 2012). It is reported that 75% of South African citizens have an indigenous African language as a home/first language, while 13.5% have Afrikaans and 9.6% have English as a home/first language. Even though a minority of South Africans have English as their home language, the majority of psychological instruments, especially personality instruments, are administered in English (Nel, 2008). English is the language used in governmental administration as well as the language of business, politics and most of the media in South Africa (Meiring et al., 2006). Even though the Constitution of South Africa (Government Gazette, 1996) grants official

status to eleven languages, the practical accommodation of eleven languages is generally not possible. Extra and Maartens (1998) indicated that the primary focus in education is on the learning of English as a communication medium. The majority of psychological instruments are available and administered in English, which can lead to bias and unfair application due to the wrong interpretation or misunderstanding of the words used in the instruments by individuals with other home languages (Van de Vijver & Rothmann, 2004).

1.6.1 Bias and equivalence

Key concepts in multicultural and multilingual assessments are bias and equivalence, and three different types of bias are defined by Van de Vijver and Rothman (2004):

- Construct bias, which refers mainly to the constructs measured.
- Method bias, which results from the methods used, for example an incomparable sample, instrument inconsistencies and administration problems.
- Item bias, which results from problematic items.

Due to the assessment of persons from multicultural and multilingual backgrounds (a common feature of the South African population), there is a definite possibility that the language in which the assessment is conducted may contribute to method bias (Wallis & Birt, 2003). The complexity introduced by multiple languages was mentioned by Foxcroft (1997) and again highlighted by McDonald (2011). Both explained that the language in which the instrument is administered may incorporate a range of concepts that the respondents do not understand, as these concepts might not be available or known in their home language.

Item bias and the effect of multiple languages was summarised by Owen (1992) in terms of methods and recommendations for administering psychometric assessments in a diverse society like South Africa's. He identified the development of unbiased instruments as one of the major challenges to be met and stressed that the emphasis should be on promoting insight into and understanding of the real nature of bias, rather than merely identifying and eliminating irregular items.

Equivalence refers to the comparability of scores between different cultures or language groups (Van de Vijver & Rothman, 2004). Types of equivalence are defined by Van de Vijver and Rothman (2004) as

- construct equivalence, measurement unit equivalence, which indicates similar origins for the measurement units; and
- scalar equivalence, which is an indication of the same scales even when the origin and measurement units are not the same.

Acceptable results in respect of bias analysis and equivalent results for different sub-groups would therefore be required before an instrument can be accepted as valid and fair for use with various sub-groups (Van de Vijver & Rothman, 2004).

1.6.2 Multicultural and multilingual research in South Africa

In the South African context, some research on the impact of language on psychometric instruments has been conducted. Examples are Claassen and Hugo (1993) who highlighted the relevance of the General Scholastic Aptitude Test (GSAT) for pupils who do not have English as their mother tongue. Furthermore Owen (1991) investigated the applicability of a junior aptitude instrument in terms of test bias for the constructs measured across different languages in South Africa. The practical application of an intelligence instrument in the diverse South African context was investigated by Grieve and Van Eeden (1997). Even though neither of these studies investigated personality instruments, which is the focus area of the current study, they both highlighted the fact that language has an enormous impact on psychometric assessments. Some local research with regard to personality instruments is evident in the work of Meiring et al. (2006) who investigated the bias in an adapted version of the 15FQ+; Taylor and Boeyens (1991) who researched the comparability of the scores of blacks and whites on the South African Personality Questionnaire (SAPQ); and Taylor and De Bruin (2004) who did research on personality (measured with the BTI) across the South African cultures. The findings of these studies emphasised the general need for further research in South Africa with regard to the impact of the multicultural and multilingual environment on personality assessment.

With the current study the aim is to sensitise psychologists about the impact of language on personality assessment and the research techniques available for these kinds of analyses.

Research in which the focus falls on the influence of language on personality assessment in South Africa has been limited, but will be discussed extensively in the next two chapters. A few examples of the types of research projects are those of Abrahams (1996) and Abrahams and Mauer (1999a, 1999b), who questioned the applicability of the 16PF. Both these studies highlighted the influence of language on personality assessment. Prinsloo and Ebersöhn (2002) investigated the applicability of the 16PF especially in terms of its fairness towards different South African language groups, and they concluded that the research methodologies used in the Abrahams (1996) study were not sufficient. They recommended that other, more applicable techniques be used.

Reseach on several versions of the 16PF followed, namely the 16PFi for industrial usage, the 15FQ, 15 FQ+ and the 16PF5. The 16PF5 was developed by Van Eeden et al. (1996) as an adapted and standardised version of the 16PF for use in South Africa.

Bias studies were not done on these different versions, but the impact of language on the psychometric properties of the fifth version of the 16PF was researched by McDonald (2011). She compared the level of understanding of native English-speaking students and non-native English-speaking students of the vocabulary used in the 16PF5 and concluded that language does influence the understanding of the items in the 16PF5 and that language creates definite challenges when psychometric assessments are done (McDonald, 2011).

To scientifically scrutinise personality instruments, it is essential to use advanced research methodologies and representative samples, specifically for cross-cultural research on personality instruments (Meiring et al., 2005). Before any decisions or predictions can be made on the basis of assessment results, it is necessary to evaluate the personality instrument thoroughly for comparability across the different language and culture groups (Cheung, Van de Vijver & Leong, 2011).

Meiring et al. (2005) conducted research in South Africa on the different types of bias for two cognitive instruments and a personality instrument. They reported factorial invariance and low levels of construct bias for all the different language groups on the cognitive instruments, but found poor structural equivalence for the personality instrument across the different language groups, as well as low internal consistencies for the African language groups. Seeing that Meiring et al. (2005) recommended that the particular personality instrument be used with caution for African language groups, especially in selection contexts, items from the personality instrument were subsequently adapted in an attempt to improve their cross-cultural equivalence. In another study, Meiring et al. (2006) again found low internal consistencies and therefore recommended that the instrument should not be used for selection in South Africa.

Previous research indicated that the differences in personality characteristics across different language groups can be a result of 'real' characteristic differences and care needs to be taken when personality instruments are interpreted (Taylor, 2000). In South Africa with its eleven official languages the probability of different personality characteristics for the different language groups is even higher, and psychologists, test developers and researchers should be alerted to the fact that the differences between the group responses may not necessarily be due to bias or unfair items in the personality instrument.

The above studies are an indication of researchers' growing awareness of the influence and the importance of language when psychometric instruments are administered in a multicultural and multilingual environment like South Africa. The impact of language on personality assessment in particular will be discussed in more detail in Chapter 3.

1.7 MEASUREMENT THEORIES

Psychometric instruments can be analysed according to two major measurement theories, namely the Classical Test Theory (CTT) and the Modern Test Theory (MTT) (Henard, 2000). Both these theories were implemented in the current investigation into the impact of language on responses to the BTI.

The MTT evolved from the shortcomings and assumptions associated with the CTT (Gulliksen, 1950) and to provide information for decision making that is not available through the CTT (Henard, 2000). An advantage of the MTT is that it does not require assumptions about sampling or normal distributions (Fan, 1998). Methods that require the measurement error values to be considered equal for all respondents are found to restrict the analysis (Fan, 1998).

One limitation of the CTT was that the item statistics – item difficulty and item discrimination – are dependent on the specific sample (Hambleton, 2004). A second limitation was that respondents can only be compared on the same (or parallel) tests (Hambleton, 2004).

In the 1950s, Frederic Lord produced a psychometric theory (MTT) that assessed respondents in a way that did not depend directly on the particular test items or the particular sample (Henard, 2000). This was the beginning of the Item Response Theory.

1.7.1 Item Response theory (IRT)

IRT, as a MTT, is a theory that focuses on item level as opposed to the test-level focus of the CTT (Fan, 1998). It is a model-based measurement approach that is based on the application of mathematical models (Osborne, 2008). IRT is based on the idea that the probability of a response to an item is a mathematical function of both person and item parameters (Osborne, 2008).

1.7.2 Rasch analysis

Rasch analysis methods were initiated by two independent mathematicians namely Rasch (1960) and Birnbaum (1968). The research done by Rasch (1960) initiated a probabilistic approach to making sense of a particular theoretical framework, which was later called the Rasch theory. Birnbaum (1968), on the other hand, presented a probabilistic model that led to a mathematical theory in which the goal of measurement was to choose the model that

accounts for the most variance in the data – referred to as the Rash analysis or Latent Trait Theory (LTT) (Osborne, 2008). Rasch models estimate item locations independent of the sample and allow the researcher to make inferences about the psychometric instrument, regardless of the sample distribution (Bond & Fox, 2001).

Rasch (1960) initiated this probabilistic model to produce an interval scale on which *item difficulties* and *person abilities* are indicated. The Rasch model is known as a fundamental measurement model. It is based on the assumption that the probability of achieving higher scores on a psychometric instrument respectively increases for individuals who possess more of the latent trait, and decreases for individuals who possess less of the latent trait being measured (Green & Frantom, 2002).

Rasch analysis allows users to create an interval scale of scores for both the difficulty levels of an item and the ability levels of a respondent (Bond & Fox, 2001). These scores are reported in units called logits and are typically placed on a vertical ruler called a logistic ruler (Osborne, 2008). Just like a yardstick measures length in inches, the logistic ruler measures in logits with persons' ability level on one side of the ruler and item difficulty level on the other. Just as two inches are twice as long as one inch; two logits are twice as large as one logit, therefore an item with a logit score of 3 is twice as difficult as an item with a logit score of 1.5 (Bond & Fox, 2001).

The Rasch model is based on mathematical formulas that are used to calculate the probability of how a person will respond to an item (Rasch, 1960). It determines the probability that the item will be answered correctly in the case of dichotomous items, or the probability for endorsing specific alternatives for polytomous items (Rasch, 1960). For dichotomous items the probability of having an item correctly answered may be different from what actually occurs, for instance a person with high ability may answer an easy item in the ability test incorrectly, which indicates that the item may not fit the predictions of the mathematical model (Taylor, 2008). Thus, for dichotomous items, the probability of a particular response to a question (correct or incorrect) is a function of the difficulty of the item and the ability of the person (Green & Frantom, 2002).

For polytomous items (used in personality instruments), the item difficulty could be described as the item endorsability, which is related to the person's standing on the specific latent trait that is measured by the item (Green & Frantom, 2002). This refers to how easy or hard it is for a person of a particular standing on the trait being measured to endorse (agree with) the item that measures a specific personality trait at a particular level on the logit scale (Bond & Fox, 2001). For example, a person who is more extraverted would be expected to agree more strongly (been more inclined to endorse) with items on an extraversion scale than someone who is more introverted (Green & Frantom, 2002). Should this not be the case, then it means that the item does not fit the expectations of the model and therefore the item should be changed or removed (Taylor, 2008).

Rasch analysis techniques determine fit statistics, in other words it requires the data to fit the model to ensure that a person's response pattern to sufficient items are indeed the way it is expected to be. In Rasch analysis, two fit statistics are reported, namely infit and outfit statistics (Bond & Fox, 2001). Through the use of these fit statistics, the Rasch model helps to identify items that do not fit the model (thereby decreasing both the validity and reliability of the instrument). It further identifies any respondents whose scores do not appear to be consistent with the model (Taylor, 2008). Respondents whose response patterns were not consistent with what expected responses should be (accrding to the model) are those respondents who were to anxious or those respondents whos standing on the latent trait were not measured appropriately, maybe due to their misunderstanding of the items (Taylor, 2008). For example respondents that endorse more strongly worded statements, while not endorsing more weakly worded statements, or for cognitive assessments, answering more difficult questions correctly while answering easier questions incorrectly. The results of the Rasch analysis make it possible to identify items that are more difficult than others to answer correctly (dichotomous items) or more difficult to endorse (polytomous items). This will allow researchers/test distributors to modify the items by making them easier (dichotomous items) or more attractable to endorse (polytomous items) or removing the specific items. They may also decide to raise the level of education/awareness to improve the understanding of those specific items, if lack of understanding the items made it more difficult to answer or

endorse the specific items (Taylor, 2008). A more complete description of the Rasch analysis methods used in the current study follows in Chapter 4.

1.8 PERSONALITY INSTRUMENTS

There are many different types of personality instruments, the most common of which is the self-report inventory. Self-report inventory instruments involve the administration of many items, phrased as statements to respondents, who respond by indicating their level of agreement in respect of each item. The most widely used personality instrument is the NEO PI-R (Boyle, 2008), which is based on the FFM. The NEO PI-R and the BTI are self-report inventories where the respondents are given statements for which they have to indicate their level of agreement.

Generally, personality instruments are imported from Europe and the USA and administered without adaptation for South Africa's unique environment (Meiring et al., 2005). This practice not only creates various challenges with regard to possible bias and lack of equivalence, as shown in some studies on these instruments (Abrahams & Mauer, 1999a, 1999b; Foxcroft, 2004; Taylor, 2000; Meiring et al., 2005; Meiring et al., 2006), but is also not in line with local legislation. The mandatory practices as set out in South African legislation require the personality instruments to be reliable, valid and fair, therefore researchers and practitioners should provide evidence that any psychometric instrument measures consistently and without bias. In addition, it is obligatory that the instrument be used in a fair way.

1.8.1 Personality instruments used in South Africa

According to Foxcroft, Patterson, Le Roux and Herbst (2004), the most popular personality inventories administered in South Africa are the Sixteen Personality Factor Questionnaire (16PF) (Cattell et al., 1970), the Fifteen Factor Questionnaire Plus (15FQ+) (Psytech, 2002) and the NEO PI-R (Costa & McCrae, 1992). All of these instruments are imported from Europe or the USA and adapted for local use (referred to as the etic approach).

1.8.1.1 The Sixteen Personality Factor Questionnaire (16PF)

Although the most extensively researched and widely used personality inventory in South Africa is the 16 Personality Factor Questionnaire (16PF), the cross-cultural research for the different languages is still not sufficient (Meiring et al., 2005). Abrahams (1996) conducted cross-cultural research on the comparability of the 16PF and included a section where words were identified from some items in the 16PF and respondents were asked to write down synonyms for these words. The synonyms provided by the participants were checked against dictionary synonyms for the words for accuracy. Many of these words were interpreted inaccurately as the synonyms were imprecise according to the dictionary comparison procedure followed. Abrahams (1996) consequently concluded that the words used in the 16PF are not understood equally well by all language groups in South Africa and thus the 16PF could not provide comparable results for the different groups or be used as a fair personality instrument.

Abrahams and Mauer (1999b) conducted further research on the impact of home language on 16PF responses and reported that significant differences were found between the mean scores of the different language groups (poor construct comparability). No indication was given if these were measurement differences or intrinsic characteristic differences for the different language groups. They further concluded that the 16PF is not suitable for use in South Africa. Since differences in mean scores might be because of 'real' differences between test-takers on certain personality factors and not just an indication of poor construct comparability, this is not the best method to identify construct equivalence (Urbina, 2004). Factor analysis and scientific comparisons with other measures are considered more suitable ways of determining construct equivalence (Urbina, 2004).

Prinsloo and Ebersöhn (2002) responded to the research of Abrahams and Mauer (1999b) by stating that more sophisticated research methods are needed to analyse personality instruments. Their criticism was specifically related to the impact of language on responses, arguing that the language aspect may have been over-accentuated. While Abrahams and Mauer (1999b) argued that the 16PF is an inappropriate instrument to measure personality characteristics in the multicultural and multilingual South Africa, Prinsloo and Ebersöhn

(2002) argued that certain variables were not taken into account in Abrahams and Mauer's (1999b) research, e.g. their sample was not representative (983 students were involved).
It was further argued that firstly advanced methodologies were not used to investigate the influence of reading skills on factor structures. Secondly, differential item functioning analysis and language proficiency assessment were not included in Abrahams and Mauer's research (Prinsloo & Ebersöhn, 2002).

Further research on the 16PF regarding the factors identified for different language groups was conducted by Van Eeden and Prinsloo (1997). They performed an exploratory factor analysis on the 16PF that resulted in their extraction of five second-order factors, namely Extraversion, Anxiety, Independence, Compulsivity and Emotional Sensitivity. These second-order factors were found for the English/Afrikaans group, and all but the fifth factor (Emotional Sensitivity) were found for the African language group. From these results Van Eeden and Prinsloo (1997) concluded that the 16PF can be used cross-culturally, but cultural and gender-specific trends need to be taken into account when interpreting the results. Van Eeden et al. (1996) adapted some doubtful items of the 16PF and renamed the inventory to the 16PF5. The level of understanding of the vocabulary of the 16PF5 by native English-speaking students and non-native English-speaking students was compared in a study (McDonald, 2011) similar to that of Abrahams (1996) and Wallis and Birt (2003). McDonald (2011) used a different form of the 16PF and also applied different methodologies as recommended by Prinsloo and Ebersöhn (2002). McDonald (2011) reported that there was a statistically significant difference in the 16PF5 results when the native English-speaking and non-native English-speaking groups were compared, as well as when a black group and a white group were compared. She reported a statistically significant relationship between students' academic literacy levels and their scores achieved on the 16PF5.

1.8.1.2 The Fifteen Factor Questionnaire (15FQ)

The 15 Factor Personality Questionnaire (15FQ) was developed as a revision of the 16PF, to be utilised more within an industrial and organisational context (Psytech, 2002). The 15FQ measures fifteen of the core personality factors identified by Cattell in 1943 (Cattell, 1947). As

the 16PF is not a timed test, Factor B (Intellectance), which is more an indicator of cognitive ability, was not found to be reliable and subsequently left out in the 15FQ (first edition) (Psytech, 2002). Factor B (Intellectance) was however reintroduced in the 15FQ+ as a meta-cognitive personality variable, rather than a cognitive ability variable (Psytech, 2002). Acceptable psychometric properties were reported for both these instruments (Psytech, 2002). Internal consistency reliability values above .7 were reported for all the factors measured with the 15FQ+ and construct validity studies were conducted by comparing results with other forms of the 16PF and significant correlations were found (Psytech, 2002). Comparisons with the NEO PI-R also resulted in statistically significant correlations between the 15FQ primary factors and the NEO PI-R global factors. Correlations between the 15FQ and the OPQ32i were only moderate and it was concluded that the reason for this may be that the OPQ32i does not fully assess the primary traits (Psytech, 2002). Various other personality instruments, for example the Jung Type Indicator (JTI), the Myers-Briggs Type Indicator (MBTI), the EPQR, the PPQ, the Occupational Personality Profile (OPP) and the Ocupational Interest Profile Plus (OIP+) were used to assess the construct validity of the 15FQ, all with very significant correlations (Psytech, 2002). With regard to bias studies, the homogeneity of the 15FQ primary factors were tested for black South Africans and it was concluded that the bias that was found reflected differences in verbal abilities, rather than racial differences (Psytech, 2002). The difference in verbal abilities rather than bias in items was confirmed by a meta-study done by Van der Walt, Meiring, Rothman and Barrick (2002) who analysed the relationship between personality instruments and job performance in South Africa.

1.8.2 Big Five and Five-Factor Model (FFM) as personality instruments used in South Africa

The FFM presents a hierarchical structure of personality traits based on five basic traits or factors (the so-called 'Big Five'). The history and discovery of the Big Five Personality Traits will be expanded on in Chapter 2.

In terms of the Big Five and FFM personality instruments, the Neo-Personality Inventory Revised (NEO PI-R) is a personality instrument that is frequently used in industry in South Africa (Taylor, 2000). It measures the so-called 'Big Five' personality factors, namely

Extraversion (E), Neuroticism (N), Conscientiousness (C), Openness to experience (O) and Agreeableness (A).

Costa and McCrae (1985) began the development of the NEO Personality Inventory based on factor analyses of the 16PF (Cattell et al., 1970). Since then they have generated a vast amount of research in terms of the Five-Factor Model (FFM). The NEO PI (Costa & McCrae, 1985) – revised in 1992 to the NEO PI-R (Costa & McCrae, 1992) – was designed specifically to measure personality in terms of the FFM.

1.8.2.1 The NEO PI-R

Taylor (2000) investigated the construct comparability of the NEO PI-R for black and white employees at a South African factory. The sample consisted of 300 respondents (150 black and 150 white), all with at least a Grade 12 level of education. Reported Cronbach alpha coefficients for the black sample (α_N = .82, α_E = .75, α_O = .65, α_A = .66, and α_C = .82) were slightly lower than for the white sample (α_N = .85, α_E = .78, α_O = .74, α_A = .74, and α_C = .82). After various rotation methods, Taylor (2000) found that the five-factor structure emerged for the white sample, but did not fit the black sample. At item level, the black sample seemed to experience difficulty with the language used in some of the items. Consequently the interpretation of factor results with regard to the black sample would have to be made with caution (Taylor, 2000). Words such as 'permissiveness', 'broad-minded', 'controversial', and 'shrewdness' were found to have unclear meanings for respondents in the black sample (Taylor, 2000). The lowest alpha coefficient was reported in the black sample for Openness to Experience, which also had the lowest congruence coefficient (.78) with the American normative data (Taylor, 2000). Taylor (2000) concluded that the NEO PI-R is useful for personality assessment of white South Africans, but caution had to be taken when interpreting the NEO PI-R results of black South Africans. She also reported that a possible reason for the poor replication of the five factors in the black sample was the lack of understanding of difficult terminology used in the NEO PI-R, as many of the American terms and expressions are not commonly used in South Africa. Taylor (2000) concluded that language is often an obstacle to personality assessment, and therefore the influence of language had to be acknowledged and researched thoroughly.

1.8.2.2 The Basic Traits Inventory (BTI)

The BTI was selected for this research project as it was the only valid and reliable personality instrument developed on a South African sample and previous research on the BTI (De Bruin & Taylor, 2005b; Taylor, 2004, 2008 and Taylor & De Bruin, 2004, 2006) indicated that it was suitable for cross-cultural assessments in South Africa.

Research on another South African developed personality instrument, the SAPQ, developed by Steyn (1974), indicated that it was not suitable for personality assessment across black and white cultures (Taylor & Boeyens, 1991).

Furthermore reseach on Afrikaans speaking students indicated that yet another personality instrument used in South Africa, the Comrey, merely confirmed the presence of Eysenck's (1970) three factor model (De Bruin, 2000). This research was however only conducted on Afrikaans speaking students. Therefore, the BTI (Taylor & De Bruin, 2006) has made a valuable contribution as a South African developed personality instrument. The BTI, used in the current study is based on the FFM and was developed as a Big Five personality instrument, with each of the five factors comprising four or five facets. The BTI was the first reliable and valid personality instrument, developed with a South African sample and successfully standardised for South African use (Taylor & De Bruin, 2006).

The Big Five personality factors have received extensive world wide support for their cross-cultural applicability (Taylor, 2004). The methodologies of studies on the Big Five personality factors often involve a comparison between the resultant personality factor structure of the instrument in one culture and that of another culture, in order to determine the structural equivalence of the instrument across cultures (Van de Vijver & Rothmann, 2004).

Different approaches can be followed to develop a personality instrument; in the case of the BTI the dimensional perspective was followed. The dimensional perspective explains individual differences in terms of traits that manifest on a continuum as overt styles of thinking, feeling and acting (McCrae & John, 1992; Taylor & De Bruin, 2006). The influence

of language and specific terminology used in the measurement of personality traits affords an opportunity for studying personality in a broader, more meaningful way (McCrae, 2001).
The development of the trait approach to personality measurement will be thoroughly discussed in Chapter 2.

1.9 RESEARCH QUESTIONS AND HYPOTHESIS

Theoretical- and practical errors are unintentionally made when psychologists base their decisions on personality instruments, for example during selections. The decisions are usually based on the face value of the instrument, not considering the underlying dynamics of the culture and/or language groups involved. Therefore the need for a more extensive cross-cultural study on the BTI were identified to ensure fair usage thereof within South Africa.

Verhoeven and De Jong (1992) indicated that the construct of language proficiency is very important for any cross-cultural study in a multicultural and multilingual environment. Since personality assessment is typically done in English, Prinsloo and Ebersöhn (2002) proposed that by testing respondents' English proficiency, the psychologist can help to assess the impact of language proficiency on respondents' performance on the personality instrument. The psychometric properties of a personality instrument can only be accepted as fair if all the assessed respondents' understanding of English is shown to be comparable, or if the responses on the items are not influenced by respondents' understanding or lack of understanding thereof (Verhoeven & De Jong, 1992).

In the current study, English language proficiency was measured with two tests, namely a Reading Comprehension test and a Verbal Reasoning test that had been specifically designed for use within the government organisation concerned. The sample was divided into two separate groups for comparison, namely a low English proficiency group and a high English proficiency group. These two groups were used to compare item response patterns (on the BTI personality instrument) of the eleven different language groups of South Africa with each other, as well as with the total group.

The research questions addressed in the current study were:

- Q_1: Whether home language impacts on the responses to BTI items?
- Q_2: Whether English proficiency, as an additional independent variable, impacts on the response patterns on the BTI?

In line with the research questions posed, the main research hypotheses for the current study were the following:

- H_1: Home language impacts on the responses to BTI items.
- H_2: English proficiency, as an additional independent variable, impacts on the response patterns on the BTI.

1.10 ASSUMPTIONS AND LIMITATIONS

The current study used a sample of convenience that consisted of voluntary applicants who had been shortlisted for appointment within a specific government organisation. Hence, even though the sample was large and represented all the official languages of South Africa, it cannot necessarily be considered entirely representative of the total population.

It was assumed that the BTI would measure the Big Five personality characteristics that it was supposed to measure and that the interpretation of the data would accurately reflect the personality traits of the respondents (as concluded earlier by Taylor (2008)).

A limitation to the current study could be that many variables outside the control of the researcher may have impacted on the response patterns on the BTI. These variables could include human error, faking, motivation, socialisation, age, gender, race, culture, etc. Analysis of these variables is considered outside the scope of this research project and will therefore not be discussed in this thesis.

1.11 CHAPTER OVERVIEW

Chapter 1: Introduction.

In this chapter, the background, relevant South African legislation, motivation for the research and theoretical framework have been presented. The hypotheses, purpose and objectives, as well as assumptions and limitations of the research were identified.

Chapter 2: Personality assessment.

In this chapter, the assessment of personality within the model of cross-cultural psychology will be explained. The focus will be specifically on personality trait assessment and on the Basic Trait Inventory (BTI), the Big Five personality assessment instrument developed in South Africa.

Chapter 3: The impact of language on personality assessment.

The focus in this chapter is on concepts of bias and issues related to language in terms of personality assessment research in South Africa. The different approaches to studying personality across different languages will be discussed in this chapter.

Chapter 4: Methodology.

This chapter presents the research methodology and design used in the current study. The instruments used as well as the sample and procedures used will be described.

Chapter 5: Results.

The results obtained in the study will be discussed in Chapter 5. The descriptive statistics will be given, followed by comparisons in respect of the different response patterns and factors that may influence the differences in responses, e.g. home language and English proficiency.

Chapter 6: Discussion and conclusion.

In this chapter, the conclusions reached from the findings in Chapter 5 will be discussed. The limitations of the study will be laid out. Recommendations will be made for further research and the future research direction will be suggested for personality assessment in a multicultural and multilingual environment such as South Africa.

CHAPTER 2: PERSONALITY ASSESSMENT

2.1 INTRODUCTION

Laher (2008) explained that personality is a dynamic concept due to its interaction with the environment. Personality should not be seen in isolation as the influence of the environment in which the individual exists should also be considered. Regarding the assessment of this dynamic construct, Retief (1992) reported that personality instruments can assist to formulate theory on how personality traits manifest. This is especially true in terms of how differences in behaviour are influenced by social and cultural backgrounds. The influence of social and cultural backgrounds is particularly important in South Africa with its many diverse societies and cultures (Meiring et al., 2005).

In order to understand or attempt to predict work behaviour in different situations, psychologists must accurately measure the personality characteristics that result in different behaviours (Meiring et al., 2006). This is attempted through the use of personality instruments based on personality theories that have evolved over many years and will be discussed comprehensively in this chapter.

The controversy surrounding the use of personality instruments changed in the 1980s when industrial psychologists recognised the value of personality instruments as predictors of work performance (Hogan, 2005). The publication of the NEO-PI (Costa & McCrae, 1985) and the Hogan Personality Inventory (Hogan, 1986) showed the advantages of using personality assessment to select potential employees. Barrick and Mount (1991) highlighted the value of personality instruments, especially those organised in terms of the FFM, in predicting occupational performance.

The focus will be on the history of personality assessment in terms of the different approaches and theories associated with personality, and will proceed to a discussion of the Five-Factor Model (FFM) (Costa & McCrae, 1992), which is the foundation for the BTI (Taylor & De Bruin, 2006), the personality instrument used in the current study.

2.2 CONCEPTUALISATION OF PERSONALITY

Personality theory is not only complex due to the enormous range of dynamic elements influencing it, but the uniqueness of individuals also makes it difficult to fully define personality (Lamiel, 1997). A common way to describe personality is in terms of the core conceptual orientations such as structure, dynamics involved, development, assessment and changes in personality over time (Lamiel, 1997). Although there are many debates on the exact definition of personality, two major themes surface regularly, namely human nature and individual differences (McCrae & Costa, 1985a; 2004; Lee & Ashton, 2005; Pace & Brannick, 2010). Human nature deals with the general characteristics of humans that are universal, such as shared motives, goals and psychological processes (Briggs, 1989). Individual differences on the other hand, deal with the most important habits and behaviours in respect of which individuals differ. Briggs (1989) indicated that these individual differences are best captured by traits, which were defined by McCrae, Costa and Piedmont (1993, p. 4) as "consistent patterns of individual differences in thoughts, feelings and behaviours". Personality as a concept was also described by Ryckman (1993) as the scientific analysis and explanation of individual differences that determine how people behave in different situations.

2.2.1 Paradigms to describe personality

Various approaches exist that attempt to define personality and each approach is valid and useful in its own right, provided that an appropriate fit is found between theory, conceptual scope and practical application requirements (Runyan, 1997). Two of the broad paradigms in terms of describing personality are

- the ideographic paradigm, which focuses on the individual and the impact of contextual variables; and
- the nomothetic paradigm, which describes and predicts individual differences in terms of predefined personality attributes (Chamorro-Premuzic, 2007) or universal laws of the human mind (Dumont, 2010).

Trait theories focus empirically on the conscious and concrete aspects of personality in straightforward terms (e.g. friendliness) (Ewen, 2010). From this perspective, personality is seen as the consistent and unchanging dispositions to think, feel and act, regardless of the context (Chamorro-Premuzic, 2007).

2.2.2 Approaches to psychometric instrument development

Three main approaches for the development of personality instruments will be discussed next – the emic (indigenous) approach, etic (imposed) approach and the lexical (language-focused) approach (Meiring et al., 2005). The terms *emic* and *etic* were first used in 1954 by linguist Kenneth Pike, who argued that the tools developed for describing linguistic behaviours could be adapted to the description of any human social behaviour (Berry, Poortinga, Segall & Dasen, 2002). The words *emic* and *etic* are derived from the linguistic terms phon*emic* and phon*etic* respectively and were proposed by Pike (1954) as a way around philosophic issues about the nature of objectivity.

2.2.2.1 The emic (indigenous) approach

In cross-cultural psychology the emic approach represents attempts to describe behaviour and psychological functioning from within a particular culture (Taylor, 2008). The emic (indigenous) approach utilises a culture-specific orientation relevant to the local context (Cheung, Cheung, Wada & Zhang, 2003). Dumont (2010) defined the term emic as the domain of behaviours found in a single society/culture or a cluster of related societies/cultures. In social psychology the indigenous (emic) approach was defined by Ho (1998) as the study of human behaviour and mental processes within a cultural context that are linked to specific values, beliefs, concepts and methodologies. With the emic approach the importance and meaningfulness of traits are investigated from within a particular culture (Church & Katigbak, 2000).

2.2.2.2 The etic (imposed/imported) approach

The etic approach represents attempts to describe behaviour and psychological functioning from outside the cultural system, and often involves the comparison of behaviour and psychological functioning between the different cultures (Taylor, 2008). The etic approach emphasises 'core similarities' in all human beings (Cheung et al., 2003).

The dilemma with the etic approach is that, while researchers should be objective, their perspectives are often clouded by their own cultural experiences and concepts; therefore this strategy is seen as an 'imposed' strategy (the researcher imposes his/her own views on the interpretation of behaviour in the other culture) (Berry, 1969).

In terms of personality assessment with the etic approach, one or more inventories that are imported from other countries or cultures are primarily used to measure and interpret personality traits for a local group (Nel, 2008). In South Africa, psychologists mainly use personality instruments that were imported (the etic approach) from Europe or the USA and adapted for local use, for example the 16PF (Cattell et al., 1970), the Fifteen Factor Questionnaire Plus (15FQ+) (Psytech, 2002), the NEO PI-R (Costa & McCrae, 1985), the Jung Personality Inventory (JPI) (Du Toit, 1987), the Myers-Briggs Type Indicator (MBTI) (Myers & McCaulley, 1985), and the Occupational Personality Questionnaire (OPQ) (Saville & Holdsworth, 1993). The personality instruments used in South Africa are often not researched well enough to substantiate their reliable, valid, bias free and fair application in this multicultural and multilingual environment (Meiring, 2007). Most of them do not take into account the multicultural, multilingual, political, social and economic history of South Africa, all of which could have a major impact on the bias and fairness of personality instruments (Meiring, 2007).

Cross-cultural studies of personality based on the etic approach deal mainly with the relevance and comparability of traits (John & Benet-Martinez, 2000). The imposed or etic approach is particularly clear in studies of cross-cultural personality assessment, which have traditionally relied on translating and adapting English-language instruments for use in countries where English is not the primary language (Cheung et al., 2001).

The etic approach is furthermore based on the assumption that the traits measured by these instruments sufficiently and satisfactorily represent the personality dimensions in all cultures (Cheung et al., 2001). It stresses the fact that there are general and common characteristics found in all human beings, and that most people around the world can be described using these universal personality traits (Cheung et al., 2003). Yik and Bond (1993) however, stated that the limitation of the etic approach lies in its possible omission of important culture-specific language and personality characteristics.

South Africa's multicultural and multilingual population is unique and test developers have generally relied on the etic approach for the validation and standardisation of personality instruments, without combining it with other approaches (Nel, Valchev, Rothmann, Van de Vijver, Meiring & De Bruin, 2012). Nel et al. (2012) recommended that both (emic and etic) approaches should be used, since the strengths and weaknesses complement one another. For example the strength of the etic approach is that it helps to identify commonalities. A weakness of the etic approach is that the focus on commonalities may lead to an underrepresentation of the unique aspects of a specific culture. In contrast, the strength of the emic approach can be found in a strong focus on the unique aspects of a specific culture at the cost of commonalities (as a weakness of the emic approach) across cultures (Nel et al., 2012).

The current development of the South African Personality Inventory (SAPI) is a project that aims to provide an indigenous personality instrument for all eleven official languages in South Africa, using a mixed-method approach (Nel et al., 2012).

2.2.2.3 The lexical approach

In addition to the emic and etic approaches, the lexical approach can be used to develop psychometric instruments for measuring personality characteristics (Ashton & Lee, 2005). In the lexical approach it is assumed that individual differences that are prominent and socially relevant will manifest as words in the ordinary language (Goldberg, 1990).

It therefore emphasises that differences in personality should be represented by a large number of similar but distinct words (generally adjectives) (Saucier, Hampson & Goldberg, 2000). These words should be used by lay people in the everyday description of their own and others' personalities (Saucier et al., 2000).

The lexical hypothesis is founded on two basic assumptions:

- The frequency of use of any specific term has a rough correspondence with its importance.
- The number of words referring to a particular personality attribute will be a rough indication of the importance of that attribute for the speakers of the language (Saucier & Goldberg, 2001).

According to the lexical approach, vigilant analyses of everyday adjectives in a specific language would reveal the primary indicators of personality (De Raad, 2000). These primary indicators can help to identify the personality types that are significant to the speakers of that language, for example, friendly, generous, even-tempered and punctual (Stagner, 1977). These words are the basic ways in which individuals understand and portray themselves and others (De Raad, 2000).

A complete theory of personality must ultimately explain the phenomena to which the terms (the lexical approach) refer and the ways in which they are used in everyday life (De Raad, 2000). Psychologists often rely on self-reports and peer ratings to gather their data, consequently they must speak and understand the language of their respondents (Stagner, 1977). Researchers agree that the importance of language should not be underestimated as it clearly surfaces in all the different approaches towards personality assessment (Abrahams, 1996, 2002; Abrahams & Mauer, 1999a, 1999b; Meiring, 2007; Spence, 1982; Taylor, 2000; Taylor & Boeyens, 1991; Wallice & Birt, 2003).

The Basic Trait Inventory (BTI) used in the current study is a locally developed (emic) personality instrument that measures the Big Five personality factors that evolved from research using the lexical approach (Taylor & De Bruin, 2006).

The BTI personality instrument is based on the nomothetic paradigm, where traits are used in an ordinal way (clear ordering of the variables) to describe personality attributes and types (Dumont, 2010).

In order to fully understand the complexity of personality assessment, the history of personality psychology (specifically traits) will be discussed, after which the different personality instruments developed in South Africa will be presented.

2.3 PERSONALITY ASSESSMENT INSTRUMENTS

Personality instruments are used to attempt to scientifically measure personality characteristics (Foxcroft & Roodt, 2005). The assessment of personality is however strongly influenced by the verbalisation thereof in different cultures (Berry et al., 2002). Even though personality structure is assumed to be universal, the articulation across cultures differs comprehensively (Berry et al., 2002).

In South Africa, the assessment of personality across different cultures has resulted in extensive criticism, especially in terms of cross-cultural applicability (Abrahams & Mauer, 1999a, 1999b; Block, 1995). Nonetheless, personality assessment still represents an essential component in personnel selection and therefore the use of personality instruments cannot simply be discarded (Barrick & Mount, 1991). The Employment Equity Act (Government Gazette, 1998) requires the fair application of reliable and valid psychometric instruments, also personality instruments, in the South African employment context. The responsibility therefore lies with the psychologist to provide evidence in support of psychometric properties, namely reliability, validity, unbiased and fair application of all psychometric instruments used, as required by the Employment Equity Act (Government Gazette, 1998).

The assessment of personality is even more complex, particularly with regard to the development and validation of assessment instruments that comply with the regulating criteria set by the ITC (International Test Commission, 2011). The ITC criteria for good test use practice can be summarised as follows:

- Test users must take responsibility for the ethical use of the test, which includes the professional and ethical manner in which a test users should act
- Test users need to ensure that they are competent to use a specific test and they should take responsibility for the use thereof.
- Test users must keep the test material safe and secure and treat the results confidentially.
- Test users must evaluate the potential utility value of the test in an assessment situation to ensure good technical properties and appropriateness of the test, to ensure fairness of testing, and to administer, score and analyse the test properly and accurately
- Test users must communicate the results clearly and accurately to the relevant persons
- Test users need to review the appropriateness of the test for the specific situation in which a test will be used.

South Africa's uniqueness in respect of different race groups and eleven official languages is often overlooked when personality instruments are imported and adapted (Meiring et al., 2005). Race and language are very important moderators of test performance (Bedell et al., 1999) and over time the assessment of black South Africans has become more systematic and thorough (Bedell et al., 1999).

2.4 TRAIT RESEARCH AS THE BASIS OF PERSONALITY ASSESSMENT

Barrick, Parks and Mount (2005) defined traits as characteristics or enduring patterns of thought, emotion and behaviour that are stable over time and that explain people's behaviour in different situations. Most personality psychologists view traits as major elements of personality; some (e.g. Buss, 1984) even see traits as the only element of personality. Costa and McCrae (1992b) concluded that rapid progress had been made towards a consensus on personality structure with the development and acceptance of the 'Big-Five' trait approach. Chamorro-Premuzic (2007, p.15) defined traits as "the internal psychological dispositions that remain largely unchanged throughout the lifespan" and suggested that traits determine differences between individuals.

Traits were found to be generally stable across the adult lifespan (McCrae & Costa, 1999), although Agreeableness and Conscientiousness increase moderately with age and Neuroticism, Openness and Extraversion decrease moderately with age.

2.4.1 History and development of trait theory

There are three major stages in the history of Trait Theory. The initial stage can be labelled as the early trait theories. The main contributors to this stage were Allport and Odbert (1936) as well as Cattell (1943). The second stage involved the discovery of the Big Five personality traits. The contributors to this phase were Fiske (1949), Tupes and Christal (1961), Norman (1963) and Goldberg (1990), who all found in their research that there were five broad traits in personality. The third stage was the further development of the five-factor model of personality where Costa and McCrae (1992a) played a very important role with the development of the Neo Personality Inventory (NEO PI). The various stages are discussed in more detail next.

2.4.1.1 First stage - Early trait theories

The first stage is discussed in terms of the contributors to the early trait theories.

a. Allport and Odbert (1936)

Allport and Odbert (1936) were among the earliest psychologists to do research on personality traits using the lexical approach. Allport (1937) was the first to formally articulate personality in the publication, *Personality: A Psychological Interpretation*. He viewed personality psychology as the study of the individual as a whole. In 1937 he defined personality as "the dynamic organisation within the individual of those psychophysical systems that determine his unique adjustment to his environment" (Allport, 1937, p. 26). This definition was later changed to "...his characteristic behaviour and thought" (Allport, 1961, p. 82)

Allport and Odbert (1936) used a full-length English dictionary – *Webster's New International Dictionary* – to compile a list of all the words that could be used to distinguish the behaviour of one human being from another. Their complete alphabetical list resulted in 17 953 single-word descriptor terms, which they then sorted into four major categories with 4 504 non-judgemental 'trait names'. This classification, even though it was a very large set of terms, provided a basic structure for further taxonomical research on the personality trait perspective (McAdams, 1997). Cattell (1943) used these 4 504 terms and reduced them through factor analysis to a much smaller number of 171 adjectives, which were more descriptive and complete than the 'trait names' provided by Allport and Odbert (1936).

b. Cattell (1943)

Cattell (1943) used Allport and Odbert's (1936) list of 'trait names' as a basis for further research. He became known as the originator of the lexical approach as he stated that all aspects of human personality that are (or have been) of importance, interest or utility, are recorded in language (Cattell, 1943). As a starting point, he used only the first category of Allport and Odbert's (1936) list (which consisted of 4 504 personality trait names) and added as much information as possible on each description to make the list as complete as possible and to not only use the dictionary description. Through an undocumented sequence of semantic decisions Cattell tried to shorten this list by applying his personal judgement at various stages in the elimination sequence (Block, 1995). After this elimination process, Cattell (1943) used factor analysis and ended up with a list of 171 adjectives, which he claimed to be representative of the personality sphere. It was however still too voluminous to assess with a single personality instrument as this would have been too costly and complex (John & Srivastava, 1999). The 171 adjectives were further clustered by conducting a correlation analysis and Cattell's semantic understanding of them, until 60 clusters remained (Cattell, 1943, 1945). Further factor analysis, as well as semantic and experimental clustering by Cattell (1943) resulted in a further reduction of clusters which were labelled as 35 bipolar traits (Ewen, 2010).

Cattell (1943) regarded factor analysis as the only way to identify the basic components of personality with only some traits as unique; he indicated many common traits that are shared by all individuals, but to varying degrees. This drastic reduction was necessary because of the data-analytic limitations that made factor analyses of a large number of variables too costly and complex (John & Srivastava, 1999). Using the list of 35, Cattell (1945) conducted several further factor analyses and identified twelve primary personality factors, which eventually became part of his 16 Personality Factors Questionnaire when he added four extra factors specific to the instrument domain (Cattell et al., 1970). These twelve primary personality factors were labelled **Abstractedness** (Imaginative versus practical); **Apprehension** (Worried versus confident); **Dominance** (Forceful versus submissive); **Emotional Stability** (Calm versus high strung); **Liveliness** (Spontaneous versus restrained); **Openness to Change** (Flexible versus attached to the familiar); **Perfectionism** (Controlled versus undisciplined); **Privateness** (Discreet versus open); **Reasoning** (Abstract versus concrete); **Rule Consciousness** (Conforming versus non-conforming); **Self-Reliance** (Self-sufficient versus dependent); and **Sensitivity (**Tender-hearted versus tough-minded) (Cattell, 1946). The four factors specific to the instrument domain, as identified by Cattell (1946), were labelled **Social Boldness** (Uninhibited versus shy); **Tension** (Impatient versus relaxed); **Vigilance** (Suspicious versus trusting); and **Warmth** (Outgoing versus reserved).

Cattell's (1943, 1945, 1946) ground-breaking work and the availability of a shorter list of variables stimulated several other researchers to examine the dimensional structure of traits (Fiske, 1949; Goldberg, 1981; Norman, 1963; Tupes & Christal, 1961).

2.4.1.2 Second stage – Discovering the Big Five personality traits

The following researchers expanded on the early trait theories, which led to the development of the Big Five theory of personality traits.

a. Fiske (1949)

Fiske (1949) constructed simplified descriptions for 22 of Cattell's (1947) 35 bipolar traits. The factor structures that were identified from self-ratings, peer ratings and ratings by psychological staff members, were very similar and resembled what would later be known as the Big Five (John & Srivastava, 1999).

b. Tupes and Christal (1961)

Tupes and Christal were employed by the United States of America Air Force to improve officer selection and promotion procedures (Block, 1995). To clarify the factors found by Fiske (1949), Tupes and Christal (1961) proceeded to reanalyse correlation matrices for eight different samples. In all the analyses, Tupes and Christal (1961) found five relatively strong and recurring factors that, according to McCrae (1992), laid the foundation for the five-factor model. John and Srivastava (1999) reported that the factors were typically labelled as follows:

- Extraversion (talkative, assertive, energetic)
- Agreeableness (good-natured, cooperative, trustful)
- Conscientiousness (orderly, responsible, dependable)
- Emotional Stability versus Neuroticism (calm, not neurotic, not easily upset)
- Intellect or Openness (intellectual, imaginative, independent-minded)

These factors eventually became known as the Big Five (Goldberg, 1981) that summarise a large number of personality characteristics (John & Srivastava, 1999). The five-factor structure was also replicated by Norman (1963) in lists derived from Cattell's 35 variables.

c. Norman (1963)

Norman (1963) used Cattell's (1947) 35 variables in four studies in which he confirmed the five-factor structure. However, he was of the opinion that there could be more factors present in the natural (everyday-used) language than the 35 listed by Cattell (1945). In later research, Norman (1967) supplemented the original Allport and Odbert (1936) list with terms obtained from a second edition of *Webster's Unabridged Dictionary*

of the English Language. In his search for additional personality indicators that may have been omitted by Cattell (1943) and Tupes and Christal (1961), Norman (1967) presented a list of 2 800 single-word descriptors deemed to represent 'stable traits'. These were presented to undergraduates to empirically test their understanding thereof. After Norman (1967) had removed the terms judged as ambiguous or unfamiliar, he was left with 1 431 terms which he believed was suitable for the development of a structured taxonomy. Further semantic sorting of the 'stable traits' resulted in the classification of 75 semantic categories which were sorted into five dimensions (Extraversion, Neuroticism, Openness to experience, Agreeableness and Conscientiousness), and each was assigned a positive and negative pole (Norman, 1967).

d. Goldberg (1990)

Goldberg researched the role of the evaluation component in adjective use (Peabody & Goldberg, 1989); the frequency of adjectives in various category use (Hampson, John & Goldberg, 1986); the consistency with which the adjectives are used by laypersons (Goldberg & Kilkowski, 1985); the level of abstractness of the adjectives (John, Hampson & Goldberg, 1991); the influence of unipolar and bipolar context (Goldberg, 1992); and the factor structure underlying laypersons' use of adjective descriptors (Goldberg & Kilkowski, 1985). Using Norman's (1967) listing of 75 semantic categories, Goldberg (1990) constructed an inventory of 1 710 trait adjectives that participants could use to describe their own personality. He then scored these responses to the inventory and conducted factor analyses on the inter-correlations of the self-rated data. After a variety of different methods of factor extraction and rotation, the first five factors basically remained the same, namely Extraversion, Neuroticism, Openness to experience, Agreeableness and Conscientiousness (Goldberg, 1990).

Goldberg (1990) referred to these factors as the 'Big Five Factors' of personality. He stated: "It now seems reasonable to conclude that analysis of any reasonably large sample of English trait adjectives in either self- or peer descriptions will elicit a variant of the Big Five factor structure and therefore that virtually all such terms can be represented within this model" (Goldberg, 1990, p. 223).

Goldberg (1993) highlighted the complexity of personality by stating that proponents of the Five-Factor Model (FFM) never intended to reduce the rich tapestry of personality to a mere five traits, but rather to simplify it through a well-researched taxonomy.

2.4.1.3 Third stage – Developing the Five-Factor Model of Personality

Various personality researchers tried to develop an integrative framework by conducting a meta-analysis of different personality inventories (Barrick & Mount, 1991; Clarke & Robertson, 2008; Connor-Smith & Flachsbart, 2007; Judge, Heller & Mount, 2002; Pace & Brannick, 2010; Prinzie, Stams, Dekovic, Reijntjes & Belsky, 2009; Salgado, 1997; Tett, Jackson & Rothstein, 1991). They concluded that the FFM has the potential to be a functional theory for personality assessment.

Following the identification of the Big Five in early lexical studies, it formed the basis for a number of personality instruments, including the Five-Factor Personality Inventory (FFPI) (Hendricks, Hofstee & de Raad, 1999, 2002), the Big Five Questionnaire (BFQ) (Caprara, Barbaranelli & Borgogni, 1993) the original NEO Personality Inventory (NEO PI) (Costa & McCrae, 1985) and the Revised NEO Personality Inventory (NEO PI-R) (Costa & McCrae, 1992b). Designed specifically by Costa and McCrae (1992b) to measure personality in terms of the five-factor model and provide an integrative framework, the NEO PI is the most widely validated and widely used instrument (internationally and locally) to assess the five personality factors identified as the Big Five (Rolland, 2002).

The NEO PI was initially developed to measure three broad personality dimensions, namely Extraversion, Neuroticism and Openness to Experience. The three dimensions were selected based on cluster analysis of the 16PF (Costa & McCrae, 1976). Costa and McCrae (1985) realised that the scales of their NEO instrument closely resembled three of the Big Five factors, but that it did not include the other two (Agreeableness and Conscientiousness). Thus, they extended their instrument with two additional preliminary scales measuring Agreeableness and Conscientiousness. The 1985 inventory (NEO PI) was revised in 1992 and was renamed the NEO Personality Inventory Revised (NEO PI-R).

The revised inventory (Costa & McCrae, 1992b) measures each of the Big Five factors on the basis of six facets.

The NEO PI-R consists of 240 items that assess personality across the five broad factors (super traits) that include six facet scales for each factor. The facet scales allow for a detailed distinction between persons with the same broad personality profile, but differ in terms of how each factor is expressed (Costa & McCrae, 1992b).

Five robust factors emerged from various studies, and hence the Big Five (Goldberg, 1990) and the FFM (Costa & McCrae, 1992a) are often used interchangeably. In fact, some references refer to the FFM as the Big Five in personality instruments (John & Srivastava, 1999).

2.4.2 Further development of the Big Five and Five-Factor Model (FFM)

Various research studies on Big Five instruments (the Big Five Inventory (BFI) (Benet-Martinez & John, 1998); the Big Five Questionnaire (BFQ) (Caprara et al., 1993; Goldberg, 1990); the NEO Personality Inventory Revised (NEO PI-R)(Costa & McCrae, 1992b); and the Five-Factor Nonverbal Personality Questionnaire (FF-NPQ) (Paunonen, Ashton & Jackson, 2001)) indicated that the Big Five factors are stable and valid. The fact that the same five factors have consistently been identified through exploratory factor analyses (EFAs) as comprehensive measures of personality indicates that the Big Five can be used as a reliable theory for personality assessment (Paunonen & Ashton, 2002). However, further development of and research (especially Confirmatory Factor Analysis (CFA)) on the five factors is necessary to substantiate the use of the Big Five factors to assess and describe personality in different contexts and with different samples (Venter, 2006).

The development process of the Big Five factors included

- defining the Big Five factors across different studies;
- establishing convergence between the Big Five and other structural models; and
- conducting cross-language and cross-cultural studies (Venter, 2006).

2.4.2.1 Defining the factors

According to Venter (2006), personality psychologists still did not fully accept the Big Five by Goldberg (1990) (who based his research on the lexical approach) and Costa and McCrae (1992a) (whose research was based on factor analysis) as a taxonomic superstructure. The labelling of the factors caused many debates (John & Srivastava, 1999). For example, the factor Agreeableness has also been labelled as social adaptability, likeability, friendly compliance, agreeableness and love (Venter, 2006).

John (1989) addressed this problem by conducting a study where the five definitions were labelled in ordinary language. In his study, he used 300 terms included in the Adjective Check List (ACL) and asked ten judges (psychologists) to independently sort the 300 terms into the Big Five categories or additionally into a sixth category if the adjective did not fit. He tested the degree to which the Big Five could capture the personality judgements formulated by each psychologist and found that the inter-rater agreement was substantial (between .90 and .94), showing that psychologists were able to use a common structure in classifying the 300 terms into the Big Five traits. The only exception was factor five (Openness to Experience), where a debate ensued in the literature about its best interpretation (John, 1989).

2.4.2.2 Comparing the Big Five and the FFM

John and Srivastava (1999) investigated the similarities and differences between the Big Five (from the lexical tradition) and the FFM (instrument-based). Three different tests were given to a sample of students to complete. A shortcoming of this sample was that university students were used, thus limiting the generalisability of findings as they do not represent the general population or the average working population (Taylor, 2008). The three different personality instruments that were administered to the sample were the Trait Descriptive Adjective (TDA) developed by Goldberg (1992), the NEO Personality Inventory Revised (NEO PI-R) developed by Costa and McCrae (1992a, 1992b), and the Big Five Inventory (BFI) based on the trait adjectives related to the Big Five and developed by

John, Donahue and Kentle (1991). Loehlin, McCrae, Costa and John (1998) then correlated the self-report scores of the three tests and came to the following conclusions:

- Similar results to previous factor analysis from McCrae and Costa (1985a, 1985b, 1985c, 1987) were reported with regard to the similarity of the Big Five personality factors and the FFM.
- The five factors replicated well in both types of theories, namely the dictionary-based (Big Five - Lexical approach) and the instrument-based (FFM) studies.
- All five factors seemed to remain stable over a period of time (life span), whether they were measured with instruments or with adjective scales (Lexical approach).

One of the strengths of the Big Five taxonomy is that it can capture the commonalities among most of the existing systems of personality traits, thus providing an integrative descriptive model for personality research (Venter, 2006).

2.4.3 Limitations of the Big Five and FFM

Block (1995) published a critique of the FFM, which was followed by a second publication and further critique six years later (Block, 2001). He addressed the point that was also debated by McCrae and Costa (2008) regarding the number of factors. They questioned why five factors are regarded as representative of personality as a whole, particularly when other studies (Thalmayer, Saucier & Eigenhuis, 2011) have argued for more factors. Block (1995; 2001) presents the history of the development of the FFM to demonstrate why the notion of personality consisting of five factors might be insufficient. According to Block (1995; 2001), Cattell (1943), Fiske (1949), later Tupes and Christal (1961) and then Norman (1963) all used their own, subjective rules for choosing adjectives from the English language datasets. Block (1995; 2001) criticised the samples used in each case and pointed out that the initial lists of adjectives were obtained from two specific English dictionaries. Even though Block (1995; 2001) did not give alternative solutions for personality assessment, his critique motivated the scientific community to research the FFM (Costa & McCrae, 1992a) more extensively before defining it as a structural model of traits and a usable basis of personality assessment (McCrae, 2010).

Below follows a summary of the critique on the Big Five and Five-Factor theory.

2.4.3.1 Theoretical limitations of the Big Five theory

Some criticism of the Big Five was that it does not provide a complete theory of personality (Block, 1995; 2001; Eysenck, 1997; McAdams, 1992; Pervin, 1994). Goldberg (1993) stated that the Big Five was never intended to be a personality theory, but it was developed to account for the structural relations among personality traits. Trait theory from a nomothetic approach is of great value for the purpose of classifying, screening, personnel selection and diagnosis (Epstein, 2010). Trait theorists in general and Big Five theorists in particular did not pay attention to the organisation of traits and the interaction between traits within a person (ideographic approach); therefore the trait theory is considered irrelevant for the ideographic approach (Epstein, 2010).

2.4.3.2 Factor analysis limitations

According to Briggs (1989), the Big Five was empirically derived and therefore not theoretical. Block (1995; 2001) expressed his concerns regarding the method and practice of factor analysis and suggested that factor analysis by itself cannot be used as the basis for making principal and dominant decisions regarding the concepts to be used in the field of personality assessment (Block, 1995). However, he did not give any alternative methods or solutions to not using factor analysis. Meehl (1992) remarked that no statistical procedure should be treated as a mechanical truth generator. Eysenck (1992) stated that subjectivity and misinterpretations due to a lack of conceptualisation could only be resolved by having a solid theoretical framework.

Markon, Krueger and Watson (2005) used meta-analysis to assemble a correlation matrix from the three-factor model of Eysenck (Eysenck & Eysenck, 1975); the seven-factor model of Cloninger (Cloninger, Przybeck, Svrakic & Wetzel, 1994) Tellegen's (1982) normal personality traits and the FFM (Costa & McCrae, 1992a). Markon et al. (2005) found that a model consisting of five factors emerged through parallel analyses that clearly

corresponded with the FFM and was strongly marked by the five domain scales of the NEO Inventories (McCrae, 2010).

Although consensus has been reached on the five broad trait domains, and the Big Five factors serve as a common language in personality psychology, problems are still experienced for specific samples with Confirmatory Factor Analysis (CFA) and Exploratory Factor Analysis (EFA) in terms of poor fit (McCrae, Zonderman, Costa, Bond & Paumonen, 1996). Church and Burke (1994) came to the same conclusion from their empirical research, namely that the poor fit not only highlights the limitations of the personality structure theory, but also the limitations of CFA to test personality structure models. While CFA requires items to load clearly on one particular factor, this is too restrictive for personality research as most indicators are likely to have secondary loadings (Block, 1995).

Marsh et al. (2010) suggested new methods to assess the Big Five Factor structure through Exploratory Structural Equation Modelling (ESEM) using the NEO PI-R. The ESEM framework was used by Marsh et al. (2010) to test factorial and measurement invariance of the NEO-FFI. They found that the failure of Big Five CFAs (based on item-level responses for NEO instruments to achieve acceptable levels of fit) can be overcome through application of the ESEM approach. Marsh et al. (2010) nevertheless stressed that the ESEM approach should not replace the CFA approach, but the best fitting model should be used by applied personality researchers.

2.4.3.3 The number of factors

The number of factors required to adequately describe personality is another one of the debated topics, and some theories in this regard will be discussed in this paragraph. Eysenck (1970) proposed a three-factor model named the Giant Three and acknowledged that various models of personality differ on the number of factors that would be optimal to describe personality adequately and accurately (Eysenck, 1990). The 16-factor model of Cattell et al. (1970) is widely accepted and used. Goldberg (1990) as well as Costa and McCrae (1992) strongly believed that the Big Five factors describe personalities

accurately, while Simms (2007) suggested that the seven-factor model of Cloninger (Cloninger et al., 1994) captures the uniqueness of individuals more correctly.

Hampson et al. (1986), on the other hand, argued that personality could be conceptualised at different levels of abstraction or breadth and that many trait domains are hierarchically structured. The Big Five dimensions represent a rather broad level in the hierarchy of personality descriptors. In any hierarchical representation one would lose information as one moves up the hierarchical levels. Although this is very useful for some initial rough distinctions, it is less valuable for predicting specific behaviours (Hampson et al., 1986).

The focus in the current study was on the Big Five factors despite sceptics' arguments that the five dimensions could not capture all of the variation in human personality and that they factors were too broad (Block, 1995; 2001; Briggs, 1989, McAdams, 1992; Mershon & Gorsuch, 1988).

2.4.3.4 Completeness of the Big Five as trait taxonomy

According to John et al. (1991), a complete trait taxonomy must include middle-level categories such as assertiveness, orderliness and creativity, and even narrower descriptors such as talkative and punctual. McCrae (1992) provided another side of the argument by stating that the Big Five does not provide descriptions of peoples' lives. He described the Big Five as a "psychology of the stranger" (p. 353) that offers a description that one might wish to make when one knows very little about a person.

This point of criticism was addressed when Costa and McCrae (1992b) developed the NEO PI-R with 30 facets (six facets for each of the five factors). This represented the most elaborate and empirically validated model of the Big Five (McCrae & Costa, 1987; Ramsay, Taylor, de Bruin & Meiring, 2008).

McCrae (2010, p. 59) stated that the FFM "does not purport to be a comprehensive taxonomy of individual differences, but only of dispositions, that is, personality traits".

He further explained that the hierarchical FFM (defined by factors and facets) should be distinguished from the Big Five, which represents five broad constructs. McCrae (2010) agreed with Block (2001) and Lanning (1994) that the Big Five constructs themselves do not exhaust valid personality trait variance. McCrae (2010) therefore identified additional factors as trait isolates, which comprise specific dispositions unrelated to either of the five constructs or any other trait.

2.4.3.5 Limitations in predicting life outcomes

The usefulness of a structural model depends on its success to predict important life outcomes (John & Srivastava, 1999). McAdams (1992) argued that the Big Five does not sufficiently predict important life outcomes – there is more to personality than just traits. McCrae and Costa (1996, 2008) offered the broader perspective of the Five-Factor Theory (FFT) to put the FFM into the context of a functioning model of trait structure. According to the FFT, "personality is a system situated between biological and social-cultural inputs and its major components are basic tendencies (especially the FFM) and characteristic adaptations (habits, attitudes, roles, etc.)" (McCrae, 2010, p. 60).

Shortly after this point of criticism was raised, a large study of adolescents that tested the validity of the Big Five against three criteria (juvenile delinquency, childhood psychopathology and academic performance) showed that the Big Five can be used to understand and predict significant life outcomes (Venter, 2006). For example, the study found that low Agreeableness and low Conscientiousness were associated with high manifestations of juvenile delinquency. Regarding psychopathology, high Neuroticism and low Conscientiousness were associated with high manifestation of internalising disorders. Results also indicated that Conscientiousness and Openness significantly predicted school performance (John, Caspi, Robins, Moffitt & Stouthamer-Loeber, 1994). In studies of job performance, the Big Five related to important outcomes in the workplace. Extraversion was found to statistically significantly predict performance in sales and management jobs, while Conscientiousness proved to be a general predictor of job performance (Barrick & Mount, 1991; Mount, Barrick & Stewart, 1998).

2.4.3.6 The Big Five derived from a natural language perspective

Block (1995) argued that the lexical approach (using a dictionary to obtain a universe of single-word descriptors) did not assure a complete set of personality-descriptive terms. It was his opinion that these single-word descriptors could not represent the complexities and uniqueness of personality (Block, 1995). He argued that the Big Five merely captured the personality conceptions of laypersons and that a language suitable for personality experts (such as psychologists) was required. McCrae (1990) pointed out that many theorists were sceptical of the ability of laypersons to understand the true basis of personality and that scientific theory often needed to transcend implicit knowledge of the culture.

Even though Block (1995) criticised the methods that McCrae and Costa (1985) used to link their research to the lexical approach, he did not provide alternatives. The NEO scales were initially developed through cluster analysis of the 16PF to measure three of the five broad personality dimensions (McCrae & Costa, 1976). The elements connecting the lexical five factors and the three factors motivated them to include the other two factors. McCrae and Costa (1985a) used methodological strategies to seek their desired factor structure, and used items that had decent internal consistency reliabilities and that loaded onto factors that were clearly distinguishable from one another. These items had to correspond with adjective-based measures. Once the items had been selected to measure those two factors, they were added to the NEO scales to form the NEO PI (Costa & McCrae, 1985) which measures the lexical five factors. Instrument scales were standardised in both self-report and peer-rating forms to represent the A (Agreeableness) and C (Conscientiousness) dimensions. According to Block (1995, p. 203), "this sequence of interlocking analyses for assuring correspondence between A and C instruments and the previous A and C adjectival measures is unusual and astute".

John (1989) addressed this criticism in his research by testing the degree to which the Big Five could capture the personality judgements formulated by psychologists. John (1989) reported that there was a substantial similarity between the five factors as defined by the panel of judges (all psychologists) and Costa and McCrae's (1992) five factors.

Block (1995, p. 207) admitted that the Big Five represents a "clarifying and advancing framework that can be used for integration in the chaotic field of personality assessment". McCrae (2010) commented that one of the things Block (1995; 2001) found most disturbing about the FFM was the notion that it was 'the answer' to all the questions of personality psychology. McCrae (2010) admitted that it was not, but confirmed what Norman (1963) had hoped for, namely that the FFM would be an adequate taxonomy of personality traits.

2.5 RESEARCH ON PERSONALITY INSTRUMENTS

In this section research done on the most popular personality instruments will be discussed – firstly research done on the general personality instruments (non-Big Five and non-FFM) and secondly research done on the Big Five and FFM instruments will be discussed.

2.5.1 General personality instruments (non-Big Five and non-FFM)

2.5.1.1 The 16PF

The original 16PF was designed as a multidimensional set of 16 scales that were identified by Cattell in 1947 (Cattell et al., 1970). The 16 primary source traits can be factored into five secondary (higher-order) factors, namely Introversion/Extraversion, Low Anxiety/ High Anxiety, Tough-Mindedness/Receptivity, Independence/Accommodation, and Low Self-Control/High Self-Control (Cattell et al., 1970).

Internationally the 16PF has been researched in different culture groups, for example the study done by Burger and Kabacoff (1982) who published the results on the different personality types as they were measured with the 16PF. Recently Yu, Zhang, Li, Wang and Tan (2012) used the 16PF to identify the personality profiles needed for Chinese military medical peacekeepers in Lebanon.

The importance of cross-cultural research were acknowledges by Golden in 1978 when he investigated the second order factor structure of the 16PF across cultures from Europe and Japan. He reported that the Japanese second order factors were significantly different from the European profiles. Whitworth and Perry (1990) compared the Anglo-Americans personality profiles with those of Mexican-Americans when the 16PF was administered in Spanish or English. Language impacted on these profiles and significant differences were reported between the groups (Whitworth & Perry, 1990).

Literature available in the South African context on the 16PF (Cattell et al., 1970) are for example the study done by Prinsloo (1992) who adapted the 16PF for the South African population and named it the 16PF, Form SA92. The adaptation of the 16PF (SA92) followed the etic approach, in order to render it appropriate for all population groups in South Africa (Prinsloo, 1992). The 16PF (SA92) is a 160-item instrument that consists of statements that require a choice between three options. The instrument is normative, and the norms were based on 6 922 participants from different academic and industrial organisations (Prinsloo, 1992).

Furthermore Van Eeden and Prinsloo (1997) conducted a study on the second-order factors of the 16PF (SA92) by screening 637 applicants for posts at a multi-cultural business institution. A distinction was made using home language as a basis, and the sample comprised 317 subjects with an African language as a home language and 320 English- or Afrikaans-speaking subjects.

Van Eeden and Prinsloo (1997) performed an exploratory factor analysis and extracted five second-order factors. These factors were identified as Extraversion (QI), Anxiety (QII), Independence (QIV), Compulsivity (QVIII) and Emotional Sensitivity (QIII). The factors were found for the English/Afrikaans group, and all but the fifth one (Emotional Sensitivity) was found for the African language group. Van Eeden and Prinsloo (1997) concluded that the 16PF (SA92) can be used cross-culturally in that specific occupational context, but cultural and gender-specific trends had to be taken into account in the interpretation of results.

A study by Abrahams and Mauer (1999a) yielded results that did not support the comparability of constructs of the 16PF (SA92) across four race groups in South Africa. Using 983 Industrial Psychology students from a number of South African universities, Abrahams and Mauer (1999a) drew up four sub-samples on the basis of race, namely Black (N=253), Coloured (N=252), Indian (N=229), and White (N=249). Alpha coefficients were extremely low for the Black sample, ranging from .02 to .63. Internal consistency alphas were also relatively low for the other three groups, and ranged from .32 to .80. Abrahams and Mauer (1999a) furthermore performed a factor analysis using target rotation. The results indicated that Cattell's 16-factor structure could not be replicated with the data, the white group fitted the structure best, and the black group showed the poorest fit (Taylor, 2004).

In a related study by Abrahams and Mauer (1999b) they researched the extent to which participants understand the meaning of words used in the 16PF (SA92). The first study consisted of 71 second-year Industrial Psychology students who spoke English as a second or third language. The students had to provide acceptable synonyms for 136 words found in the items of the 16PF (SA92). These synonyms were marked correct or incorrect based on definitions provided by three different dictionaries. It was found that most respondents could not provide acceptable synonyms. However, it must be noted that the words were not placed in any context, and the meaning of a word can often be derived from the structure or context of the sentence. The second study required 10 black Industrial Psychology honours students to provide a description of what was meant or asked by each item in the 16PF (SA92) and they also had to comment on the usefulness of the item. Numerous interpretation problems arose, revealing both cultural and language discrepancies in the interpretation of the items (Abrahams & Mauer, 1999b).

Prinsloo and Ebersöhn (2002) responded to Abrahams and Mauer's (1999a, 1999b) studies on the 16PF (SA92) and highlighted methodological issues and the need for differential interpretation of scores across cultures. Prinsloo and Ebersöhn (2002) stressed that 'high' or 'low' scores obtained on the 16PF (SA92) did not mean 'good' or 'bad', but rather that, in certain situations, more or less of a given personality construct could be desirable.

A replication of Abrahams and Mauer's (1999b) study on the impact of home language on responses to items on the 16PF (SA92) was carried out by Wallis and Birt (2003). The original study drew no comparisons between first-language English speakers (native English speakers) and those with English as a second or third language (non-native English speakers). Wallis and Birt (2003) investigated whether there was a discrepancy between these two groups in their ability to understand words in the 16PF. A sample of 96 native English-speaking and 35 non-native English-speaking students were asked to provide synonyms for the 135 words extracted from the 16PF in Abrahams and Mauer's (1999b) study. One word was repeated in the original list, hence 135 items instead of the original 136 items were used (Taylor, 2004).

Wallis and Birt (2003) realised that if they scored the synonyms according to informal language use (i.e. accepting Afrikaans translations, subtle synonyms, and everyday English meanings that are not technically correct, but mean the same thing), both groups seemed to understand most words in the list. They commented that this is an indication that the results obtained by Abrahams and Mauer (1999b) were more a result of the methodology that was used than of language-related problems. It was recommended that further studies using different methodologies be undertaken to determine the extent of language barriers as fundamental reasons for score differences.

McDonald (2011) conducted a study similar to that of Abrahams (1996) and Wallis and Birt (2003) on the 16PF5, in which the understanding of the vocabulary between native English-speaking students and non-native English-speaking students was investigated. In McDonald's (2011) study students had to choose synonyms from multiple-choice options and afterwards the results of non-native English speaking students were compared with those of native English-speaking students. Although a different form of the 16PF as well as different methodologies (as recommended by Prinsloo and Ebersöhn (2002)) were used, McDonald (2011) concluded that there was a significant difference in the scores achieved (number of correct synonyms for words used in the 16PF5) by native English-speaking and non-native English-speaking groups, as well as by a black group and a white group.

McDonald (2011) also determined that there was a statistically significant relationship between a student's academic literacy level and his/her average score (number of correct synonyms for words used in the 16PF5) on the 16PF5.

2.5.1.2 The 15FQ+

In 2002, the 16PF (SA92) was revised by Psytech for use in industrial and organisational environments and named the 15 FQ+ (Psytech, 2002). The 15FQ+ measures 15 of the core personality factors identified by Cattell in 1947. Originally, Factor B (Intellectance) was a measure of ability that did not perform reliably because the personality instrument was untimed (Psytech, 2002). Hence it was left out of the first edition of the 15FQ and later reintroduced in the 15FQ+ as a meta-cognitive personality variable and not as an ability variable (Psytech, 2002). Five global factor scores could also be calculated from the scale scores in the 15FQ+, and these have been shown to correlate highly with the NEO PI-R (Taylor, 2004).

Meiring et al. (2005) conducted an extensive study on test bias in South Africa utilising the 15FQ+ and two cognitive instruments – an instrument that measured reading and comprehension, and an instrument that measured spelling ability. The sample consisted of 13 681 applicants who had applied for entry-level positions in a government organisation. The black group made up 85% of the sample, and was representative of nine South African language groups. All applicants had a minimum of a Grade 12 educational qualification. Although the 15FQ+ demonstrated low item bias, the internal consistency reliability coefficients were unacceptably low (Cronbach alpha values ranging from $\alpha = .231$ for the Conventional-Radical scale for Xhosa-speaking respondents to $\alpha = .652$ for the Affected by feelings-Emotionally stable scale for Setswana-speaking respondents). Evidence of construct bias was found for two of the five factors: Conventional-Radical where a stronger political association exists for the black respondents, and Relaxed-Tense, due to the assumption that black respondents are more relaxed people (Meiring et al., 2005). Meiring et al. (2005) concluded that the usefulness of the 15FQ+ was limited, and that certain semantic revisions of items needed to take place in order for the items to be better understood (e.g. the use of difficult words such

as ‘gullible’, ‘temperamental’ and ‘conventional’ should be avoided). This finding was in line with recommendations from studies done on the 16PF (SA92) (Abrahams & Mauer, 1999b) and the NEO PI-R (Taylor, 2000) about problematic issues regarding the understanding of certain words in personality instruments.

2.5.2 Big Five and FFM personality instruments

The Five-Factor Model (FFM) presents a hierarchical structure of personality traits with five basic traits or factors (the so-called ‘Big Five’) (Taylor, 2004). Currently, the most extensively researched and most influential formulation of individual differences in personality is the ‘Big Five’ trait taxonomy (McCrae & Costa, 2008). As discussed earlier in this chapter, this taxonomy builds on the early work of Fiske (1949), Norman (1963), and Tupes and Christal (1961). Furthermore, a number of psychologists specialising in personality assessment have proposed that the universe of trait dimensions can be reduced to approximately five basic bipolar categories (Digman, 1990; Goldberg, 1981, 1993; John, 1990; McCrae, 1992; McCrae & Costa, 1987). McCrae and Costa (1987) identified and labelled the Big Five traits as extraversion-introversion (E), neuroticism (N), openness to experience (O), agreeableness-antagonism (A), and conscientiousness-un-directedness (C).

The Big Five personality factors have received considerable support for their cross-cultural applicability worldwide (Benet-Martínez & John, 1998; De Young, 2010; McCrae, 2001; Meiring et al., 2006; Taylor & De Bruin, 2006; Taylor, 2000). The methodologies used in studies on the Big Five personality factors often involve a comparison of the personality factor structure of the instrument in one culture to that of another culture. This is done to determine the structural equivalence of the instrument across cultures (Van de Vijver & Rothmann, 2004).

De Raad (2000) suggested that considerably more research was needed to enhance the precise meaning of the factors and to improve the validity and cross-cultural applicability of specifically the Big Five model as a personality measurement theory. McCrae (2001) stated that the FFM had been studied widely from a cross-cultural perspective.

Some pertinent literature is discussed next to highlight research done on cross-cultural assessment with the Big Five and FFM personality instruments.

Heaven, Connors and Stone (1994) investigated the structure set of 112 English language descriptors for a sample of 230 black South African undergraduate university students. The data was subjected to a principal components analysis with oblimin rotation and both three- and five-factor solutions were extracted. Unfortunately neither Eysenck's Giant Three nor the Big Five factors could be identified in this study. However, it must be noted that although English was the medium of instruction at the specific university, it was not the first language of many of the participants. The meaning of the adjectives was probably not clear to the bulk of the sample and the alone-standing adjectives could well have been interpreted differently by various respondents, since they were not presented in the context of a sentence. Heaven et al. (1994) suggested that dimensions beyond Extraversion and Neuroticism were culturally determined, and that the Big Five could possibly have been extracted from a list of African natural language terms.

In another study conducted in South Africa, Heaven and Pretorius (1998) found support for the FFM among white participants, but not among African participants. In the same study they also failed to find support for Eysenck's Giant Three dimensions.

Van der Walt et al. (2002) identified 19 studies with 3 478 cases to include in a meta-analysis study of the relationship between the Big Five personality constructs and job performance criteria in South Africa. They found that Extraversion, Neuroticism and Conscientiousness were all valid predictors for job performance in South Africa. They also found that for a sample with an education level higher than Grade 12 (moderating factor), the FFM constructs had a higher predictive value for job performance.

Visser and Du Toit (2004) intended to determine if the FFM was relevant in South Africa by using the Occupational Personality Questionnaire (OPQ) among telecommunication job applicants. After analysing the data by means of exploratory factor analysis, they concluded that all five constructs of the FFM were obtained, with an additional sixth

construct, labelled Interpersonal Relationship Harmony. The cross-cultural equivalence of the findings, however, was not discussed (Nel, 2008).

Meiring et al. (2005) reported that only a few studies had addressed the suitability of the FFM in South Africa. One such a study was conducted by Zhang and Akande (2002) who used the NEO PI-R (Costa & McCrae, 1992) to investigate the applicability of the FFM personality dimensions for South Africans. They did not only find a different personality structure than the personality structure from other studies conducted elsewhere, but also reported that some items that measure Openness to Experience had low item-total correlations and reliability.

Investigation into the possible presence of a five-factor structure for personality in South Africans has only recently become a topic of interest (Nel, 2008).

2.5.2.1 Comrey Personality Scales (CPS)

The CPS, a personality trait inventory of 180 multiple-choice items that measure eight major factors of personality, was developed through factor analytic methodology (Comrey, 1970).

The CPS was used in various studies to assess the personality structure, for example Zamudio, Padilla and Comrey (1983) assessed the personality structure of Mexican Americans and found that a majority of the eight factors maintained substantial loadings and corresponded closely with Comrey's normative sample. Two factors, namely Conformity and Orderliness, showed the weakest fit. Overall they reported adequate measurement properties and identified the CPS as the most preferable personality instrument for Mexican Americans. Furthermore Weis and Comrey (1987) used the CPS to assess the personality characteristics of the Hare Krishna and Brief and Comrey (1993) used the CPS to assess the personality characteristics of a Russian sample.

In South Africa the purpose of research on the instrument was to compensate for the discrepancies between the personality models of Cattell, Eysenck and Guilford (De Bruin, 2000).

When De Bruin (1997) investigated the psychometric properties of the CPS for Afrikaans-speaking respondents by administering a back-translated version to 804 Afrikaans-speaking first-year students, he found that six of the eight CPS scales had congruence coefficients of above .90. He concluded that the CPS was cross-culturally feasible for Afrikaans-speaking respondents in South Africa.

Next, De Bruin (2000) conducted an inter-battery factor analysis of the CPS and the 16PF on 700 Afrikaans-speaking university students and revealed three of the Big Five personality factors, namely Extraversion, Neuroticism and Conscientiousness. Thus the importance of these factors was highlighted for the Afrikaans-speaking sample in South Africa (De Bruin, 2000).

Although good results were obtained for the CPS, it was only researched for Afrikaans-speakers and merely confirmed the presence of three of the Big Five personality factors in South Africa (Taylor, 2004). This reconfirmed the need for the development of a South African measure of the Big Five that contains more cultural-specific language and terms specific to South Africa (Taylor & De Bruin, 2006).

2.5.2.2 The NEO Personality Inventory – revised (NEO PI-R)

The NEO PI-R (Costa & McCrae, 1992a) is the best-researched personality instrument internationally for assessing the Five-Factor Model across cultures (Boyle, 2008). It has been published in Dutch, French, German, Korean, Spanish, Polish and Portuguese, and validated translations are available in a number of other languages such as Italian and Norwegian. McCrae and Terracciano (2005) conducted a meta study across 50 cultures to identify the universal features of personality traits measured with the NEO PI-R. Very high internal consistency reliability coefficients were reported for the NEO PI-R across these 50

cultures, the coefficients were reported as follows: Neuroticism α=.90, Extraversion α=.90, Openness to Experience α=.88, Agreeableness α=.92 and Conscientiousness α=.94.

In the South African context, translations are available in Afrikaans, Southern Sotho and Xhosa (Costa & McCrae, 2003). The majority of studies done on the FFM in South Africa used the NEO PI-R (Costa & McCrae, 1992b) as the key personality instrument.

The structure of the FFM in South Africa was also researched by Heuchert et al. (2000) with a sample of 408 undergraduate student volunteers (268 white, 92 black, 43 Indian, and 5 coloured). The respondents completed the NEO PI-R, but the coloured group (too small a sample to include in further analyses) and students older than 22 (since US college student norms were employed) were dropped from the factor structure analysis, leaving the sample size at 363 students. When Heuchert et al. (2000) compared the South African group with the American normative sample, five factors were extracted from the South African data. A target rotation to the American sample yielded good fit, with all facets loading very high on their hypothesised domains. Only Angry Hostility (N2) and Warmth (E1) had secondary loadings at or above .40 on another domain (Agreeableness) in addition to the hypothesised domain.

Heuchert et al. (2000) found similar results in a varimax-rotated solution for the white group. Again all facets had loadings of above .40 on their posited factor, and the same two secondary loadings were present. Assertiveness (E3) also had a negative secondary loading on Neuroticism. However, a comparison with the American normative groups yielded congruence coefficients at or above .90 for all five factors (Taylor, 2004). A target rotation of the black and white South African sample yielded closer fit of the factors than that of the American sample, with congruence coefficients ranging from .85 to .90 for the black and white samples (Heuchert et al., 2000).

Heuchert et al. (2000) concluded that there is a clear five-factor solution on the NEO PI-R for both white and black South African students and that the five-factor solutions were similar to the FFM results obtained by US college students.

Taylor (2004) mentioned that research results for use of the NEO PI-R in a South African context are contradictory, providing both optimistic and pessimistic recommendations. However, she concluded that most researchers agree that the NEO PI-R needs item revision in order to be better understood by South African respondents (Taylor, 2004).

The Neo PI-R (Costa & McCrae, 1992b), as stated above, provided the best structure for measuring the Big Five in South Africa. The BTI was developed on the basis of the factor structure of the Neo PI-R to measure the Big Five personality traits for South Africans in terms of five factors and their facets (Taylor, 2004).

2.6 PERSONALITY INSTRUMENTS DEVELOPED IN SOUTH AFRICA

Personality instruments are mainly imported from Europe and the USA (etic approach) and adapted for South African use due to the high demands in terms of time, research and responsibilities accompanying the development of a new personality instrument (Meiring, 2007). However, two personality instruments are in the process of being developed in South Africa (Taylor, 2008) (emic approach) and will be discussed next. They are the South African Personality Questionnaire (SAPQ) (Steyn, 1974) and the Basic Traits Inventory (BTI) (Taylor & De Bruin, 2006).

It is evident from these studies that the applicability of the Five-Factor Model in the South African population yields promising results. However, in trying to discover the actual personality structure for South Africa, it will be more valuable to search for the traits that are familiar, inherent and observable in all the language groups (Taylor, 2008). South Africans' description and observation of personality traits may fluctuate within language groups and therefore this phenomenon needs to be investigated.

2.6.1 The South African Personality Questionnaire (SAPQ)

Steyn (1974) developed the South African Personality Questionnaire (SAPQ) specifically for use in a South African context. The SAPQ is a 150-item instrument, available in English and Afrikaans, and only applicable to white South Africans with 12 or more years of

formal education (Steyn, 1974). Steyn (1974) derived five bipolar scales from literature and claimed that these measures would provide sufficient reliability and descriptive relevance to the white section of the South African population.

These five bipolar scales are as follows:

- Social unresponsiveness vs. Social responsiveness
- Tranquillity vs. Anxiety
- Amity vs. Hostility
- Flexibility vs. Rigidity
- Submissiveness vs. Dominance

In a series of studies by Steyn (1974), the lowest Cronbach alpha value for the internal consistency reliability coefficient of the scales of the SAPQ was .79. In a joint factor analysis with the 16PF (N=268), Steyn (1974) concluded that most of the 16PF factors loaded on at least one SAPQ factor.

Taylor and Boeyens (1991) investigated the SAPQ's construct comparability across culture groups. They reported that the instrument was "unsuitable – and unalterable – as an instrument for making deductions on personality that are comparable across Black and White cultures" (Taylor & Boeyens, 1991, p. 9). Four samples of male students from various South African universities (two black samples – 136 and 123 students respectively, and two white samples – 193 and 188 students respectively) were used, and the data fitted the SAPQ structure for three of the four groups (two white and one black group) when an exploratory factor analysis was performed (Taylor & Boeyens, 1991). They further investigated the differential item functioning (or item bias) of the SAPQ and found that 53% of the items in the scale showed some type of item bias for both of the black samples. This prompted them to suggest that "a new South African personality assessment instrument be constructed, for there is no instrument that one can confidently recommend for general use at this stage" (Taylor & Boeyens, 1991, p. 9).

In response to the research by Taylor and Boeyens (1991), Retief (1992) agreed with the SAPQ's lack of utility and emphasised that analysing different responses across cultures

may reveal important information on differences in the interpretation of social contexts and cultural values. The distribution of the SAPQ has since been discontinued. Yet, until recently, this was the only personality instrument that had been developed in South Africa.

Another 'imposed' (etic approach) personality instrument that was used and researched in South Africa during this same period was the Comrey Personality Scales (CPS, 1970). Even though the CPS had not been developed in South Africa, research on it provided valuable information with regard to the Big Five factors and their usability in South Africa (Taylor, 2004).

2.6.2 The Basic Traits Inventory (BTI)

The BTI (Taylor & De Bruin, 2006) was developed in an attempt to address the scarcity of locally developed (emic approach) and validated personality instruments that can address the specific and unique challenges of the South African population. It is a 193-item inventory that uses a Likert-type response (5-point) scale with response options ranging from strongly disagree to strongly agree.

Likert scales allow for greater variance than a dichotomous scale, but still permit respondents to answer relatively quickly and easily, without the confusion brought about by too many options (Clark & Watson, 1995). Each item was carefully evaluated in terms of its content for appropriateness to the relevant factor; social desirability; simplicity and clarity; and grammar.

The items were keyed in both positive and negative directions so as to keep the scales balanced and as a strategy to control for compliance to all items (Taylor, 2008). This method however caused methodological concerns about whether the items keyed in negatively have the same meaning as those keyed in positively. Wong, Rindfleisch and Burroughs (2003) found in a study of the Material Values Scale (MVS) (Richins & Dawson, 1992) involving 800 respondents a lack of measurement equivalence across cultures, even

when the items were changed into non-directional questions. Barnette (2000) stated that negative-worded items reduce reliability and create artificial factors in factor analysis.

The strong point of the BTI (Taylor & De Bruin, 2006) is that it uses everyday language and not complicated psychological terms. It can be used in almost any context where personality assessment is done, such as psychological diagnosis, recruitment and selection, personal development, educational settings, counselling and research (Taylor & De Bruin, 2006).

The BTI (Taylor & De Bruin, 2006) is a personality inventory that has been developed in South Africa to assess the Big Five factors of personality. These factors are Openness to Experience, Conscientiousness, Extraversion, Agreeableness and Neuroticism. The BTI also includes a measure of social desirability (Taylor & De Bruin, 2006). Each of the first four factors consists of five facets, while Neuroticism has only four facets (Taylor & De Bruin, 2006). Each facet is captured through responses to multiple-choice items (Taylor & De Bruin, 2006).

Although the BTI is a fairly new personality instrument, very promising results were obtained by Taylor (2004); Taylor and De Bruin (2006); Taylor (2008), as well as Ramsay et al. (2008).

Taylor (2008) reported alpha coefficients of above .80 for all of the race groups, for gender groups higher than .85 and for the different language groups above .83 (Taylor, 2004). The five-factor structure corresponded with the five factors expected from the FFM theory (Taylor, 2004).

Tucker's phi was used as the coefficient of agreement or congruence to investigate the factorial agreement between the different groups and to make meaningful comparisons between groups. A value of .95 or above was taken to indicate factorial similarity, and values below .90 indicated incongruities in the factor structures of the two groups (Van de Vijver & Leung, 1997).

Taylor and de Bruin (2004) reported Tucker's phi coefficients for the BTI as ranging between .95 and .98, which indicated factorial similarity across the different ethnic groups in South Africa.

Further evidence for construct validity was found by De Bruin et al. (2005) when they compared the BTI with the 16PF 5th edition. The first five factors of the 16PF 5th edition corresponded closely with the factors of the FFM and provided strong support for the construct validity of the BTI scales. Each of the BTI facets had its highest loading on the appropriate factor and all of these loadings were indicative of the stability of the factor structure (De Bruin et al., 2005).

The five factors of the BTI have demonstrated good reliability in various studies with different samples (Taylor, 2004; De Bruin et al., 2005; Taylor & De Bruin, 2006). De Bruin and Taylor (2005b) concluded that adequate confirmation was provided of the construct validity of BTI across cultures, and that some evidence indicated predictive validity and measurement invariance across language groups. The most recently reported Cronbach alpha coefficients are for Extraversion (36 items, α=.87), Neuroticism (34 items, α=.93), Conscientiousness (41 items, α=.93), Openness to Experience (32 items, α=.87), and Agreeableness (37 items, α=.89) (De Bruin & Taylor, 2005b).

According to Taylor (2008), the BTI statistically performs very well in terms of little or no construct, item and response bias for a number of different culture groups. She used Rasch techniques to investigate bias for gender groups (men versus women), ethnic groups (black versus white students) and language groups (English, Afrikaans and indigenous African languages), and concluded that the BTI reported significant statistics for construct, item, and response bias across a number of different groups.

Ramsay et al. (2008) found a good fit between the postulated five-factor model (McCrae et al., 1998) and the BTI for three groups of South African participants. The BTI displayed an acceptable level of measurement invariance across Nguni, Sotho and Pedi language groups for a sample of clerical position applicants (Ramsay et al., 2008).

Van der Walt et al. (2002) found that Extraversion, Neuroticism and Conscientiousness are valid predictors for job performance. They also suggested that education acted as a moderating factor and that the FFM constructs had better predictive value for a sample with an educational level higher than Grade 12. (The educational level required from applicants by the government organisation used in the current study was Grade 12.)

To conclude, the BTI is an easy to use, easy to understand personality inventory (Taylor & De Bruin, 2006). It is available in Afrikaans and English, but only the English version was used in the current study.

2.7 SUMMARY

The history of personality psychology was discussed in terms of theory and the research that had led to the identification of the Big Five factors. The structuring of personality based on the Big Five factors and the FFM has been researched extensively internationally (Digman, 1990; Goldberg, 1981, 1993; John, 1990; McCrae, 1992; McCrae & Costa, 1987), but its applicability for personality assessment in South Africa has not yet been proved sufficiently (Meiring et al., 2005).

Research conducted on the suitability of the various imported (etic approach) personality measures currently used in South Africa demonstrates significant differences for the diverse local population – specifically as far as bias and the adverse impact of South Africa's eleven official languages are concerned (Meiring et al., 2005).

However, studies investigating the presence of the Big Five in South Africa showed promising results (Taylor, 2004). Therefore Taylor and De Bruin (2006) developed the BTI as a South African personality instrument measuring the Big Five by using more simpified language and local South African terms.

In the following chapter the various methodological challenges confronting test developers and researchers in South Africa will be discussed, with a special focus on the challenges related to the country's multilingual population.

CHAPTER 3: IMPACT OF LANGUAGE ON PERSONALITY ASSESSMENT

3.1 INTRODUCTION

Despite the origin of different languages having been a widely studied topic over many years, linguists have still not reached a final consensus on the origin of different languages (Herbert, 1992). Linguists also debate whether having different languages in a country is a gift or a curse (Herbert, 1992). In 1866, the Linguistic Society of Paris went so far as to ban debates on the subject of the origin of different languages (Tallerman & Gibson, 2011). Since the early 1990s, however, a growing number of professional linguists, archaeologists, psychologists, anthropologists and others have attempted to address with new methods what they are beginning to consider 'the hardest problem in science', namely – where did different languages originate from (Tallerman & Gibson, 2011)?

Psychologists are nonetheless more concerned about the consequences of having different languages, than the origin thereof, especially in terms of the impact these different languages have on fair assessments (Meiring et al., 2005). This concern is even more prominent in the South African context where eleven official languages have an impact on psychometric assessments (Meiring et al., 2005).

A number of research studies that have been conducted in South Africa as a multicultural and multilingual environment will be discussed in this chapter.

3.2 RESEARCH ON THE IMPACT OF LANGUAGE ON PERSONALITY ASSESSMENT

Differences in the meaning attached to constructs and the way they manifest in different cultures and/or languages are bound to surface during personality assessments (Kamwangamalu, 2007). It is important to acknowledge the social history and challenges when psychometric assessment is done in a language other than the repondent's home language (Kamwangamalu, 2007).

Zhou, Saucier, Gao and Liu (2009) used the lexical approach to explore the factor structure of Chinese personality descriptors. Firstly they examined the between-language replicability of the Chinese personality structure and secondly they tested the universality across language of the Big Five model in comparison with alternative models (Zhou, Saucier, Gao & Liu, 2009). They highlighted the importance of studies on the language of personality as that will provide important indicators of what the personality test should measure (Zhou, Saucier, Gao & Liu, 2009).

As stated before, the five-factor model has been extensively researched internationally for cross-cultural personality assessment and is at the forefront of trait perspective research (Heuchert et al., 2000).

However, research on the influence of language on personality assessment in South Africa was highlighted when Abrahams (1996; 2002), as well as Abrahams and Mauer (1999a; 1999b) criticised the fairness of administering the 16PF (SA92) in English in a multicultural and multilingual environment. Even though Prinsloo and Ebersöhn (2002) responded in terms of the research methodology used by Abrahams and Mauer (1999), the focus of personality assessment research shifted to the effect of eleven different languages in South Africa. Meiring et al. (2005) looked at the construct, item and method bias of cognitive and personality tests in South Africa and specifically the adapted version of the 16PF (SA92), namely the 15FQ+. They concluded that the 15FQ+ should be used with caution for black South Africans because of the low item bias and the unacceptably low internal consistency reliability coefficients (i.e. Cronbach alpha values ranging from α=.23 for the Conventional-Radical scale for Xhosa-speaking respondents to the highest Cronbach alpha value α=.65 for the Effected by feelings-Emotionally stable scale for Setswana-speaking respondents). Evidence of construct bias was also found for two of the five factors, namely the factor Conventional-Radical and the factor Relaxed-Tense (Meiring et al., 2005). This finding is in line with recommendations from studies done on the 16PF (SA92) (Abrahams & Mauer, 1999b) and the NEO PI-R (Taylor, 2000) about problematic issues regarding the understanding of certain words in personality instruments.

Van Eeden and Mantsha (2007) conducted research on the theoretical and methodological considerations that need to be taken into account when translating a personality instrument. They specifically focused on the translation of the 16PF5 into an African language and administering it to the language group. They found that many items did not improve the reliability of the instrument and, should the aim be to achieve acceptable reliability, these items would have to be excluded. However, the reliability would still be low. The absence of equivalent concepts in the target language causes the meaning of an item to change and Van Eeden and Mantsha (2007) indicated that trends manifested differently for the different cultures, specifically in relation to cultural norms. They concluded that these challenges proved that the literal translation of the 16PF5 was not recommended.

Foxcroft (1997) investigated the different perspectives on the subject of ethical and fair practices with regard to psychological testing in South Africa and in 2004 summarised the processes to be followed when planning a psychological test in the multicultural South African context.

Foxcroft (1997) also summarised some perspectives on the ethical considerations and fair practices of psychological testing in terms of the administration language. She proposed that a code of fair testing practice and a national test development agenda should be developed to enhance the ethical use of psychometric tests in South Africa. She argued that language proficiency tests should be done to establish the level of understanding of the language in which the tests are administered before further testing is done, as this would ensure fairer testing practices. She also highlighted the importance of appropriate norms and ethical and fair practices with regard to psychological testing (Foxcroft, 1997). To eliminate the effects of past apartheid political policies, she proposed that ethical test development be enhanced by developing a Code of Fair Testing Practice and a national test development agenda for South Africa.

Foxcroft (2004) identified two very important issues that test developers have to consider when psychometric tests are to be used in a multicultural environment.

These were the cultural relevance (and potential bias) of the test right from the planning and design phase (not only during the item-writing phase), and the appropriateness of the methods of test administration for a specific culture group. Foxcroft (2004) emphasised that more test developers should spend more time on design issues during the planning phase.

Foxcroft (2004) recommended that a multicultural test development team and a reference panel of cultural experts, anthropologists, psychologists, linguists, etc., work together to ensure that a rich mix of cultural and language inputs are given during the development of psychometric tests. She also elaborated on the following aspects that according to McIntire and Miller (2000) had to be made more appropriate for test development for a multicultural population:

- Identifying the purpose and rationale for the test as well as the intended target population
- Defining the construct (content domain) and creating a set of test specifications to guide item writing
- Choosing the test format
- Choosing the item format
- Specifying the administration and scoring methods

John (1990b) found that items of an imported Big Five personality instrument, which are normally associated with Agreeablenees (A), Conscientiousness (C) and Openness to experience (O), loaded significantly onto a single dimension. Contrary to expectation, Introversion (E-) and Extraversion (E+) items loaded onto separate dimensions. He suggested that the administration language, English, might have an impact, as it was not the home language of the African respondents. Heaven and Pretorius (1998) decided to re-investigate the underlying structure of language descriptors used by John (1990) among non-English-speaking South Africans. A principal components analysis was done, followed by rotation to oblimin solution, while a five-component extraction was done for both data sets. Factor loadings greater than .50 were regarded as significant (Heaven & Pretorius, 1998).

For the Afrikaans-speaking respondent group, five clearly interpretable components explained 37,7% of the variance (Heaven & Pretorius, 1998), while the same components did not load clearly on the five factors for the Sotho-speaking group. Labels were given to the components as was previously done by Heaven et al. (1994) and John (1990b). Heaven and Pretorius (1998) concluded that the Big Five taxonomy is inadequate for describing personality dimensions, especially among Sotho-speaking respondents, and they recommended that locally constructed measures be developed. According to Verhoeven and De Jong (1992), language definitely influences the responses to psychometric instruments and should always be included as a research objective.

This statement was supported by research done by Bedell et al. (1999), who highlighted culture as a moderator variable in psychological test performance in South Africa. They discussed the cultural variation and the relevant moderator variables in test performance from a historical viewpoint to present issues and trends for cognitive and personality tests. Bedell et al. (1999) concluded that there was a growing need among psychologists for more relevant and better researched tests to be used in the multicultural and multilingual environment of South Africa.

Van de Vijver and Rothmann (2004) further investigated the process of assessment in multicultural groups in South Africa. They summarised four procedures that needed attention when dealing with multicultural assessments, namely the investigation of equivalence of existing instruments, defining new norms, developing new instruments, and studying and eliminating validity-threatening factors (Van de Vijver & Rothmann, 2004).

Research on the FFM and the Big Five constructs yielded similar results. Heuchert et al. (2000) conducted research on the NEO PI-R by administering it to 408 South African college students and found that the five-factor model was well reproduced for the entire sample, which consisted of black and white respondents. Significant differences were found in the factor Openness to experience, where the white group scored relatively higher, the black group relatively low and the Indian group intermediately; however they concluded that the personality structure was highly similar across the races.

Heuchert et al. (2000) indicated that the differences between the responses to the five factors might be due to social, economic or cultural differences, rather than the product of race itself.

Taylor (2000) accepted the FFM as a personality model and looked at an imported personality instrument, namely the NEO PI-R in terms of the construct comparability for black and white employees and found that there is a clear five-factor solution on the NEO PI-R for both white and black South Africans. The possibility of the FFM as a model to describe and assess personality in South Africa has become evident from previous multicultural and multilingual research.

The influence of language on personality assessment was further emphasised by McDonald (2011) who compared a native English-speaking group and non-native English-speaking group's understanding of the vocabulary used in the 16PF5. She also found that the impact of language cannot be ignored, and subsequently Nel (2008) attempted to uncover the personality dimensions in the eleven different language groups in South Africa. The objective of the latter study was to identify the shared and unique dimensions of the different language groups to develop a South African personality instrument that would meet the requirements of the Employment Equity Act (Government Gazette, 1998).

Based on the personality dimensions found by Nel (2008), Valchev, Van de Vijver, Nel, Rothmann, Meiring and De Bruin (2011) explored the personality structure in the eleven languages of South Africa to initiate the development of a personality instrument specifically for South African use (etic approach), namely the South African Personality Instrument (SAPI).

Seeing that the etic approach (importing instruments) caused so many frustrations for South African psychologists, Taylor (2004) investigated the development of the BTI as a five-factor personality inventory based on the FFM specifically for South Africa's unique environment.

The above research studies have highlighted the consequences of administering the same personality instrument to different language groups. Each of South Africa's eleven languages is linked to a relatively distinct cultural group, depending on the first language of members in that group (Valchev et al., 2011). Even though South African historians warned against equating language with ethnic groups or culture in a historical context (Nurse, 1997; Van Warmelo, 1974), this was a contemporary study and the cultural groups were clearly identifiable by language (as illustrated by Slabbert and Finlayson (1998)). Herbert (1992) promoted the recognition of language as a central mark of ethnic identity, as language has often been used as the primary criterion for assignment to an ethnic group. Slabbert and Finlayson (1998) furthermore linked language and identity by noting that language does not only have an instrumental value, but also a symbolic value in terms of being the means through which the values of the individual and particularly the group are expressed.

Ntshangase, Kaschula and Anthonissen (1999) concluded that language is part of culture and that there seems to be no question that languages are as much based on culture as they are intrinsic; language not only expresses cultural values, but to some extent also determines the culture. The current study will follow an ethno linguistic approach where language is seen as part of the culture of a community. The discussion of culture will also serve as an amplification of the language that forms part of that specific culture, for example, the Zulu culture will be discussed as an explanation of people in that culture who use the Zulu language as their first or home language. Fasold (1990) argues that the ethno linguistic approach accepts that language is intimately human and that it will be a mistake not to consider cultural values and beliefs associated with the language. For the purpose of the current study, language will be used as the only identifier of culture – based on the research of Valchev et al. (2011) who confirmed that culture groups are clearly identifiable by the language they indicate as their home language.

The impact of eleven home languages on personality assessment, specifically with the BTI, in South Africa, will be elaborated upon in this chapter, as well as challenges with regard to psychometric assessment in English and the influence that English language proficiency may have on the assessment of personality with the BTI.

3.3 OFFICIAL LANGUAGES IN SOUTH AFRICA

According to Slabbert and Finlayson (2008, p. 13) "South Africa is a unique playground where the complexities of globalisation, colonialism and racism continue to be played out in the rich diversity of languages and cultures". South Africa, with its eleven official languages, are often referred to as the Rainbow Nation. The multicultural and multilingual setting in South Africa is set out Table 3.1.

Table 3.1

The Official Languages of South Africa

Language	Total in Population	% of Population
Afrikaans	6 855 082	13.45%
English	4 892 623	9.60%
Sepedi	4 618 576	9.06%
Sotho	3 849 563	7.55%
Swati	1 297 046	2.55%
Tsonga	2 277 148	4.47%
Tswana	4 067 248	7.98%
Venda	1 209 388	2.37%
Xhosa	8 154 258	16.00%
Zulu	11 587 374	22.74%
Sign language	234 655	.46%
Other languages	828 258	1.63%
TOTAL	50 961 443	

(Statistics South Africa, 2012)

Table 3.1 shows that Zulu is the most commonly spoken language (22.74%) in South Africa, while Ndebele is the least commonly spoken language (2.14%). Afrikaans is spoken by 13.45% of South Africans, while only 9.6% of the population has English as a first language.

Due to the large variety of languages in South Africa, the languages are often grouped together as some languages have many similarities in syntax and grammar, for example isiZulu, isiXhosa, siSwati and isiNdebele are collectively referred to as the Nguni

languages. The Sotho languages – Setswana, Sepedi and Sesotho – also have much in common and are often grouped together, especially to increase sample sizes for research purposes (Taylor, 2008). This can however have a confounding effect on the reliability and validity results for the specific psychometric instruments evaluated and might not give a clear picture of real response patterns for each language separately. This problem was specifically addressed in the current study with large enough samples available for all eleven official languages.

Since the BTI was administered only in English, the history and social characteristics of English are discussed in the following paragraphs.

Kamwangamalu (2007) distinguished between three eras in the social characteristics of English in South Africa, namely the pre-apartheid era (from 1795 to 1947), the apartheid era (from 1948 to 1994) and the post-apartheid era (after 1994).

English was viewed in the pre-apartheid era as the language of the enemy (Brandford, 1996). It was seen as a threat to the Afrikaner identity and an instrument of domination, because it was the language of the British troops who had invaded what was then the Cape of Good Hope, now Cape Town (Kamwangamalu, 2007).

In the apartheid era that followed the whites-only election in 1948, English became the language through which the black community could inform the outside world of their struggle against the apartheid regime (Brandford, 1996). During apartheid only the 'white' languages, Afrikaans and English, were recognised as official languages in South Africa (Kamwangamalu, 2007). This changed the social view of English favourably (Kamwangamalu, 2007) and English was adopted by the Black community not necessarily due to a great love of the language, but rather in protest against Afrikaans (Brandford, 1996).

After the first democratic elections in 1994, the picture changed dramatically and the new South Africa now has eleven official languages (Kamwangamalu, 2007). The *Constitution of the Republic of South Africa* was approved by the Constitutional Court on 4 December

1996 and took effect on 4 February 1997. This placed a huge responsibility on the South African Government to implement positive measures to elevate the status and advance the use of all the official languages. English came to be seen as the language of advancement, education, access, democracy, black unity and liberation (Nomvete, 1994). In the post-apartheid era, English was seen as a language that bonds the formerly divided communities together (Kamwangamalu, 2007).

Phaswana (2003) investigated the implementation of the constitutional eleven-languages clause in Parliament and found that English is commonly used and other official languages are sidelined. Phaswana (2003, p. 124) explained that "the eleven-language policy is an ideal policy which practically cannot work … It was a matter of political correctness to say that eleven official languages are equal." Similarly, the perception exists that psychometric assessments in the eleven official languages practically cannot work, but the development and standardisation process should still take all languages into account.

3.4 LANGUAGE PROFICIENCY AND PERSONALITY ASSESSMENT

In the early years, Thurstone (1938) suggested a model for language performance that contained seven primary mental abilities of which at least two were explicitly verbal, namely verbal comprehension and verbal fluency. Other researchers proposed several variables within the domain of language behaviour alone (Davis, 1944; Guilford, 1982; Spearitt, 1972; Thorndike, 1973).

According to Meyer and Foster (2008), multinational organisations all over the world should strive to ensure that personality instruments are language independent. They explain that organisations should be able to compare personality scores across different languages, using the same 'metric'. More relevant to South Africa's multilingual environment, administering a psychometric instrument in English can have its own challenges, as a lack of English proficiency may have an adverse impact on the individual's performance on the test (Meiring et al., 2006). Even though English is generally understood across the country (being the language of business, politics and the media), administering a psychometric instrument in English may lead to incorrect responses.

Using instruments in English obviously standardises the process and makes the administration more practical, especially in large groups, as was the case of the government organisation in the current study where up to 200 applicants were assessed per test session. However, the possible adverse impact that completing an English personality test may have on the performance of an individual who does not have English as his/her home language must be taken into account, investigated and as far as possible minimised (Meiring, 2007).

Personality instruments are highly language dependent (Meyer & Foster, 2008). This is even more of a challenge in South Africa with its eleven official languages. It results in a situation where psychometric instruments are administered in English, which is not the home language of most of the respondents and for this reason research on the cross-cultural measurement invariance and/or the impact of language on the responses, is of extreme importance. South African researchers have consistently demonstrated how taking a test in a language that is not one's first language can impact on test results (Abrahams, 1996; 2002; Abrahams & Mauer, 1999a; 1999b; Bedell et al., 1999; Foxcroft, 2004; Heaven & Pretorius, 1998; Heuchert et al., 2000; Meiring et al., 2006; Nel, 2008; Taylor, 2000; 2004; Van de Vijver & Rothmann, 2004; Van Eeden & Mantsha, 2007; Vogt & Laher, 2009).

Regarding personality assessment, it is essential to recognise that personality is a social aspect of a person's life and that language proficiency is intimately linked to an individual's social uniqueness (Kamwangamalu, 2007). Thus it is extremely important to remove any language barriers and to be aware of the different levels of understanding of the assessment language and the impact that this might have on the results (Terzoli, Dalvit, Murray, Mini & Zhao, 2005).

Since language has a significant effect on students' understanding of learning material and consequently on their education results, Dlamini (2001) argued that the ideal would be for students to be educated in their home language. Likewise, the ideal would be for individuals to be psychometrically assessed in their home language (Terzoli et al., 2005).

However, the use of African indigenous languages in an educational system has proved to be difficult and in an assessment scenario it has also led to more challenges than solutions (Abrahams, 1996; 2002; Abrahams & Mauer, 1999a; 1999b; Bedell et al., 1999; Foxcroft, 2004; Heaven & Pretorius, 1998; Heuchert et al., 2000; Meiring et al., 2006; Nel, 2008; Taylor, 2000; 2004; Van de Vijver & Rothmann, 2004; Van Eeden & Mantsha, 2007; Vogt & Laher, 2009). Terzoli et al. (2005) reported that the absence of technical terms in some languages, the cost of developing new educational material and the retraining of young students to become more competent in English are problems that greatly hamper Dlamini's (2001) ideal, namely for students to be educated in their home language. Likewise, the absence of technical terms in some languages, the cost of developing new psychometric instruments and the retraining of individuals to become more competent in English, result in individuals not being assessed in their home language, even though this is considered to be the ideal (Terzoli et al., 2005).

Slabbert and Finlayson (1998) illustrated that there is a positive relationship between language proficiency and the personality structure of a culture group. Language proficiency plays a very important role in describing personality and should therefore also be investigated as a factor that influences the response patterns in psychometric assessments (Slabbert & Finlayson, 1998). The impact that having multiple languages has on personality assessment responses was explored by Meyer and Foster (2008), who maintained that personality assessment results should be language-independent and the same 'metric' should be used to compare personality scores across different sub-groups. For this they recommended multiple language norms, which will be discussed more thoroughly later in this chapter.

Verhoeven and De Jong (1992) indicated that the construct of language proficiency is very important for all classification studies in a multicultural and multilingual environment. Language proficiency is frequently labelled in research as a potential source of bias, especially in relation to personality assessment (Maree, 2002; Meiring, 2007; Owen, 1991; Prinsloo, 1998; Van de Vijver & Rothmann, 2004; Van Eeden et al., 1996). Hence, language proficiency assessments are widely recommended for cross-cultural assessments to enhance fair assessment practices (Claassen & Hugo, 1993; Foxcroft,

1997; Grieve & Van Eeden, 1997; Maree, 2002; Meiring et al., 2005; Meiring et al., 2006; Owen, 1991; Prinsloo, 1998; Prinsloo & Ebersöhn, 2002; Van Eeden, 1993; Van Eeden & Van Tonder, 1995; Van Eeden et al., 1996).

When respondents are psychometrically assessed, they could be disadvantaged when the language used in the instrument's instructions differs from the respondent's home language (Meyer & Foster, 2008). South Africa, with its multicultural and multilingual environment, especially needs to combine personality assessment with language proficiency assessment in order to ensure fair assessment practices (Meiring et al., 2005). The fairness of the personality instrument can only be justified if the level of understanding of English of all the respondents assessed is adequate (Meiring et al., 2005).

The role of language and the respondent's proficiency in the test language was described by Meiring et al. (2005) as the level of understanding of the words being used, the understanding of the context and the interrelationships of the words, the understanding of phrases and idiomatic expressions, double meanings and qualifying words. These are all aspects that may influence the respondent's performance on the personality instrument (Meyer & Foster, 2008). Abrahams and Mauer (1999b), Maree (2002), McDonald (2011), Prinsloo (1998) and Van Eeden et al. (1996) observed that language proficiency certainly plays a role when testing non-native speakers of the test language. Language proficiency, which is a complex construct, has elements of intellectual ability connected to it and care should be taken to measure it without bias (Van de Vijver & Rothmann, 2004). According to Verhoeven and De Jong (1992), the first requirement for a structurally modelled language proficiency test is simplicity. They furthermore warned researchers not to make language proficiency a multifaceted profile in a multidimensional space, but rather to test language proficiency on the individuals' everyday language level.

The emphasis in modern psychometric research is on the impact of race and language as important moderators of test performance, especially within the South African context (Abrahams, 1996; Foxcroft, 1997; Heaven & Pretorius, 1998; Van de Vijver & Rothmann, 2004; Foxcroft & Roodt, 2005).

Beddell, Van Eeden and Van Staden (1999) recommended that a more rigorous and unbiased approach should be followed for psychometric assessments in South Africa.

Cross-cultural measurement (in this case cross-language measurement) invariance is especially important in the South African context, yet it is too often ignored (Burgess, 2002). As South Africa's language groups are characterised by cultural differences (Trompenaars & Hampden-Turner, 1998), such validation is critical, particularly if these measures are to be used in a screening/selection context.

In a study conducted by Foxcroft, Paterson, Le Roux and Herbst (2004) on the needs of psychological assessment practitioners and test utilisation patterns in South Africa, practitioners identified the need to address language issues in testing and to adapt tests for South Africa's diverse society.

Very little research on equivalence and bias was conducted in South Africa between 1960 and 1984, because of the prevailing apartheid policy (Claassen, 1997; Owen, 1992).

In the current study, language proficiency was measured with two tests, namely a Reading Comprehension test and a Verbal Reasoning test that were specifically designed for the government organisation concerned (De Beer, 2004).

3.5 PROPOSED SOLUTIONS FOR MULTICULTURAL AND MULTILINGUAL CHALLENGES IN PERSONALITY ASSESSMENT

The influence and challenges of working within a multicultural and multilingual environment are not only a South African problem and have been researched internationally (Matsumoto, Grissom & Dinnel, 2001; McCrae, 2001; Rolland, 2002; Triandis & Suh, 2002; Van de Vijver & Leung, 1997; 2001). Measurement invariance across language groups is possible in any multicultural and multilingual society (Ramsay et al., 2008). One way to overcome measurement invariance is to develop a personality instrument in the specific environment where it will be administered. Research results on the BTI (Taylor & De Bruin, 2006), which was developed in South Africa, confirmed that

there is merit in developing psychometric assessment products for specific groups and making comparisons across groups (emic: within-culture approach), and this also lends support to the universality of the FFM of personality (Ramsay et al., 2008). A solution proposed by Meyer and Foster (2008) to attempt to overcome the challenges of doing personality assessments in a multicultural and multilingual environment is to use multi-language norms.

3.5.1 Multi-language personality norms

Different language norms can allow a psychologist the freedom to compare individuals to different sub-groups (language groups) in a target population (Meyer & Foster, 2008). Generating norms on a single version, form or translation is not a complicated process; however, to generate norms across multiple forms or translations is much more difficult,; as scores from different translations should be combined appropriately (Meyer & Foster, 2008). Schmitt, Allik, McCrae and Benet-Martinez (2007) highlighted that observed differences in mean scores of different cultures may exist not only because of a real cultural disparity on the trait, but the mean score differences could also be the result of either inappropriate translations, biased sampling or non-identical response styles of people from the different cultures.

Meyer and Foster (2008) built their research on the findings of Van de Vijver and Poortinga (1997), which indicated multiple sources of error and bias inherent to cross-cultural personality assessment. Meyer and Foster (2008) collapsed the sources of error in multiple-language assessment into three categories, namely sample differences (research methodology), translation differences (instrument) and cultural differences (real differences in latent construct and other cultural influences).

3.5.1.1 Sample differences

Meyer and Foster (2008) found that the sample size can affect observed statistics, and concluded that statistics tend to ‘stabilise’ at around 600 cases as illustrated in their research with the Hogan Personality Inventory (HPI) (Hogan & Hogan, 2007).

Sample size must be considered in any analysis, especially when integrating samples to form a single norm across cultures or languages (making true differences notable from statistical artefacts) and to have a representative workforce norm (Van de Vijver & Poortinga, 1997).

Secondly, the sample compositions should be focused on having similar language-specific samples that are representative of the population (Meyer & Foster, 2008).

3.5.1.2 Cultural differences

Cultural differences do not only cause problems with the sampling and translations, but also influence the distributions of scores (Schmitt et al., 2007). Even though various studies have focused on examining mean differences in personality assessment (Schmitt et al., 2007), differences other than latent trait differences should also be considered, for example the way different cultures or language groups endorse items.

Meyer and Foster (2008) concluded that assessment in multiple language environments are common and that global norms may be the only practical method of comparing scores across individuals.

3.5.1.3 Translation differences

Meyer and Foster (2008) noted that many difficulties result from the need to combine and compare data collected on multiple forms that represent different languages. They concluded that translations could fundamentally change the form of the original instrument because of the quality of translation, inconsistencies across languages and inconsistencies in the cultural relevance of items (Meyer & Foster, 2008).

Van de Vijver and Leung (1997) highlighted strategies for conducting translation as application (literal translation of items), adaptation (translation with cultural relevance taken into account) and assembly (entirely new assessment of the same construct in the target language).

3.6 TRANSLATION

In trying to overcome language challenges in assessments, the translation of personality instruments has been investigated (Brislin, 1986; Geisinger, 1994; Rolland et al., 1998; Van Eeden & Mantsha, 2007). Various practical problems are experienced especially with translations in the South African context, due to the large number of official languages and the paucity of test administrators who speak these languages (Van de Vijver & Hambleton, 1996). To complicate matters even more, practitioners reported different dialects and a lack of language standardisation in African languages (Van Eeden & Mantsha, 2007). Grieve (2005) and Van den Berg (1996) expressed a concern about the lack of concepts and expressions available to translate personality instruments in a uniform manner.

Brand (2004) also commented that languages are culturally and epistemologically loaded, making it difficult to translate indigenous African (collective) terms into Eurocentric (individualistic) terms. Furthermore, many African languages have a limited lexicon to describe psychological terms such as emotions, as well as limited descriptive terms to portray behaviours, traits and social interactions (Nel, 2008).

To highlight the difficulty of correctly translating personality tests, the research of Heuchert et al. (2000) indicated that the translation of the NEO PI-R into Xhosa was very difficult, as some items could not be translated due to limited vocabulary. This problem is found in most indigenous languages that do not have much exposure to certain Western types of mindset and English informal terminology (Nel, 2008).

From the above discussion, it can be concluded that the translation of psychometric instruments causes more problems than solutions. Test constructors are faced with the challenge of developing and/or changing psychometric instruments to be suitable for all eleven languages in South Africa (Nel et al., 2012). Bedell et al. (1999) highlighted the fact that the cultures and races are highly diversified in South Africa. Although these linguistic and cultural differences are well known, there is a lack of understanding of their impact on psychometric assessment (Nel, 2008).

It is widely acknowledged that the translation of psychological instruments involves more than the mere rewriting of text in another language (Bracken & Barona, 1991; Brislin, 1980; 1986; Geisinger, 1994; Hambleton, 1994). A suitable translation requires a balanced consideration of psychological, linguistic and cultural influences (Hambleton, 1994; Van de Vijver & Hambleton, 1996).

Even though guidelines have been developed by the International Test Commission (ITC, 2000) for adapting educational and psychological tests, many problems experienced are intrinsic to translating tests and solutions for maximising construct equivalence across languages are still considered necessary (Hambleton, 1994). Practical problems with regard to the translation of personality instruments in South Africa include the large number of official languages, the different dialects and a lack of language standardisation, especially with African languages, which simply intensify over time (Wallis & Birt, 2003). African languages often lack the concepts and idiomatic expressions required for direct translations (Grieve, 2005; Van den Berg, 1996).

The translation of specific instruments will be discussed with emphasis on the well-known 16PF, followed by the Big Five and FFM-related instruments.

3.6.1 Translation of the 16PF (5th edition)

A Tshivenda version of the 16PF (5th edition), translated through back-translation design, was administered to 85 students at the University of Venda for Science and Technology, Of this group, 92% had Tshivenda as a first language. Van Eeden et al. (1996) found reasonable differential item-functioning results and acceptable item-total correlations for the 16PF (5th edition). However, the item analysis resulted in very low reliabilities and many of the items would have to be excluded to slightly increase already low reliabilities. The meaning of the items changed when they were translated because of the absence of similar concepts in the target language, difficulty to translate idiomatic terminology, confusion or misinterpretation of negative items, and general translation errors (Van Eeden & Mantsha, 2007).

A literal translation proved to be insufficient and the translation of the 16PF (5th edition) instrument into other African languages seemed not to be a viable solution as the validity analysis of the translated version proved to be not practical (Van Eeden & Mantsha, 2007).

3.6.2 Translation of the NEO PI-R

As discussed in 2.5.2.2, the NEO PI-R (Costa & McCrae, 1992a) is the most popular and best-researched measure for assessing the Five-Factor Model across cultures (Boyle, 2008; Heuchert et al., 2000; Hull et al., 2010; McCrae et al., 1996; McCrae et al., 1998; Rolland et al., 1998; Taylor, 2000; 2004; Zhang & Akande, 2002). The NEO PI-R has been published in Dutch, French, German, Korean, Spanish, Polish and Portuguese, and validated translations are available in a number of other languages such as Italian, Norwegian and even Afrikaans, Southern Sotho and Xhosa (Costa & McCrae, 2003).

Borkenau and Ostendorf (1990) successfully replicated the five-factor model across gender, instruments and observers. Using the NEO PI (Costa & McCrae, 1985) and Norman's (1963) adjective scales, Borkenau and Ostendorf (1990) obtained self-report and peer-rating data for a set of 256 German adults (128 males and 128 females). A number of analyses were conducted (factor comparabilities, multitrait-multimethod analyses using structural equation modelling and confirmatory factor analysis) and these all provided strong support for the replicability of the five factors across language, gender, instruments and observers (Borkenau & Ostendorf, 1990).

Taylor (2004) recommended among other that the BTI be translated into Afrikaans and other indigenous African languages, and that the translatability of the test should be investigated. To date, no such studies have been found in literature. From the discussions that follow, it will become clear that the translation of personality instruments measuring the Big Five does not seem to be a workable solution for the multicultural and multilingual dilemma.

3.6.3 Translation of the Big Five and FFM personality instruments

Considerable disagreement exists in the literature between researchers whose studies either continue to support the universality of the FFM (Costa & McCrae, 1992) and those who raise questions on the validity of cross-cultural applications, particularly with regard to language issues (Allik & McCrae, 2004b; Ashton & Lee, 2005; McCrae & Terracciano, 2005). Even though Allik and McCrae (2004b) were very sceptical about McCrae and Costa's (1996) suggestion that personality structure is largely independent from culture, they concluded that cultural unity was based on the psychic unity of all people and that the quality of translation, conditions of administration and sampling had little effect on the results of a personality instrument.

In a study using the emic (within-culture) approach towards the structure of personality across cultures, Hofstee, Kiers, De Raad, Goldberg and Ostendorf (1997) compared the Big Five factor structures obtained from Dutch, German and English adjective measures. By identifying adjectives that were the same in the three measures through back-translation, Hofstee et al. (1997) conducted a number of analyses to determine the cross-cultural applicability of the Big Five. There was some evidence for the recurrence of the Big Five across the three cultures, although it appeared that adjectives do not necessarily translate well across the three languages (Dutch, German and English). Aditionally, many of the original adjectives fell out of the joint solution due to the lack of translatability, which may have limited the range of comparison (Hofstee et al., 1997).

The most definite results in research on the FFM were obtained with translations of the NEO PI-R (McCrae & Allik, 2002). It was translated into more than 40 languages or dialects and factorial studies were conducted in more than 30 cultures (McCrae & Allik, 2002). In every case a reasonable approximtion of the intended structure was found, provided that adequate samples and appropriate statistical methods were used (McCrae & Allik, 2002). Even though previous research on the NEO PI-R by McCrae et al. (1998) (which used translation and back translation) identified poor psychometric properties in some items, they collected extensive evidence of the universality of FFM personality traits and the

effective functioning of the five-factor structure. McCrae et al. (1998) concluded that the FFM can be seen as a universal structure and should be useful in cross-cultural research.

Translation of personality instruments into indigenous African languages is almost impossible, as many personality descriptives cannot be translated due to the restricted vocabularies especially of African languages (Van Eeden & Mantsha, 2007). Attempts resulted in inaccurate translations and changes in the meaning of the items which rendered the items difficult to understand and to respond to accurately (Van Eeden & Mantsha, 2007).

3.7 CROSS-CULTURAL PERSONALITY RESEARCH

Various cross-cultural studies emphasised the need to research the influence of multicultural environments on psychometric assessments internationally (Matsumoto et al., 2001; McCrae, 2001; Roland, 2002; Triandis & Suh, 2002; Van de Vijver & Leung, 1997; 2001).

Multicultural assessment was put on the agenda by the promulgation of the Employment Equity Act, Act 55 of 1998, Chapter 2, and Section 8 (Government Gazette, 1998) in South Africa. Van de Vijver and Rothman (2004) speculated that the Employment Equity Act was ahead of everyday practice in South Africa and that psychologists might not be able to live up to these expectations and requirements. However, they agreed that one of the main goals of the assessment profession in South Africa is (and should be) to bring current practice into line with legal requirements, for example by developing new instruments and by validating existing instruments for use in multicultural groups (Van de Vijver & Rothman, 2004).

Studies in the South African context have consistently demonstrated the problematic and negative effects that taking tests in a second language have on test item responses (Bedell et al., 1999; Foxcroft, 1997; Van de Vijver & Leung, 2001; Van de Vijver & Rothmann, 2004). Linguistic prejudice must therefore be accepted in the interpreting of response patterns on any psychometric instrument (Meyer & Foster, 2008).

The lexical approach acknowledges the influence of language when new personality instruments are developed, emphasising that differences in personality should be represented by a large number of similar but distinct words (generally adjectives) (Saucier et al., 2000). These words should be used by lay people in everyday descriptions of their own and others' personalities (Saucier et al., 2000).

Cross-cultural measurement invariance is especially important in the South African context, yet it is too often ignored (Burgess, 2002). South Africa's language groups are characterised by cultural differences (Trompenaars & Hampden-Turner, 1998), therefore validation is critical if psychometric measures are to be used in a selection context. Van de Vijver and Poortinga (1992) suggested that there is an intricate relationship between culture and test performance, and Van de Vijver and Rothman (2004) emphasised that any multicultural assessments have to focus on the key concepts of bias and equivalence.

According to the lexical approach, characteristics that are important for understanding human behaviour can become encoded in language as single terms (Goldberg, 1981). Thus, extensive research on the influence of language and culture should be done to ensure that the assessment results are reliable and non-biased. The purpose of many initial broad lexical studies was to find a classification system (taxonomy) for personality assessment that was generalisable across languages and cultures (John & Srivastava, 1999).

The differences between self-reported personality traits and national character stereotypes were later investigated by Terracciano et al. (2005), resulting in the conclusion that national character does not reflect mean personality trait levels in 49 cultures. This highlighted the fact that the challenges in studying the influence of culture on personality assessment are far from being resolved.

3.7.1 Trends in language research of general (non-Big Five and non-FFM) personality instruments

Studies on the equivalence of different language and population groups of the 16PF (SA92) English version showed mixed results. Prinsloo (1992) reported favourable difficulty and discrimination values for the items, and found that primary and secondary factor loadings were acceptable and that there were no significant differences in reliabilities. Van Eeden and Prinsloo (1997) found some culture-specific trends in another study and reported that this had to be taken into account when results on these factors are interpreted. For example, the reliability coefficients of all the factors were in most cases slightly lower for the African language group than for the total group. Van Eeden and Prinsloo (1997) further concluded that although some differences in the factor structure were evident, these findings were interpretable in terms of the descriptions by Cattell (1947).

Prinsloo (1998) found that when researchers controlled for language proficiency, the differential item functioning and factor analysis was more acceptable. However, De Bruin et al. (2005) still reported factorial similarity in the second-order factors for Afrikaans, English and the African language groups (Nguni and Sotho) for the 16PF (SA92).

As mentioned in the previous chapter on personality assessment, Abrahams and Mauer (1999a, 1999b) reported less favourable results in terms of item-total correlations for the 16PF (SA92). In fact, they found significant differences on item level in respect of how different cultures responded and unacceptably low internal consistency coefficients on the primary factors for the black sample. Prinsloo and Ebersöhn (2002) highlighted the methodological mistakes made by Abrahams and Mauer (1999a, 1999b), which might have contributed to the negative results.

Nonetheless, Abrahams and Mauer (1999a, 1999b) made valuable contributions to consider when assessing members of historically disadvantaged groups in South Africa. These considerations can be summarised as follows:

- Disadvantaged groups tend to be unfamiliar with psychological tests.
- Psychological tests may measure different constructs than those for which they have been designed and standardised.

- All groups in a multicultural society may not have been adequately represented in the standardisation samples (Abrahams & Mauer, 1999b).

3.7.2 Trends in language research of Big Five and FFM personality instruments

Heaven and Pretorius (1998) conducted a study to investigate whether the language descriptors of the FFM were adequate when used by a group that did not have English as their first language. They found that a different pattern of components with significant loadings emerged for the Sotho-speaking group. Seeing that different cultures and languages have different rules for using language in different situations, linguistic prejudice can occur within the same language groups as well as across languages and cultures (Ntshangase, Kaschula & Anthonissen, 1999).

Heuchert et al. (2000) compared a South African group of students with the American normative sample for the NEO PI-R as laid out in its manual (Costa & McCrae, 1992). They extracted the five factors for the South African data and all five factors demonstrated congruence scores at or above .90. A comparison of the white group with the American normative groups yielded congruence coefficients at or above .90 for all five factors. The sample size for the white group was 268 students (Heuchert et al., 2000). However, since only 92 black students participated in this study – which was not a big enough sample size for factor analysis – Heuchert et al. (2000) agreed that the weaker fit results for the black students should be interpreted with caution.

McCrae and John (1992) concluded that the FFM (Costa & McCrae, 1992) and the Big Five (John et al., 1991) can be used as integrative descriptive models and various research studies found that the FFM (or the Big Five for that matter) can be generalised across languages and cultures (Church & Katigbak, 1989; Church, Reyes, Katigbak & Grimm, 1997, John & Srivastava, 1999).

Investigation into the applicability of the Big Five model in the South African population was done by Heuchert et al. (2000) who administered the NEO PI-R to both black and white college students.

They found evidence for construct equivalence and a clear five-factor solution for both groups. Taylor (2000) administered the NEO PI-R to employees of a large company and only had difficulty finding equivalence for one factor, namely Openness, for the African sample.

The FFM of personality performed very well in various local cross-cultural studies (De Bruin et al., 2005; Heuchert et al., 2000). De Bruin et al. (2005) reported high levels of congruence between the second-order factors of the 16PF5 for Afrikaans, English and indigenous African languages, while the second-order factors of the 16PF5 also correlated significantly with those of the FFM (Costa & McCrae, 1992). De Bruin et al. (2005) found this to be very relevant for the diverse South African population and further investigated the construct comparability of the Big Five in South Africa. The results of their study corroborated the construct validity of the BTI.

Various lexical studies (Cheung et al., 2001; McCrae & Allik, 2002; McCrae & Costa, 1997; Paunonen, Zeidner, Enggvik, Oosterveld & Maliphant, 2000) extensively researched the applicability of the FFM for different cultures and identified it as an effective method to measure personality across different cultures.

Despite somewhat mixed results, these studies agreed that factors E, A and C almost always emerge, whereas factors N and O of the Big Five model sometimes do not feature (Saucier & Goldberg, 2001). Saucier and Goldberg (2001) explained that no clear conclusion had been reached on the reasons for factors N and O not featuring in all cultures, and suggested that it may be that these factors are missing in the language group or merely from the set of adjectives studied. Further research in this regard was recommended.

De Raad and Peabody (2005) contested the stability of the FFM across cultures and claimed that while the Big Three are universal (Extraversion, Agreeableness and Conscientiousness), the Big Five may be restricted to American English and German speakers. Nevertheless, the Big Five and FFM currently constitute the most reliable way of identifying and describing personality factors across different cultures (Boyle, 2008;

Heuchert et al., 2000; Hull et al., 2010; McCrae et al., 1998; McCrae et al., 1996; Rolland et al., 1998; Taylor, 2000; 2004; Zhang & Akande, 2002) and was used as basis for the development of the BTI.

According to Hofstede and McCrae (2004), the evidence supporting the universality of the factor structure as collected by McCrae et al. (1998) allowed researchers to further investigate empirically the long-standing questions with regard to personality and cultural values. They investigated the link between personality traits and dimensions of culture based on their own previous research. Hofstede's (1980) earlier studies on the dimensions of culture at IBM in over 71 countries identified four dimensions of national culture, namely power distance, uncertainty avoidance, individualism and masculinity:

- Power distance can be defined as the extent to which the less powerful members of an organisation accept and expect that the power is distributed unequally.
- Uncertainty avoidance indicates a society's tolerance for ambiguity, in other words a society's comfort with unstructured situations.
- Individualism refers to the degree to which individuals are integrated into groups.
- Masculinity can be defined as the distribution of emotional roles between sexes, especially in terms of values.

The link between personality traits and dimensions of culture was defined from previous research by McCrae that was included in the studies by Hofstede and McCrae (2004), McCrae and Costa (1997, 1999, 2003), as well as Costa, Terracciano and McCrae (2001). They concluded that the same personality factor structure was found in a wide variety of cultures, that the factors were stable and appeared to be universal throughout most of the adult life span, and that similar gender differences were found among cultures. McCrae (2001) explained his view on personality and culture not as a matter of documenting how culture shapes personality, but rather as how personality traits and culture interact to shape the behaviour of individuals and social groups.

Hofstede and McCrae (2004) mentioned that personality studies compare individuals, while cultural studies compare societies, and that any combination of these studies

causes its own challenges. Some of these challenges are clear in Oyserman, Coon and Kemmelmeier's (2002) study, where they researched the cultural dimensions in individuals and found notably inconsistent results. A study by Peabody (1985) highlighted the challenges involved in cross-cultural personality studies long before Hofstede and McCrae (2004). Peabody (1985) tried to rate national character as reflected by shared perceptions of the personality traits of the typical member of that culture. Peabody (1985) also tried to get expert ratings of the ethos itself described in the language of personality. He found that it was not that easy to assess personality across cultures and concluded (as McCrae (2001) later reported) that the meaningfulness of mean trait scores depends on the viability of a series of reasonable assumptions.

Valchev et al. (2011) argued that the language groups of South Africa are very diverse and cannot be simplified to a dichotomous distinction between 'black' and 'white'.

Meiring et al. (2005) conducted a study on South Africa's cultural diversity in which they investigated the construct, item and method bias of certain cognitive and personality measures used in South Africa. Even though they found low levels of construct bias in both cognitive measures and both revealed factorial invariance in all the language groups, less favourable results were reported for the personality measure (15FQ+). Meiring et al. (2005) concluded that low structural equivalence (for whites, coloureds, Indians and Ndebeles) and unacceptably low internal consistencies (for the black groups) were particularly problematic and that the 15FQ+ should be used with caution for selection purposes.

Even though McCrae and Costa (1997) concluded that the NEO-PI R factor structure has cross-cultural invariance, methodologists argued that for comparisons among cultures, more variables should be included – for instance the equivalence of the scales (Van de Vijver & Leung, 1997).

Many of the existing personality instruments are not appropriate for screening and selection purposes as they are either imported, not standardised for the South African population, or standardised mainly for the white segment of the South African population

(Taylor, 2004). Ethically and legally the use of personality instruments is problematic in South Africa because they are generally imported and used without adaptation (Nel, 2008). Research indicates that personality instruments in South Africa are not cross-culturally applicable, because previously disadvantaged groups were not adequately represented in the adaptation of imported inventories (Meiring et al., 2006). The current study will therefore attempt to address this shortage of cross-language research in terms of the Big Five factors as they are measured with the BTI personality instrument.

The BTI, used in the current study to determine the FFM of personality, was developed in South Africa and is based on the extensively researched Big Five factors of personality. De Bruin and Taylor (2005b) provided evidence of good construct validity across South African cultures and concluded that the BTI has good measurement invariance across the different language groups in South Africa.

3.8 PERSONALITY RELATED PERSPECTIVES WITHIN CULTURES

Different perspectives on personality within different cultures lead to different manifestations of personality dimensions (Berry, 2000). Individualism and collectivism are currently among the most widely researched perspectives in respect of cultural differences (Hofstede, 2001).

3.8.1 Collectivism versus individualism

Individualism and collectivism have become extremely popular as a way of distinguishing cultural behaviour (Arce-Ferrer, 2006; Church & Lonner, 1998; Eaton & Louw, 2000; Triandis & Suh, 2002). These dimensions concern the relationship between the individual and the group (or collective) in a given society (Hofstede, 2001). Triandis and Suh (2002) maintained that in collectivist cultures individuals tend to give priority to the goals of the group rather than to their own goals.

Vogt and Laher (2009) investigated the relationship between the FFM of personality and individualism and collectivism, as evidence indicated the presence of other factors not

addressed in the FFM. Their study consisted of a sample of 176 students from the University of the Witwatersrand and used the BTI and the Individualism/Collectivism scale. Vogt and Laher (2009) explored whether the five factors and individualism/collectivism manifested differently across cultures and whether differences would be found across race and language groups in South Africa. Results however indicated that there were no significant differences between the five factors and individualism/collectivism. In addition, no significant differences were found between race or language groups for the five factors and individualism/collectivism. Vogt and Laher (2009) recommended that the same study be repeated with a more representative sample, as their sample was too small and the grouping together of black, indian and coloured groups to create comparative samples in terms of magnitude might have influenced the results. Furthermore, they suggested that a broadly inclusive approach should be followed to investigate individualism and collectivism, since each of the approaches to these constructs has its own limitations.

Studies on the NEO PI-R in cross-cultural situations found significant differences in the FFM between Western and Asian cultures (Church, 2000; Cheung et al, 2001; Cheung, 2004; McCrae & Terraccianno, 2005). McCrae (2004) attributed this finding to the differences between the individualistic societies of the Western and the collectivist societies of Asia (McCrae, 2004; Rolland et al., 1998).

A study by Van Dyk and De Kock (2004) hypothesised that white and coloured officers in the South African National Defence Force (SANDF) would be more individualistic, while black officers would be more collectivistic. However, no significant differences were found in attitude towards individualism and collectivism between the black, coloured or white groups. Van Dyk and De Kock (2004) argued that these findings were due to the fact that student populations had been found to be more individualistic in nature, due in part to their shared exposure to similar education (Eaton & Louw, 2000; Van Dyk & De Kock, 2004). In support of this view, Oyserman et al. (2002) argued that the demands of an academic environment foster individualism, since the focus is on individual striving, competition and the realisation of one's own potential.

3.9 LANGUAGE AND THE DEVELOPMENT OF THE BTI

Van Eeden and Mantsha (2007) commented that the content of items is culture bound, regardless of the language in which the instrument is presented. Language gives expression to the behaviour related to the personality concept that is measured, therefore the contents of the items are directly linked to the culture in which the test was developed (McCrae, 2001).

Foxcroft, Paterson, Le Roux and Herbst (2004) researched test utilisation patterns and the needs of psychological assessment practitioners in South Africa. The practitioners clearly indicated two needs, firstly to adapt tests for South Africa's diverse environment and secondly to address language issues in testing. Foxcroft (2004) attributed the problem of a shortage of locally developed tests to a significant shortage of experienced test developers in South Africa.

Taylor (2004) identified the need to establish an instrument for personality assessment in South Africa that would be suitable for cross-cultural use. She reported that the variety of cultures and languages present in South Africa influenced this task to an enormous extent; therefore the similarities and differences between different language and culture groups had to be understood to identify meaningful personality constructs and to develop appropriate items for a personality instrument. The integrity of the BTI was strictly controlled to ensure all moderator variables, as possible sources of bias, were eliminated (Taylor & De Bruin, 2006).

Taylor and De Bruin (2006) developed the BTI as a culturally valid personality inventory based on the FFM (Costa & McCrae, 1992) for use in South Africa. Similar factor structures and acceptable reliabilities were found across samples from African and European descent (Taylor & De Bruin, 2006). Further analysis indicated that the BTI demonstrated a practical level of measurement invariance across the Nguni, Sotho and Pedi language groups (Ramsay et al., 2008). The current study further explores the influence of language on personality assessment by adding the levels of English proficiency and investigating the impact that both these independant variables may have

when the English version of the BTI is administered to South Africans with diverse home languages.

3.10 SUMMARY

In this chapter the awareness and understanding of issues related to language and cultural differences were emphasised, as well as the importance of creating a society that is tolerant of different languages and cultures in a multicultural and multilingual society such as South Africa. The country is known for its diversity and therefore South African psychologists need to be sensitive to all the different aspects that affect responses to personality instruments.

According to Van de Vijver and Rothman (2004, p. 2), research regarding equivalence and bias in South Africa is still in a stage of infancy. Various studies have been conducted since then (De Bruin et al., 2005; Meiring et al., 2005; Ramsay et al., 2008; Taylor, 2004; 2008), but still not enough evidence is available about the impact of language on personality assessment with the BTI to live up to the demands set by the Employment Equity Act (Government Gazette, 1998).

Different solutions to the multicultural and multilingual challenges have been investigated, but still the best solution seems to be the development of a unique South African personality instrument, as the translation of imported instruments regularly results in more challenges than solutions (Grieve, 2005; Hambleton, 1994; Van de Vijver & Hambleton, 1996; Van den Berg, 1996; Van Eeden et al., 1996; Van Eeden & Mantsha, 2007). Since various cross-language and cross-cultural studies have indicated that the Big Five and FFM personality factors are very relevant to personality measurement in South Africa, Taylor and De Bruin (2006) decided to use them as a basis for the development of the BTI.

To limit any adverse impact on personality assessments, it is advisable to include English proficiency tests so as to ensure the respondents' correct understanding of the personality-related questions (Meyer & Foster, 2008).

CHAPTER 4: METHODOLOGY

4.1 INTRODUCTION

Finding the same Five-Factor Model (FFM) across cultures does not necessarily mean that a raw score has the same interpretation across cultures, in other words measurement equivalence. The NEO PI-R researched by Costa and McCrae (1976, 1985, 1988a, 1988b, 1992a, 1992b) demonstrated that the same personality traits can be reliably captured across cultures. Still, when evidence is found that the same traits are being measured across cultures, it does not necessarily mean that the interpretations of the scores across cultures are the same.

In addition to response styles such as extreme response style and acquiescence, there seems to be true personality characteristic differences between cultures. Allik and McCrae (2004b) found that respondents from European and North American cultures were more Extroverted, Open to new experience and less Agreeable than were people from Asian or African cultures. McCrae and Terracciano (2005) partially replicated these findings by showing higher levels of Extroversion and Openness to experience among European and Americans (North and South) as compared to Asians and Africans. Furthermore, they reported that scale variances differed by culture, with Western cultures showing greater variability. The results were not attributable to acquiescence and possibly not to extreme responding. By using observer ratings, it was hoped that the tendency in some cultures toward modesty in self-presentation would be minimised (McCrae & Terracciano, 2005).

Locally, different methods have been used to evaluate the impact of language on the measurement of personality and personality instruments. Abrahams (1996), for example, took words from items in the 16PF, asked respondents to write synonyms for these words, and subsequently scored their responses by using a dictionary. Wallis and Birt (2003) used the same words as Abrahams (1996), but scored the responses according to informal language and everyday English meanings, thereby allowing credit for words that were not technically correct.

However, the methodology in these studies was criticised by Prinsloo and Ebersöhn (2002). McDonald (2011) conducted similar research using the latest version of the 16PF, namely the 16PF5, and in her study students had to choose synonyms from multiple-choice options. Although different methodologies as recommended by Prinsloo and Ebersöhn (2002) were used by McDonald (2011), she reported that there was still a significant difference in the 16PF5 results – when the native English-speaking and non-native English-speaking groups were compared, and also when a black group and a white group were compared. She reported a statistically significant relationship between students' academic literacy levels and their scores achieved on the 16PF5. Based on these results, McDonald (2011) reported a significant relationship between students' academic literacy levels and their scores on the 16PF5. She concluded that English language proficiency certainly plays a role when testing non-native speakers of the test language.

The purpose of the current study was to expand on research by Taylor (2008) and to further investigate the impact that different languages may have on response patterns on the BTI and to enhance the accurate measurement of personality in a multicultural and multilingual environment such as South Africa. The current study differs from that of Abrahams (1996), Wallis and Birt (2003) and McDonald (2011) in terms of the methodology used. Words were not taken from the personality instrument to check respondents' level of understanding, and a different personality instrument was used, namely the BTI instead of the 16PF. In addition, two English proficiency tests were administered and the combined score for these two tests was added as another independent variable that could influence response patterns on the BTI.

English proficiency was measured by means of two tests – a Reading Comprehension test and a Verbal Reasoning test – to measure the level of respondents' understanding of English as administration language of the BTI. The sample was divided into two groups, a low English proficiency group and a high English proficiency group, based on their performance in these two tests combined and reflecting their understanding of English. The two groups were constituted by taking those scoring in the upper quartile (25%) and in the lower quartile (25%) of the combined raw scores. The high performers in the English proficiency tests (upper 25%) were compared to the low performers (bottom

25%) for each South African home language group. The influence of these two extreme English proficiency groupings on the dependent variable (responses on the BTI personality instrument) was analysed in the current study.

The methodology and data analysis procedures are discussed next. The instruments used and the composition of the sample, as well as the procedures that were followed in the data collection and analyses are described. Some basic CTT procedures and some advanced MTT methods, specifically Rasch analysis methods, were used and are also explained in this chapter.

4.2 PSYCHOMETRIC INSTRUMENTS

4.2.1 Instruments for measuring English proficiency

There is no general, universally accepted definition of language proficiency; therefore Chomsky's (1965) description of 'linguistic competence' as 'the knowledge of the grammar of a resident speaker's language' will be used. The knowledge of English grammar, as well as the respondents' ability to read and write English was assessed with a reading comprehension test and a verbal reasoning test (De Beer, 2004). Both were specifically developed for the government organisation to use during the screening and selection of potential applicants.

Posel and Zeller (2010) report that the National Income Dynamics Study (NIDS), a new household survey done in 2008, focused more on linguistic ability in the individual's home language and English than did the census of 2001. This is particularly important in South Africa where many citizens are able to speak, read and write more than one language, although at different proficiency levels. This NIDS collected not only socio-economic information, but also information on how well individuals are able to read and write both their home language and English. Posel and Zeller (2010) summarised the findings from the NIDS and concluded that self-assessed reading and writing ability are highly correlated and that individuals typically report significantly higher ability in their home language. Furthermore, they remarked that those individuals who reported good reading

and writing ability in their home language also reported good reading and writing ability in English (Posel & Zeller, 2010).

Carroll (1968) tried to conceptualise the domain of language proficiency by reporting that various different aspects should be measured in respect of linguistic competence and performance, specifically modularity of mind, underlying cognitive operations, the process of reading and the process of writing. Although various different opinions exist about the dimensions that influence language proficiency (Carroll, 1968; Perfetti, 1985), Verbal reasoning and reading comprehension always feature as important dimensions. For the purposes of the current study, it was therefore decided to assess these two dimensions as an indication of a respondents' general level of English proficiency.

4.2.1.1 Reading comprehension

Job-specific psychometric assessments are enforced by the Employment Equity Act (Government Gazette, 1998), stating that any psychometric assessments should be based on the inherent requirements of the job. Sandoval, Frisby, Geisinger, Scheuneman and Grenier (1998) elaborated on the standards of employment testing in saying that the level of English proficiency required should not exceed the level of English required for the relevant occupation or profession. Since test distributors were not able to provide a psychometric instrument to measure the level of English proficiency in the government organisation from which the sample was taken, a tender process was followed to attract test developers to develop instruments for measuring reading comprehension and verbal reasoning on the language level of the training material in this government organisation.

Olson (1977) stated that a reading comprehension instrument must measure the reader's linguistic abilities and not depend on any other cues or represent any dimensions other than reading and comprehension ability. He stressed the importance of identifying whether respondents can make inferences from a paragraph that they read. The reading comprehension test used in the current study was developed for the government organisation by taking three paragraphs from the basic training modules and asking multiple-choice questions based on the content of these paragraphs.

The reading comprehension test required of the applicant to read the paragraphs and comprehend the material in order to answer 30 multiple-choice questions (De Beer, 2004). A time limit of 20 minutes was given for the completion of these questions (De Beer, 2004).

4.2.1.2 Verbal reasoning

Verhoeven and De Jong (1992) stated that verbal ability is crucial for measuring language proficiency as it is an indication of human intelligence. The model of Thurstone (1938) on language performance has seven primary mental abilities of which at least two are explicitly verbal, namely 'verbal comprehension' and 'verbal fluency'. The use of a verbal reasoning test as part of a selection battery not only gives an indication of language proficiency, but also of the mental abilities of the candidate (Verhoeven & De Jong, 1992). For this reason, a verbal reasoning instrument was included in the selection battery to measure applicants' level of English proficiency.

General reasoning ability based on verbally formulated material formed the basis of the verbal reasoning test, while numerical reasoning and the ability to read graphs were included to measure respondents' ability to do verbal reasoning in different domains to find a solution to problems (De Beer, 2004). The verbal reasoning test consisted of 45 multiple-choice questions to be completed within a time limit of 35 minutes. In this test it was assumed that the respondents have the ability to interpret verbally constructed questions and problems in a logical manner and to draw appropriate conclusions as an indication of their verbal reasoning ability (De Beer, 2004).

De Beer (2004) conducted research on the validity and reliability of both English proficiency instruments (i.e. Reading Comprehension and Verbal Reasoning). Coefficient alphas for these instruments were reported as follows: Reading Comprehension had a mean alpha of .80 and Verbal Reasoning had a mean alpha of .83, for a sample size of 1 972 trainees in the government institution's training college (De Beer, 2004).

4.2.2 Basic Traits Inventory (BTI) for measuring personality

Organisational productivity and competitiveness are directly related to the performance of its employees (Sutherland, De Bruin & Crous, 2007). To outperform competitors, organisations need to identify situational and dispositional factors that influence the employees' performance (Rothman & Coetzer, 2003). Dispositional factors include personality characteristics, needs, attitudes, preferences, etc. (Douglas, Frink & Ferris, 2004; Mount et al., 1999). Identifying important personality characteristics and measuring them before enlistment can improve employee satisfaction and job performance by matching individual personality characteristics with the demands of the particular job (Barrick & Mount, 1991; Rothmann & Coetzer, 2003). Employees of the government organisation used in the current study may well be exposed to many traumatic incidents during a working day and therefore psychologists identified the BTI as an appropriate personality instrument to measure the required personality characteristics for employment. One of these is low Neuroticism scores, which includes the facets Affective instability, Anxiety, Self-consciousness and Depression. The BTI measures the Big Five personality factors identified by Costa and McCrae (1988).

As indicated repeatedly, the personality instrument used in the current study is the BTI (Taylor & De Bruin, 2006). It is a self-report instrument consisting of 193 items, without a time limit, but generally it requires approximately 30-45 minutes to complete (Taylor & De Bruin, 2006). The statements are answered on a five-point scale ranging from strongly disagree (1) to strongly agree (5). The BTI measures the Big Five personality factors in terms of Extraversion, Neuroticism, Openness to experience, Conscientiousness and Agreeableness, and each of the five factors has five facets, except for Neuroticism, which has four (Taylor & De Bruin, 2006). The factor analysis for determining the construct validity of the BTI demonstrated a satisfactory fit with the FFM of personality (Taylor, 2004). Cronbach alpha coefficients reported by Taylor (2004) were α_E=.89, α_N=.95, α_C=.92, α_O=.87 and α_A=.90.

In another study by Taylor and De Bruin (2006), the BTI also demonstrated good reliabilities, and Cronbach alpha coefficients were reported for Extraversion (36 items,

α_E=.87), Neuroticism (34 items, α_N=.93), Conscientiousness (41 items, α_C=.93), Openness to experience (32 items, α_O=.87), and Agreeableness (37 items, α_A=.89). Various studies provided evidence of the construct validity of the BTI across different cultures, as well as some evidence of predictive validity and measurement invariance across different language groups in South Africa (De Bruin & Taylor, 2005b; Taylor, 2008).

When Taylor (2008) conducted research on the influence of home language on the assessment of personality with the BTI, the BTI was administered only in English, and no test for English proficiency was administered, as was the case in the current study. Taylor (2008) divided the home languages into the following three groups for comparison: English, Afrikaans, and indigenous African languages. Although there are eleven official languages in South Africa, many of the indigenous South African languages have a similar origin and grammatical structure and such similar languages were combined to enlarge the sample size per language group. Taylor (2008) reported very high internal consistency reliabilities, indicated by the Cronbach alpha coefficient and the person-separation index (PSI) calculated through Rasch analysis. The PSI describes the number of levels that could be created for people with different abilities, thus it indicates how efficiently a set of items can separate persons measured in terms of their abilities. This results in a linear comparison of 'Hard' and 'Easy' tests (Wright & Stone, 1999). The reliability estimates were very similar across the CTT (Cronbach alpha) and MTT methods, and the Rasch analysis (Person Separation Index) for the Big Five factors of the BTI, as well as for the different Big Five factors (Extraversion (α=.90; PSI=.89), Neuroticism (α=.94; PSI=.93), Conscientiousness (α=.94; PSI=.92), Openness to experience (α=.88; PSI=.85), and Agreeableness (α=.88; PSI=.86)) (Taylor, 2008). However, some problems were encountered when internal consistency reliabilities were calculated for the different facet scales across the gender, race and language groups in Taylor's (2008) study. In terms of bias, she reported very slight statistically significant differences and suggested that further studies be conducted before decisions are made on excluding factors and/or items from the BTI, especially for South African use.

Taylor (2008) identified several items with possible bias between Afrikaans, English and indigenous African languages: 15 of the 36 items from the factor Extraversion, 13 of the

34 Neuroticism items, 18 of the 41 items for Conscientiousness, 14 of the 32 Openness to experience items and 11 of the 37 items from the Agreeableness factor had significant differential item functioning (DIF) contrast values. The current study investigated the item bias of the BTI items for much larger samples of respondents for all of the eleven official home languages and also considered the different levels of English proficiency.

Ramsay et al. (2008) conducted a measurement invariance test on the BTI for three indigenous African language groups and concluded that the BTI was invariant across these three groups. This suggested that combining indigenous African language groups would not introduce too much error variance when doing cross-cultural comparisons (Ramsay et al., 2008). Nevertheless, in the current study the sample sizes for the eleven language groups were large enough to perform bias and equivalence analysis for each language and to investigate the impact that these different home languages might have on response patterns to the BTI items.

4.3 THE SAMPLE

The sample for the current study was derived from a database that has accumulated over a period of two years (2008 and 2009). The sample consisted of 105 342 persons who applied to be employed by the particular government organisation. All applications were for similar entry-level functional positions within this government organisation.

One requirement for applicants was that they should have passed at least Grade 12. It has been shown that education has a discernible effect on responses to paper-and-pencil personality instruments (Meiring et al., 2005). Informed consent was another prerequisite for participating in the assessment session.

Barrett (2007) suggests that relatively large sample sizes (numbers of N>200) be used in each culture group, especially for Confirmatory Factor Analysis (CFA) in cross-cultural research, so as to prevent technical problems (violation of normality, missing data, etc.). It is paramount for cross-cultural researchers to work with adequately large samples to obtain stable factor structures that can then be examined for equivalence (Fischer, 2004).

Matsumoto et al. (2001) encouraged larger sample sizes because they are more likely to be representative of the population, they are more likely to produce replicable results, and they increase statistical power. Furthermore, larger samples increase the robustness of the data and prevent the violation of statistical assumptions.

Tables 4.1 and 4.2 indicate that this sample was adequate for group comparisons with regard to sample size.

Table 4.1 provides a description of the demographic composition of the sample. The total sample consisted of 105 342 applicants, of which 63 811 (61%) were men and 41 531 (39%) were women.

Table 4.1

Demographic Composition of the Sample

Gender	Coloured	Black	White	Asian	Total
Female	2 720	38 407	225	179	41 531
Male	4 406	58 147	596	662	63 811
Total	7 126	96 554	821	841	105 342

The mean age was 25 years. The composition in terms of ethnicity was as follows: black applicants made up 96 554 (91%) of the sample, Asian applicants 841 (1%), coloured applicants 7 126 (7%) and white applicants made up 821 (1%) of the total sample. In this sample, 2 261 (2%) applicants indicated English as a home language, 6 786 (6%) indicated Afrikaans as a home language, and the rest (96 295 – 91%) indicated an indigenous African language as their home language.

The distribution of the indigenous African languages is summarised in Table 4.2. While the composition of the sample did not necessarily reflect the demographic composition of South Africa, the size of the sample was large enough to allow comparisons across languages.

The potential contribution of the current study is its representativeness of all official languages in the South African context with a large sample size that was available for each of the eleven official language groups.

Table 4.2 indicates the language distribution of the current sample in relation to the language distribution found in South Africa according to the census results of 2011 (Statistics South Africa, 2012).

Table 4.2

Language Distribution

Language	Sample distribution	%	South Africa distribution (2012 Statistics)	%
Afrikaans	6 786	6.44%	6 855 082	13.45%
English	2 261	2.15%	4 892 623	9.60%
Ndebele	2 002	1.90%	1 090 223	2.14%
Sepedi	23 825	22.62%	4 618 576	9.06%
Sotho	7 517	7.14%	3 849 563	7.55%
Swati	3 628	3.44%	1 297 046	2.55%
Tsonga	10 857	10.30%	2 277 148	4.47%
Tswana	6 687	6.35%	4 067 248	7.98%
Venda	5 042	4.79%	1 209 388	2.37%
Xhosa	17 265	16.39%	8 154 258	16.00%
Zulu	19 472	18.50%	11 587 374	22.74%
Total	105 342		50 961 443	

The sample distribution does not reflect the population distribution accurately, yet the different language groups were generally dispersed according to their distribution in the population. The sample consisted of 6.44% Afrikaans-speaking respondents while the total population consists of 13.45%. The proportion of English-speaking respondents included in the current study is considerably smaller (2.15%) than that in the total population (9.6%), while the proportion of other languages in the sample is relatively similar to that in the total population. The following groups were over represented in the sample, namely the Sepedi group (22.62% for the sample versus 9.06% in the general population), the Tsonga group (10.3% for the sample versus 4.47% in the general

population) and the Venda group (4.79% for the sample versus 2.37% in the general population). Convenience sampling techniques were used and even though the different language groups were large enough for further analysis, they cannot necessarily be considered representative of the total population. Random selection was not used and the particular group of applicants is not necessarily representative of the total South African population.

4.4 RESEARCH DESIGN

There is a multitude of possibilities regarding the independent variables to be compared when investigating measurement bias (Taylor, 2008). One of these is a differential research design which is used when the independent variable cannot be manipulated experimentally, in other words it occurs naturally (Taylor, 2008). The independent variable for the present study represents the grouping that is of most concern to South African psychologists in assessment scenarios, namely sub-groups based on the eleven official languages of this country. Additionally, English proficiency was added as an independent variable based on a combination of the reading comprehension and verbal reasoning raw scores.

4.5 THEORETICAL BASIS FOR MEASUREMENT

There are two major measurement theories regarding the analysis of assessment measures, namely CTT and MTT. Standardised assessment measures are increasingly developed using MTT methods due to the more theoretically justifiable measurement principles and the greater potential to solve practical measurement problems (Embretson & Reise, 2000). MTT is more item oriented and an individual's performance on an item can be predicted by his/her ability or standing on the latent trait in relation to the endorsability of the item (Henard, 2000). The current study neither focused on the comparison of the theories nor tried to render a theory redundant, but the focus was more on the MTT methods – specifically Rasch analysis – as an extension of CTT findings about evaluating the impact of language on BTI responses and ultimately the fair use of

the BTI in South Africa. The CTT and MTT will be discussed shortly to provide a basis for understanding these analysis methods, especially those used in the current study.

4.5.1 Classical test theory (CTT)

CTT is often referred to as the traditional theoretical basis for measurement (Urbina, 2004). The basic assumption in CTT is that the score that an individual obtains on a test (observed score) reflects his/her true standing on the latent construct or trait measured (true score) plus measurement error (Urbina, 2004).

According to Embretson and Reise (2000), the following assumptions are made about error in the CTT:

- Error is assumed to be random.
- Error is not related to other variables.
- Standard error of measurement is assumed to be normally distributed within persons and homogeneously distributed across persons. It means that if an individual were to take a test an infinite number of times, the distribution of his/her observed scores would likely be bell-shaped, the mean would indicate the individual's true score, and the dispersion would indicate the distribution of random error.

CTT methods are fairly clear-cut and easy to perform, but have a number of limitations (Henard, 2000; Urbina, 2004). The most noticeable limitation is that the characteristics of the test cannot be separated from the characteristics of the respondent (Taylor, 2008). Henard (2000) and Fan (1998) explain that the person statistics are item dependent while the item statistics are sample dependent. They refer to it as circular dependency – if a instrument is labelled as 'difficult', test-takers may appear to have lower ability, and if a group of respondents all have high levels of ability, the instrument may wrongly be labelled as 'easy'. The second limitation is that the CTT tends to be measure oriented, rather than item oriented (Henard, 2000). Using only CTT methods cannot provide test distributors with the significant information to predict how an individual would respond to a single item of the instrument.

Test developers would not be able to target particular levels of ability or compare performance of individuals on different items, as would be the case when MTT is used (Henard, 2000).

4.5.2 Modern test theory (MTT)

MTT was developed mainly as a result of limitations and assumptions associated with CTT (Henard, 2000), especially the limitation that the characteristics of the test cannot be separated from the characteristics of the respondent (Taylor, 2008). In addition, MTT provides information for decision making that is not available through CTT (Henard, 2000).

Item Response Theory (IRT), as a MTT method, is a model-based measurement theory in which trait level estimates depend on person responses and the psychological properties of the items, in other words a more inclusive description of the assessment situation in terms of respondents and items (Embretson & Reise, 2000). This provides instrument score interpretation that can be associated with the underlying traits of the person tested (Taylor, 2008).

Rasch analysis, as another MTT method, which has two basic assumptions, namely local independence (responses to the measurement items are independent of one another) and unidimensionality (only one latent trait is measured) (Embretson & Reise, 2000). According to Rasch, the performance of an individual on an item can be predicted by his/her ability (or standing on a latent trait) and the relationship between the difficulty (or endorsability) of the item (Henard, 2000).

4.6 COMPARISON OF MEASUREMENT THEORIES

A major difference between CTT and MTT, is that CTT tends to focus on the total score of the instrument, while MTT tends to focus on the individual items and the person the test is being administered to (Urbina, 2004).

Hambleton et al. (1991) identify the following limitations of CTT:

- Ability scores of respondents are item dependent (i.e. they depend on the item difficulties).
- The item statistics (difficulty, discrimination, reliability) are respondent dependent.
- Discrimination indices as well as reliability estimates tend to be higher in heterogeneous respondent groups than in homogeneous ones.
- No information is available about how respondents with specific abilities might perform on a certain test item.
- Equal measurement error is assumed for all respondents (this measurement error is item dependent).
- Classical item indices are not invariant across subpopulations (i.e. different subgroups of the sample of respondents give different item statistics).

MacDonald and Paunonen (2002) demonstrated similarities in results obtained through CTT and MTT. These similarities were identical to those found by Lawson (1991) and Fan (1998), which seems to discredit the assumption that CTT methods are inferior to MTT in producing person-invariant item statistics. CTT set the principles for measurement development, therefore many MTT supporters refer to CTT as the old rules of measurement (Embretson & Reise, 2000).

Since MTT principles were developed by mathematicians (Fischer, 1973; Lord, 1968; 1975; 1980; Rasch, 1960; Wright & Stone, 1979), their applicability to psychology have not always been recognised. Rene Dawis and David Weiss, professors at the University of Minnesota, first investigated the applicability of MTT on applied psychological measurement in the late 1960s and early 1970s (Embretson & Reise, 2000) and highlighted the potential of these methods to improve psychological measurement. Lord and Novick (1968) tried to provide continuity between the 'new' and the 'old' test theory (CTT); however Embretson and Reise (2000) stated that some well-known rules of measurement can no longer be applied as they are fundamentally different from the 'old rules'.

Table 4.3

'Rules' of Measurement

CTT (Old Rules)	MTT (New Rules)
i. Standard error of measurement applies to all scores in population.	i. Standard error of measurement differs across scores (response patterns) but generalises across populations.
ii. Longer tests are more reliable.	ii. Length of test does not influence reliability.
iii. Comparing test scores across multiple forms is optimal when forms are parallel.	iii. Comparing test scores across multiple forms is optimal when test difficulty levels vary between persons.
iv. Unbiased estimates of item properties depend on having representative samples.	iv. Unbiased estimates of item properties may be obtained from unrepresentative samples.
v. Test scores obtain meaning by comparing their position in a norm group.	v. Test scores have meaning when they are compared for distance from items.
vi. Interval scale properties are achieved by obtaining normal distributions.	vi. Interval scale properties are achieved by applying justifiable measurement models.
vii. Mixed-item formats lead to unbalanced impact on test total scores.	vii. Mixed-item formats can yield optimal test scores.
viii. Change scores cannot be meaningfully compared when initial score levels differ.	viii. Change scores can be meaningfully compared when initial score levels differ.
ix. Factor analysis on binary items produces artifacts rather than factors.	ix. Factor analysis on raw item data yields a full information factor analysis.
x. Item stimulus features are unimportant compared to psychometric properties.	x. Item stimulus features can be directly related to psychometric properties.

(Embretson & Reise, 2000, p. 15)

In Table 4.3 the 'old' and 'new' rules are compared to illustrate the similarities and differences between CTT and MTT, and to highlight the advantages of using both.

In the current study both theories were used to investigate the impact of language on the response patterns of the BTI. From the CTT, MANOVA analysis with Scheffe *post-hoc* analysis were administered to determine whether language and English proficiency impacted on the BTI factors.

Wright and Mok (2004) stated that only Rasch measurement models can produce linear measures, overcome missing data, give estimates of precision and have devices of detecting misfit. Therefore Rasch analysis methods, from the MTT, were applied to investigate the impact of language and English proficiency on the responses to each item of the BTI.

4.7 DATA ANALYSIS TECHNIQUES

Paper-and-pencil psychometric instruments were administered to all repondents, and responses were marked on optical reader forms and captured with an optical reader. The optical reader helps to minimise human error and improves the speed at which the data is captured. The captured data was processed in Statistica (version 6, 2003) and basic descriptive statistics were obtained. The data was saved in Excel (Microsoft Office Professional Plus, 2007) and transferred into Winsteps (version 3.74, 2011) for the Rasch analysis techniques. All MTT procedures were performed in Winsteps (version 3.74, 2011).

4.8 STATISTICAL ANALYSIS

A number of different statistical techniques were used in the present study, especially from the MTT genre. MTT provides the best justifiable measurement scale properties that have a significant influence on inferential statistics (Embretson & Reise, 2000). The main objective of the current study was to identify the impact that different languages have on the endorsement of items and to indicate differential item functioning or item bias of items of the BTI for the eleven official language groups in South Africa.

4.8.1 Descriptive statistics

The minimum, maximum, mean and standard deviation values are given to describe the data set that was used during the analysis. The mean value is an indication of the central tendency of the measure (Forshaw, 2007), in other words it is an indication of the value after summing all the values and dividing the total by the number of cases in the distribution (Urbina, 2004). The standard deviation or square root of the variance gives an indication of the spread of the responses in relation to the mean value (Forshaw, 2007). A low standard deviation will indicate tightly packed scores around the mean (leptokurtic) while a high standard deviation indicates widely distributed responses (platykurtic) (Forshaw, 2007).

Many statistical tests assume that the data distribution is normal; therefore the dispersion of the responses per factor needs to be investigated (Miles & Banyard, 2007). The Kolmogorov-Smirnov statistic assesses the normality of the distribution of scores. A non-significant result ($p>.05$) indicates normality and significant values ($p<.05$) suggest violation of the assumption of normality, which is quite common in larger samples (Pallant, 2010). Hill and Lewicki (2006) however stipulate that normal distribution-based tests can still be used if the samples are large enough ($n>100$), which is the case in the current study.

The emphasis of the current study was on MTT, specifically Rasch analysis, to identify if there are different response patterns on the BTI for the different languages and the different levels of understanding of the administration language, namely English proficiency. A short summary of the descriptive statistics is given to assist in understanding of the data used in the analysis.

4.8.2 Multivariate analysis – MANOVA

MANOVA is a multivariate analysis of one or more continuous or categorical independent variables (home language - categorical and English proficiency - continuous) and their impact on related continuous dependent variables (BTI factors) in terms of the significance of the difference between the mean scores that are compared (Pallant, 2010). MANOVA measures whether group membership produces significant differences in responses and when it does, that combination of variables can be used to differentiate among groups (Tabachnick & Fidell, 1983).

According to Tabachnick and Fidell (1983, p. 292) three F-ratios are obtained in a two-way ANOVA (MANOVA):

- The first F ratio indicates whether the first independent variable (home language) has a significant *main effect* on the dependent variable (BTI factors).
- The second F ratio indicates whether the second independent variable (English proficiency) has a significant *main effect* on the dependent variable (BTI factors).

- The third F ratio indicates the *interaction* between the two independent variables and whether they have a significant effect on the dependent variable, in other words, if the impact of one independent variable depends on the level of the other.

Various *post-hoc* comparisons are available to conduct a whole set of comparisons and explore the differences between each of the groups (Pallant, 2010). Scheffe test was used in the current study to identify the exact location of differences between the language groups.

4.8.3 MTT methods

MTT allows users to create an interval scale of scores for both the difficulty of items and the ability (or standing on the latent trait) of the persons tested (Wright & Stone, 1979). These scores are reported in units called logits and are typically placed on a vertical ruler called a logistic ruler (Bond & Fox, 2007).

The rating scales of assessment instruments are assumed to have equal intervals, but particularly with personality instruments this is often not the case (Green & Frantom, 2002). Test developers therefore prefer the Rasch analysis model to assist with the construction of instruments with equal interval rating scales (Green & Frantom, 2002). The Rasch model places respondents and instrument items on the same scale, based respectively on their ability or (in the case of personality assessment) the person's standing on the latent trait being measured and the difficulty or endorsability of the item. This makes it easier to identify items that clearly distinguish between persons who are high or low on the latent trait and can be used to identify biased items. Rasch analysis also highlights different response patterns, which is an indication of differential item functioning (DIF) in the instrument. Since the BTI is a widely used and standardised personality instrument, items will not be removed during the current research. Thus the instrument will remain intact in its standard validated format, which will also allow for the comparison of results with previous findings. The intention of the current study is to make psychologists aware of problematic items that may cause different interpretations

or responses and to compare problem items with items that were identified as problematic in previous research by Taylor (2008).

As indicated in 4.5.2, Rasch analysis methods have two basic assumptions, namely local independence and unidimensionality (Embretson & Reise, 2000). Local independence indicates that the responses are independent of one another, while unidimensionality indicates that only one latent trait (dimension/factor) is measured per item. The logical pattern of responses is investigated next to determine the fit of the items and individuals that responded to these specific items.

4.8.3.1 Fit indices

Residual mean square summary statistics, named INFIT and OUTFIT mean square values, are determined in Rasch analysis to indicate the degree to which items and people responses have a logical pattern (Green & Frantom, 2002).

Items as well as people can 'over fit' (be too predictable) or 'under fit' (be too unpredictable) the logical anticipated pattern of responses and they may then be removed from the analysis to allow better fit to the model (Bond & Fox, 2001). As the BTI is a widely used and standardised personality instrument, the current study will identify probematic items and make users of the BTI aware of items that may cause different interpretations to item responses. The test distributors may decide to change, remove or replace some of the identified problem items in future versions/editions/revisions of the BTI.

The INFIT mean square is sensitive to irregular responses to on-target items and the OUTFIT mean square is sensitive to irregular responses to off-target items (Wright & Linacre, 1994). The focus in the current study was on the INFIT mean square (MNSQ) values, which focuses on the on-target items. The current study reports only the INFIT MNSQ statistics for the items that are considered to show misfit by having values below .60 (overfit) or above 1.40 (underfit) (as set by Wright and Linacre (1994)).

4.8.3.2 Internal consistency reliability

According to Guilford (1965), the reliability of any set of measurements is logically defined as the proportion of their variance that is true variance. Internal consistency reliability is an objective procedure determined by Cronbach's alpha or Kuder-Richardson's coefficients (Moerdyk, 2009; Murphy & Davidshofer, 2005). The true measure variance is assumed to be the genuine value of whatever is being measured (Guilford, 1965). Reliability is an indication of how homogeneous the items are.

Rasch measurement also produces reliability measures, one in terms of the items and the other in terms of each person's ability. A person's ability index is given on a linear scale calculated from a logistic transformation of the respondents' raw score (Wright & Stone, 1999). The person separation index (PSI) describes the number of levels that could be created for people with different abilities. It indicates how efficiently a set of items can separate persons measured in terms of their abilities. This results in a linear comparison of 'hard' and 'easy' tests (Wright & Stone, 1999, p.159).

A better reliability coefficient is obtained through Rasch analysis than through CTT – firstly because the numerical arguments are now linear rather than curvilinear, and secondly because the actual average error variance of the sample is used instead of the error variance of an 'average' person (Wright & Stone, 1999).

The item separation index (ISI) is generated to determine the item reliability in Rasch terms. This is an indication of the replicability of item difficulty, should the analysis be repeated with another sample of participants. It would be expected that the difficulty order of the items should remain the same and that the items are well separated in terms of their difficulty parameters (Bond & Fox, 2007). The ISI is an indication of how well the items separate people with different levels of ability and can be seen as similar to the scale's internal consistency reliability (Bond & Fox, 2007).

The item separation index (ISI) and person separation index (PSI) are expressed as reliabilities and range from .0 to 1.0 (Wright & Stone, 1999).

Higher separation values indicate better separation between items or persons and therefore allow more precise measurement with the instrument (Wright & Stone, 1999).

The item separation index (ISI) as well as the person separation index (PSI) will be reported for each of the BTI factors.

4.8.3.3 Differential item functioning (DIF)

Differential item functioning is identified by giving a DIF contrast value when comparing the item locations of different groups. According to Lai, Teresi and Gershon (2005), the DIF contrast value indicates a meaningful difference if this value is larger than .5 logits.

The DIF contrast values will be calculated for all the items of the BTI, firstly for the entire sample and secondly for the higher English proficiency group (top 25%) and the lower English proficiency group (bottom 25%), across all eleven official languages. The items that show bias when the BTI is administered to different language groups will be identified, and also the effect that English proficiency might have on responses to the BTI items.

4.9 POSTULATES

The main research questions asked in the current study are

- whether the eleven official home languages of South Africa have an effect on the responses made on the BTI; and
- whether English proficiency influences the response patterns.

These questions form the basis of the postulates given for the present study. Different statistical analysis techniques (as described above) will be used in various combinations to provide evidence that supports the postulates formulated in this section.

The postulates for the present study are focused on the identification of item bias in the BTI.

4.9.1 Item bias

Item bias is also known as differential item functioning. This type of bias occurs when there are inconsistencies in the instrument at item level, perhaps caused by poor translation or inappropriate items in a particular context, which could lead to items having a different psychological meaning across cultures (Van de Vijver & Tanzer, 1997; Van de Vijver & Leung, 1997).

Null hypothesis 1

There are no statistically significant differences between the responses to the BTI items of respondents with different home languages.

Alternative/Research hypothesis 1

There are statistically significant differences between the responses to the BTI items of respondents with different home languages.

Null hypothesis 2

There are no statistically significant differences between the responses to the BTI items of respondents with different English proficiency levels.

Alternative/Research hypothesis 2

There are statistically significant differences between the responses to the BTI items of respondents with different English proficiency levels.

Null hypothesis 3

There are no statistically significant differences between the responses to the BTI items of respondents with different home languages and different English proficiency levels.

Alternative/Research hypothesis 3

There are statistically significant differences between the responses to the BTI items of respondents with different home languages and different English proficiency levels.

4.10 SUMMARY

In this chapter, the sample, the instrument and the statistical analysis methods used to evaluate the data were described. A short summary was given of the differences between CTT and MTT. Some limitations of basic CTT methods that led to the development of MTT were highlighted and thereafter some advanced MTT (i.e. the Rasch analysis techniques, such as Differential item functioning (DIF)) were described and the reasons for focusing on these Rasch analysis techniques were stipulated. Thereafter the postulates for the current study were presented.

The next chapter will explain the results that were obtained from the data analysis.

CHAPTER 5: RESULTS

5.1 INTRODUCTION

The results obtained in the present study are presented in this chapter. The basic descriptive statistics are given in terms of the minimum, the maximum, the mean and the standard deviation for the Big Five personality factors of the BTI. The reason for initially presenting the descriptive results is that the data set needs to be understood before any further statistical analyses can be presented. After reporting the descriptive statistics of the data used, the test for normality for each of the variables used is given.

Multivariate analyses of variance (MANOVA) were used to identify whether there are any statistically significant differences between the mean scores of sub-groups based on the independent variables (i.e. home languages and English proficiency) on the dependent variables (i.e. the BTI Big Five personality factors).

The power of any statistical analysis procedure is dependent on the size of the sample and therefore the effect sizes were also reported.

When using the MTT, the assumptions of unidimensionality and local independence (Bond & Fox, 2007) are tested. The items that do not fit the model are reported in terms of the INFIT mean square values. The internal consistency reliabilities with regard to the item separation index (ISI) and person separation index (PSI) are outlined, after which the dimensionalities of each of the five factors are discussed. The differential item functioning (DIF) for the items is summarised both for the different language groups and for the groups based on the level of English proficiency.

5.2 DESCRIPTIVE STATISTICS

The descriptive statistics for the total sample are given in Table 5.1. The mean value is an indication of the central tendency of the measure in terms of the ‘average’ value for the responses (Forshaw, 2007). A low standard deviation will indicate tightly packed scores

around the mean (leptokurtic), while a high standard deviation points to widely distributed responses (platykurtic) (Forshaw, 2007).

Table 5.1

Descriptive Statistics - Total Sample (N=105 342)

BTI personality factors	Items	Minimum	Maximum	Mean	Standard deviation	Skew-ness	Stan-dard error	Kurtosis	Standard error
Extraversion	36	0	180	120.74	17.29	-.16	.01	1.51	.02
Neuroticism	34	0	170	78.36	19.01	.38	.01	.67	.02
Conscientiousness	41	0	205	165.65	21.51	-1.28	.01	4.85	.02
Openness to experience	32	0	160	117.11	17.78	-1.66	.01	8.76	.02
Agreeableness	37	0	185	133.63	24.71	-2.29	.01	10.26	.02
Social desirability	13	0	65	43.335	8.07	-.21	.01	.23	.02

The skewness value indicates the symmetry of the distribution (Pallant, 2010). Perfectly normal distributions will have a skewness value of 0 (Pallant, 2010). Table 5.1 indicates that Neuroticism has a positive skewness (scores clustered to the left of the distribution, indicating more scores with low Neuroticism), which is an indication that the sample generally obtained lower scores on Depression, Anxiety, Self-consciousness and Affective instability (the facets of Neuroticism). The other factors have negative skewness values, which indicates that the distributions of scores are clustered more to the right-hand side of the graph (i.e. higher score values). This means that more respondents obtained high scores on Extraversion, high Conscientiousness scores, high scores on the factor Openness to experience, and high scores on the factor Agreeableness and on the Social desirability factor.

Kurtosis provides information on the 'peakedness' of the distribution (Pallant, 2010). All the BTI factors had a positive kurtosis value, which indicates that the distribution is rather peaked or clustered in the centre (especially the factors Openness to experience (8.76) and Agreeableness (10.26). This is typically associated with lower standard deviations, indicating that the scores are 'bundled' closely together and not dispersed widely (Urbina, 2004).

According to Tabachnick and Fidell (2007), larger samples tend to cause problems with the interpretation of skewness and kurtosis values. They found that skewness will not make a substantive difference in the analysis and that positive kurtosis can result in an underestimation of the variance when larger samples are used. Tabachnick and Fidell (2007) recommend that other tests for normality be used to inspect the shape of the distribution, as the skewness and kurtosis values are too sensitive with larger samples.

5.3 TEST FOR NORMALITY

Score distributions vary systematically across cultures; therefore multivariate normality can be problematic in cross-cultural research (Au, 1997). The Komogorov-Smirnov test was used to test for normality with the large sample used in the current study and determine the normality of the distribution of scores. The results are presented in Table 5.2.

The Komogorov-Smirnov test is based on a statistic that indicates how much a sample cumulative distribution function deviates from a specific population cumulative distribution function (Hawkins & Weber, 1980). The test was performed for each of the variables concerned in the current study. Since it indicates the deviation of a sample distribution from a specific population distribution, it is a general test of goodness of fit (Hawkins & Weber, 1980). Significance values smaller than .05 indicate a violation of the assumption of normality, which is quite common in larger samples (Pallant, 2010).

Table 5.2

Distribution - Normality

Factor	Mean	Standard deviation	Significance	Komogorov-Smirnov result
English proficiency*	40.39	9.33	.00	Not normally distributed
Extraversion	120.74	17.29	.00	Not normally distributed
Neuroticism	78.37	19.01	.00	Not normally distributed
Conscientiousness	165.65	21.51	.00	Not normally distributed
Openness to experience	117.11	17.79	.00	Not normally distributed
Agreeableness	133.63	24.71	.00	Not normally distributed
Social desirability	43.34	8.07	.00	Not normally distributed

*English proficiency is a combined score of verbal reasoning and reading comprehension total scores

Neither English proficiency responses nor responses on all the Big Five personality factors measured by the BTI were normally distributed according to the Komogorov-Smirnov test. Since the scores of this sample are not normally distributed for all the variables involved in the current study, non-parametric statistical analysis methods would typically be recommended, depending on the sample size. According to Hill and Lewicki (2006), parametric statistics may be used when the sample is larger than 100. Therefore, because the sample in this study was so large, parametric statistics were used, even though all the factors were found to be not normally distributed. According to them it often makes little sense to use non-parametric statistics when the data set is large, due to the central limit theorem. The central limit theorem states that when the sample becomes very large, the sample means will follow the normal distribution even if the particular variable is not normally distributed in the population, or is not measured very well (Hill & Lewicki, 2006). They conclude that parametric methods are usually much more sensitive or have more statistical power, and are therefore more appropriate for larger samples.

5.4 INTERNAL CONSISTENCY RELIABILITY

Internal consistency reliability, which is an indication of the amount of measurement error present in a test, is measured in CTT with the Cronbach alpha coefficients. Tests that are relatively free of measurement error are considered to be reliable (Kaplan & Saccuzzo, 2001). An acceptable level of reliability, although very low, is regarded to be above .60 (Clark & Watson, 1995).

The Cronbach alpha coefficients (Cronbach, 1951) for the factors of the BTI are presented in Table 5.3, together with the person separation index (PSI) as determined by Rasch analysis, to determine the degree of random measurement error present in the test. The PSI is an indication of the reliability of the test through MTT (Bond & Fox, 2001). It indicates how well the items separate the different levels of ability of the respondents (Bond & Fox, 2001). A PSI above .60, although very low, is regarded as an acceptable level of reliability (Bond & Fox, 2001).

Table 5.3
Cronbach Alpha Coefficients and PSI for Psychometric Instruments (N=105 342)

		Items (*n*)	α	PSI	ISI
English proficiency	Verbal reasoning	45	.83	.82	1.00
English proficiency	Reading comprehension	30	.80	.78	1.00
BTI	Extraversion	36	.86	.85	1.00
BTI	Neuroticism	34	.89	.86	1.00
BTI	Conscientiousness	41	.93	.88	1.00
BTI	Openness to experience	32	.90	.84	1.00
BTI	Agreeableness	37	.94	.86	1.00
BTI	Social desirability	13	.72	.70	1.00
BTI	Total items	193			

Clark and Watson (1995) regarded Cronbach alpha coefficients above .60 as acceptable, and Bond and Fox (2001) recommended the same with regard to the PSI. As is evident from the table above, the reliability estimates for the BTI in the current study indicated very good internal consistency reliabilities. The PSI values, which indicate the ability of the items to efficiently separate persons in terms of their abilities (Bond & Fox, 2001), are still acceptable even though they are lower than the Cronbach alpha coefficients for all the factors.

The reliability in terms of Cronbach alpha coefficients (α) and the PSI are reported as follows: Extraversion (α=.86; PSI=.85), Neuroticism (α=.89; PSI=.86), Conscientiousness (α=.93; PSI=.88), Openness to experience (α=.90; PSI=.84), Agreeableness (α=.94; PSI=.86) and Social desirability (α=.72; PSI=.70).

The item separation index (ISI) indicates that if the analyses were repeated with another sample of participants, the difficulty order of the items can be expected to remain the same and the items should be well separated in terms of their difficulty parameters (Bond & Fox, 2001). The ISI calculated for the different Big Five personality factors measured by the BTI was 1.00 for each of the factors, even for the faking scale (Social desirability). This indicates that the items were well separated in terms of their location parameters and would remain in the same order, should the analysis be repeated with another sample.

The high Cronbach alpha coefficients and high separation values indicated that the BTI is a very reliable instrument that separates very well between 'easy to respond' and 'difficult to respond' items, or persons 'high' or 'low' on that specific latent trait. Thus it can be concluded that the BTI rendered a very precise measurement of the Big Five personality factors for this sample.

To further investigate the reliability of the BTI for the different South African language groups, Cronbach alpha coefficients are given for each factor in respect of the eleven official language groups. These values are presented in Table 5.4.

Table 5.4

Cronbach Alpha Coefficients of BTI Factors for South African Languages

Language	Extraversion (36 items)	Neuroticism (34 items)	Conscientiousness (41 items)	Openness to Experience (32 items)	Agreeableness (37 items)	Social Desirability (13 items)
	α	α	α	α	α	α
Afrikaans (N=6786)	.88	.93	.95	.88	.91	.70
English (N=2261)	.87	.92	.95	.88	.92	.73
Ndebele (N=2002)	.87	.89	.93	.90	.93	.73
Sepedi (N=23825)	.84	.89	.93	.91	.95	.71
Sotho (N=7517)	.87	.90	.93	.88	.92	.73
Swati (N=3628)	.86	.89	.92	.89	.93	.72
Tsonga (N=10857)	.85	.88	.93	.90	.94	.70
Tswana (N=6687)	.87	.90	.93	.88	.92	.74
Venda (N=5042)	.85	.88	.93	.90	.93	.71
Xhosa (N=17265)	.88	.90	.93	.90	.95	.73
Zulu (N=19472)	.86	.89	.93	.89	.92	.71
AVERAGE	.86	.89	.93	.89	.93	.72

Each of the Big Five personality factors was measured very reliably across the eleven official languages of South Africa with the help of the BTI personality instrument. Cronbach alpha coefficients above .84 were reported for the five factors and above .70 for the faking scale (Social desirability) for all the groups. This is very good evidence that the BTI shows good internal consistency reliability for all eleven languages in South Africa.

The current study contributes to the evidence that attests to the BTI being a very reliable South African personality instrument that can be administered to all eleven language groups.

5.5 EFFECT SIZES IN CROSS-CULTURAL RESEARCH

Before MTT techniques were administered, effect sizes were determined as the sample was very large and the practical significance of the results needs to be considered. For large samples, the percentage of variance of the dependent variable is explained by the independent variables through the eta-squared (Eta^2) value (Pallant, 2010).

Effect size is an indication of the importance of the findings in research (Pallant, 2010). Tabachnick and Fidell (2007, p.54) described effect size as 'the set of statistics that indicates the relative magnitude of the difference between means, or the amount of the total variance in the dependent variable that is predictable from knowledge of the levels of the independent variable'.

The Eta^2 value for the BTI responses with language as independent variable was .01, which is a small effect (i.e. 1% of the variance in the BTI response is explained by the language variable) (Cohen, 1988). For English proficiency, Eta^2=.14, which is a larger effect (Cohen, 1988) and means that 14% of the variance in the BTI response was explained by the level of English proficiency.

The effect of English proficiency was the highest; therefore the decision was made to divide the sample into two sub-groups for further analyses.

Cohen's *d* presents the mean difference between groups in terms of standard deviation units. Cohen (1988) presented the following guidelines to interpret the value of *d* when comparing different groups:

- < 0.1 = trivial effect
- 0.1 - 0.3 = small effect

- 0.3 - 0.5 = moderate effect
- > 0.5 = large difference effect

(Cohen, 1988).

The effect size (practical significance) in terms of Cohen's *d* (Cohen, 1988) is presented in the following tables to compare the relevant groups together with the statistical significant (p<.05) results.

5.6 MULTIVARIATE ANALYSIS (MANOVA)

MANOVA renders F-ratios to indicate the influence that more than one independent variable has on the dependent variable (Pallant, 2010). The significant differences are summarised in Table 5.5 with language and English proficiency as independent variables and the BTI factors as dependent variables.

Table 5.5

Multivariate Analysis – MANOVA (Wilks' Lambda)

	Wilks' Lambda value	F	Hypothesis df	Error df	Sig p	Eta^2
Home language	.95	83.36	60	631980.0	.00	.01
English proficiency	.87	2736.01	6	105325.00	.00	.15

The MANOVA analysis revealed significant differences in the BTI factors by respondents with different home languages (Wilks' Lambda = .917, p<.001, Eta^2=.014, *d*=.11) and different levels of English proficiency (Wilks' Lambda =.865, p<.001, Eta^2=.135, *d*=.81).

Post-hoc comparisons are used when a set of comparisons needs to be made to explore the differences between each of the groups (Pallant, 2010). The Scheffe test, as a *post-hoc* method, was done to further explore the differences between each of the language groups. Only the mean differences that were significant at the p<.05 (95%) level are presented. The complete list of mean differences for all the BTI factors is attached in Appendix A for the different language groups and in Appendix B for the two different English proficiency levels.

The mean differences (at a significance level of p<.05) between the language groups are given in Table 5.6 for the Extraversion factor of the BTI.

Table 5.6

Extraversion – Statistically Significant Mean Differences between Languages

							95% Confidence Interval	
Language	*n*	Language	*n*	Mean difference (p<.05)	Standard Error	Effect size (*d*)	Lower Bound	Upper Bound
English	2 261	Afrikaans	6 786	3.72	.42	.21	5.51	1.93
		Sepedi	23 825	3.21	.38	.19	1.58	4.83
		Sotho	7 517	1.86	.41	.11	.08	3.63
		Swati	3 628	3.21	.46	.19	1.23	5.19
		Tsonga	10 857	2.10	.40	.12	.39	3.81
		Tswana	6 687	2.77	.42	.16	.97	4.56
		Xhosa	17 265	3.73	.39	.21	2.08	5.38
		Zulu	19 472	2.45	.38	.14	.81	4.09
Afrikaans	6 786	Sotho	7 517	-1.86	.29	-.10	-3.10	-.63
		Tsonga	10 857	-1.62	.27	-.01	-2.76	-.48
		Venda	5 042	-3.79	.32	-.22	-5.17	-2.42
		Zulu	19 472	-1.27	.24	-.07	-2.31	-.23
Ndebele	2 002	Venda	5 042	-2.32	.46	-.14	-4.27	-.37
Sepedi	23 825	Sotho	7 517	-1.35	.23	-.08	-2.33	-.38
		Tsonga	10 857	-1.11	.20	-.07	-1.96	-.25
		Venda	5 042	-3.28	.27	-.20	-4.43	-2.13
		Zulu	19 472	-.76	.17	-.05	-1.47	-.05
Sotho	7 517	Venda	5 042	-1.93	.31	-.11	-3.27	-.58
		Xhosa	17 265	1.88	.24	.11	.86	2.90
Swati	3 628	Venda	5 042	-3.29	.38	-.19	-4.89	-1.68
Tsonga	10 857	Venda	5 042	-2.17	.29	-.13	-3.43	-.91
		Xhosa	17 265	1.63	.21	.09	.73	2.54
Tswana	6 687	Venda	5 042	-2.84	.32	-.16	-4.22	-1.46
Venda	5 042	Xhosa	17 265	3.80	.28	.22	2.62	4.99
		Zulu	19 472	2.52	.27	.15	1.35	3.69
Xhosa	17 265	Zulu	19 472	-1.28	.18	-.07	-2.06	-.51

The highest statistically significant mean differences were identified between Venda and Xhosa (3.80, *d*=.22 small effect). This implies that the Venda-speaking respondents were more inclined to endorse items measuring Extraversion than the Xhosa-speaking respondents did. The statistically significant mean differences between English and Afrikaans (3.72, *d*=.21 small effect), English and Xhosa (3.73, *d*=.21 small effect) and Afrikaans and Venda (-3.79, *d*=-.22 small effect) were also high for Extraversion.

The statistically significant (p<.05) mean differences between languages are given in Table 5.7 for the Neuroticism factor of the BTI.

Table 5.7

Neuroticism – Statistically Significant Mean Differences between Languages

							95% Confidence Interval	
Language	*n*	Language	*n*	Mean difference (p<.05)	Standard Error	Effect size (*d*)	Lower Bound	Upper Bound
English	2 261	Afrikaans	6 786	-5.96	.46	-.29	-3.99	-7.93
		Ndebele	2 002	-7.20	.58	-.39	-9.69	-4.71
		Sepedi	23 825	-7.60	.42	-.41	-9.39	-5.82
		Sotho	7 517	-5.92	.46	-.30	-7.86	-3.97
		Swati	3 628	-6.99	.51	-.38	-9.16	-4.82
		Tsonga	10 857	-4.97	.44	-.27	-6.84	-3.09
		Tswana	6 687	-6.29	.46	-.32	-8.27	-4.32
		Venda	5 042	-6.86	.48	-.36	-8.92	-4.81
		Xhosa	17 265	-8.58	.42	-.46	-10.40	-6.77
		Zulu	19 472	-7.65	.42	-.41	-9.45	-5.85
Afrikaans	6 786	Sepedi	23 825	-1.64	.26	-.09	-2.76	-.52
		Xhosa	17 265	-2.62	.27	-.14	-3.78	-1.46
		Zulu	19 472	-1.69	.27	-.09	-2.83	-.54
Ndebele	2 002	Tsonga	10 857	2.23	.46	.12	.26	4.21
Sepedi		Sotho	7 517	1.68	.25	.09	.61	2.76
		Tsonga	10 857	2.63	.22	.14	1.69	3.57
		Tswana	6 687	1.31	.26	.07	.19	2.43
		Xhosa	17 265	-.98	.19	-.05	-1.79	-.17
Sotho	7 517	Xhosa	17 265	-2.66	.26	-.14	-3.79	-1.54
		Zulu	19 472	-1.73	.26	-.09	-2.83	-.63
Swati	3 628	Tsonga	10 857	2.02	.36	.11	.47	3.58
		Xhosa	17 265	-1.59	.35	-.09	-3.07	-.11
Tsonga	10 857	Tswana	6 687	-1.33	.30	-.07	-2.59	-.06
		Venda	5 042	-1.89	.32	-.10	-3.28	-.51
		Xhosa	17 265	-3.61	.23	-.19	-4.61	-2.62
		Zulu	19 472	-2.68	.23	-.14	-3.65	-1.71
Tswana	6 687	Xhosa	17 265	-2.29	.27	-.12	-3.46	-1.12
		Zulu	19 472	-1.36	.27	-.07	-2.51	-.21
Venda	5 042	Xhosa	17 265	-1.72	.30	-.09	-3.02	-.42
Xhosa	17 265	Zulu	19 472	.93	.20	.05	.09	1.78

The mean differences presented are statistically significant at the p<.05 level. The highest mean difference was identified between English and Xhosa (-8.58, *d*=-.46 moderate effect), which implies that Xhosa respondents were more inclined to endorse items measuring Neuroticism than did the English respondents. The other high statistically significant (p<.05) mean differences for Neuroticism were between English and Ndebele (-7.2, *d*=-.39 moderate effect), English and Sepedi (-7.6, *d*=-.41 moderate effect) and

English and Zulu (-7.65, *d*=-.41 moderate effect). Thus English-speaking respondents were less inclined to endorse items that measure Neuroticism than did respondents speaking Ndebele, Sepedi and Zulu.

The statistically significant (p<.05) mean differences between languages are given in Table 5.8 for the Conscientiousness factor of the BTI.

Table 5.8

Conscientiousness – Statistically Significant Mean Differences between Languages

							95% Confidence	
Language	*n*	Language	*n*	Mean difference (p<.05)	Standard Error	Effect size (*d*)	Lower Bound	Upper Bound
English	2 261	Afrikaans	6 786	-2.64	.52	.12	-4.87	-.41
		Ndebele	2 002	3.37	.66	.16	.56	6.19
		Sepedi	23 825	3.21	.47	.15	1.19	5.23
		Sotho	7 517	2.64	.51	.12	.44	4.84
		Tswana	6 687	2.41	.52	.11	.18	4.64
		Xhosa	17 265	6.17	.48	.29	4.12	8.22
		Zulu	19 472	3.08	.48	.15	1.04	5.12
Afrikaans	6 786	Tsonga	10 857	-2.61	.33	-.12	-4.03	-1.19
		Venda	5 042	-2.41	.40	-.11	-4.12	-.71
		Xhosa	17 265	3.53	.31	.17	2.22	4.85
Ndebele	2 002	Tsonga	10 857	-3.34	.52	-.16	-5.57	-1.11
		Venda	5 042	-3.14	.57	-.15	-5.57	-.72
		Xhosa	17 265	2.80	.51	.13	.64	4.97
Sepedi	23 825	Swati	3 628	-1.85	.38	-.08	-3.48	-.21
		Tsonga	10 857	-3.18	.25	-.15	-4.24	-2.12
		Venda	5 042	-2.98	.33	.14	-4.40	-1.56
		Xhosa	17 265	2.97	.21	.14	2.05	3.88
Sotho	7 517	Tsonga	10 857	-2.61	.32	-.12	-3.99	-1.24
		Venda	5 042	-2.41	.39	-.11	-4.08	-.74
		Xhosa	17 265	3.53	.30	.17	2.26	4.80
Swati	3 628	Xhosa	17 265	4.81	.39	.23	3.14	6.49
		Zulu	19 472	1.72	.39	.08	.06	3.38
Tsonga	10 857	Tswana	6 687	2.38	.33	.11	.95	3.81
		Xhosa	17 265	6.15	.26	.29	5.02	7.27
		Zulu	19 472	3.05	.26	.15	1.95	4.15
Tswana	6 687	Venda	5 042	-2.18	.40	-.10	-3.89	-.47
		Xhosa	17 265	3.76	.31	.18	2.44	5.09
Venda	5 042	Xhosa	17 265	5.95	.34	.28	4.48	7.41
		Zulu	19 472	2.85	.34	.14	1.40	4.30
Xhosa	17 265	Zulu	19 472	-3.09	.22	-.15	-4.05	-2.13

The mean differences presented for Conscientiousness are significant at the p<.05 level. The highest statistically significant mean difference was identified between English and Xhosa (6.17, *d*=-.29 small effect), indicating that English respondents were more inclined

to endorse items measuring Conscientiousness than did Xhosa-speaking respondents. High mean differences for the Conscientiousness factor were also reported between respondents speaking Tsonga and Xhosa (6.15, *d*=.29 small effect) and Venda and Xhosa (5.95, *d*=.28 small effect).

The statistically significant (95% level) mean differences between languages are presented in Table 5.9 for the Openness to experience factor of the BTI.

Table 5.9
Openness to Experience – Statistically Significant Mean Differences between Languages

							95% Confidence	
Language	*n*	Language	*n*	Mean difference (p<.05)	Standard Error	Effect size (*d*)	Lower Bound	Upper Bound
English	2 261	Afrikaans	6 786	2.79	.43	.18	4.64	.95
		Xhosa	17 265	2.99	.40	.17	1.30	4.69
Afrikaans	6 786	Sepedi	23 825	-1.41	.24	-.08	-2.45	-.36
		Sotho	7 517	-2.90	.30	-.18	-4.17	-1.63
		Swati	3 628	-1.66	.37	-.11	-3.23	-.10
		Tsonga	10 857	-2.18	.28	-.13	-3.36	-1.01
		Tswana	6 687	-3.22	.31	-.21	-4.53	-1.91
		Venda	5 042	-3.20	.33	-.19	-4.61	-1.79
		Zulu	19 472	-1.40	.25	-.08	-2.47	-.33
Ndebele	2 002	Tswana	6 687	-2.17	.45	-.13	-4.11	-.24
		Venda	5 042	-2.15	.47	-.12	-4.16	-.14
Sepedi	23 825	Sotho	7 517	-1.49	.24	-.08	-2.50	-.49
		Tswana	6 687	-1.82	.25	-.10	-2.87	-.77
		Venda	5 042	-1.80	.28	-.10	-2.97	-.62
		Xhosa	17 265	1.61	.18	.09	.85	2.37
Sotho	7 517	Xhosa	17 265	3.10	.25	.18	2.05	4.15
		Zulu	19 472	1.50	.24	.09	.47	2.53
Swati	3 628	Xhosa	17 265	1.87	.32	.11	.48	3.26
Tsonga	10 857	Xhosa	17 265	2.39	.22	.13	1.46	3.32
Tswana	6 687	Xhosa	17 265	3.43	.26	.20	2.33	4.52
		Zulu	19 472	1.82	.25	.11	.74	2.90
Venda	5 042	Xhosa	17 265	3.41	.28	.19	2.19	4.62
		Zulu	19 472	1.80	.28	.10	.60	3.00
Xhosa	17 265	Zulu	19 472	-1.61	.19	-.09	-2.40	-.81

The mean differences presented are significant at the p<.05 level. The highest statistically significant mean difference was identified between Tswana and Xhosa (3.43, *d*=.20 small effect), with another high mean difference between Venda and Xhosa (3.41, *d*=.19 small effect) for the factor Openness to experience. Thus the conclusion can be made that Xhosa-speaking respondents found it more difficult to endorse items measuring Openness to experience than did Tswana- and Venda-speaking respondents.

The statistically significant mean differences (p<.05) between the official languages are given in Table 5.10 for Agreeableness.

Table 5.10

Agreeableness – Statistically Significant Mean Differences between Languages

							95% Confidence	
Language	*n*	Language	*n*	Mean difference (p<.05)	Standard Error	Effect size (*d*)	Lower Bound	Upper Bound
English	2 261	Afrikaans	6 786	3.58	.60	.18	6.14	1.02
		Sepedi	23 825	3.52	.54	.13	1.20	5.84
		Xhosa	17 265	4.79	.55	.18	2.43	7.15
Afrikaans	6 786	Swati	3 628	-3.01	.51	-.15	-5.18	-.84
		Tsonga	10 857	-3.72	.38	-.16	-5.35	-2.09
		Venda	5 042	-5.09	.46	-.24	-7.05	-3.13
Ndebele	2 002	Tsonga	10 857	-2.99	.60	-.12	-5.55	-.42
		Venda	5 042	-4.36	.65	-.18	-7.15	-1.57
Sepedi	23 825	Sotho	7 517	-1.71	.33	-.01	-3.10	-.31
		Swati	3 628	-2.95	.44	-.11	-4.83	-1.07
		Tsonga	10 857	-3.66	.29	-.14	-4.88	-2.44
		Tswana	6 687	-1.76	.34	-.07	-3.22	-.30
		Venda	5 042	-5.03	.38	-.19	-6.67	-3.40
		Xhosa	17 265	1.27	.25	.05	.21	2.32
		Zulu	19 472	-1.26	.24	-.05	-2.28	-.24
Sotho	7 517	Tsonga	10 857	-1.95	.37	-.08	-3.54	-.37
		Venda	5 042	-3.33	.45	-.14	-5.25	-1.41
		Xhosa	17 265	2.97	.34	.12	1.52	4.43
Swati	3 628	Xhosa	17 265	4.22	.45	.16	2.29	6.15
Tsonga	10 857	Tswana	6 687	1.90	.38	.08	.26	3.54
		Xhosa	17 265	4.93	.30	.19	3.64	6.22
		Zulu	19 472	2.40	.30	.10	1.14	3.67
Tswana	6 687	Venda	5 042	-3.28	.46	-.14	-5.24	-1.31
		Xhosa	17 265	3.02	.36	.12	1.50	4.54
Venda	5 042	Xhosa	17 265	6.30	.40	.24	4.61	7.99
		Zulu	19 472	3.78	.39	.17	2.11	5.44
Xhosa	17 265	Zulu	19 472	-2.52	.26	-.10	-3.63	-1.42

The highest significant mean difference was identified between Venda and Xhosa (6.30, *d*=.24 small effect); which means that Venda-speaking respondents were more inclined to endorse items measuring Agreeableness than did Xhosa-speaking respondents. Other highly significant differences were found between Afrikaans and Venda (-5.09, *d*=-.24 small effect) and between Sepedi and Venda (-5.03, *d*=-.19 small effect) for the factor Agreeableness. Venda-speaking respondents were more inclined to endorse Agreeableness items than did respondents speaking Afrikaans and Sepedi.

Table 5.11

Social Desirability – Statistically Significant Mean Differences between Languages

						95% Confidence	
Language	*n*	Language	*n*	Mean difference (p<.05)	Effect size (*d*)	Lower Bound	Upper Bound
English	2 261	Ndebele	2 002	-4.83	-.63	-5.86	-3.79
		Sepedi	23 825	-5.24	-.68	-5.99	-4.50
		Sotho	7 517	-3.31	-.42	-4.12	-2.50
		Swati	3 628	-5.35	-.70	-6.25	-4.44
		Tsonga	10 857	-6.26	-.79	-7.04	-5.48
		Tswana	6 687	-2.98	-.37	-3.80	-2.15
		Venda	5 042	-6.35	-.74	-7.20	-5.49
		Xhosa	17 265	-3.49	-.44	-4.25	-2.74
		Zulu	19 472	-4.41	-.57	-5.16	-3.66
Afrikaans	6 786	Ndebele	2 002	-4.98	-.68	-5.84	-4.13
		Sepedi	23 825	-5.40	-.70	-5.86	-4.93
		Sotho	7 517	-3.47	-.45	-4.03	-2.90
		Swati	3 628	-5.50	-.75	-6.20	-4.81
		Tsonga	10 857	-6.42	-.83	-6.94	-5.90
		Tswana	6 687	-3.13	-.41	-.371	-2.55
		Venda	5 042	-6.50	-.86	-7.13	-5.88
		Xhosa	17 265	-3.65	-.47	-5.04	-4.09
		Zulu	19 472	-4.56	-.60	-5.04	-4.09
Ndebele	2 002	Sotho	7 517	1.52	.19	.67	2.37
		Tsonga	10 857	-1.43	-.18	-2.26	-.61
		Tswana	6 687	1.85	.23	.99	2.71
		Venda	5 042	-1.52	-.19	-2.41	-.63
		Xhosa	17 265	1.34	.17	.54	2.13
Sepedi	23 825	Sotho	7 517	1.93	.24	1.49	2.38
		Tsonga	10 857	-1.02	-.13	-1.41	-.63
		Tswana	6 687	2.27	.28	1.80	2.73
		Venda	5 042	-1.10	-.14	-1.63	-.58
		Xhosa	17 265	1.75	.22	1.41	2.09
		Zulu	19 472	.84	.11	.51	1.16
Sotho	7 517	Swati	3 628	-2.04	-.26	-2.72	-1.35
		Tsonga	10 857	-2.95	-.37	-3.46	-2.45
		Venda	5 042	-3.04	-.38	-3.65	-2.42
		Zulu	19 472	-1.10	-.14	-1.56	-.64
Swati	3 628	Tsonga	10 857	-.92	-.12	-1.56	-.27
		Tswana	6 687	2.37	.30	1.67	3.07
		Venda	5 042	-1.00	-.13	-1.74	-.27
		Xhosa	17 265	1.85	.24	1.24	2.47
		Zulu	19 472	.94	.12	.33	1.55
Tsonga	10 857	Tswana	6 687	3.29	.41	2.76	3.81
		Xhosa	17 265	2.77	.35	2.36	3.18
		Zulu	19 472	1.85	.24	1.45	2.26
Tswana	6 687	Venda	5 042	-3.37	-.41	-4.00	-2.74
		Xhosa	17 265	-.52	-.06	-1.00	-.03
		Zulu	19 472	-1.43	-.18	-1.91	-.95
Venda	5 042	Xhosa	17 265	2.86	.36	2.31	3.40
		Zulu	19 472	1.94	.25	1.41	2.47
Xhosa	17 265	Zulu	19 472	-.92	-.12	-1.27	-.56

The Social desirability factor's statistically significant mean differences (p<.05) are given in Table 5.11 for the Social desirability factor of the BTI.

The mean differences presented are significant at the p<.05 level. The highest significant mean difference was identified between respondents who spoke Afrikaans and Venda (-6.50, *d*=-.86 large effect), while other high mean differences for the Social desirability factor of the BTI were identified between Afrikaans and Tsonga (-6.42, *d*=-.83 large effect), English and Venda (-6.35, *d*=-.86 large effect) and between English and Tsonga (-6.26, *d*=-.79 large effect). This is an indication that Tsonga- and Venda-speaking respondents were more inclined to endorse items measuring the Social desirability of the BTI, than did Afrikaans- and English-speaking respondents.

Since the highest mean differences identified were most often for Xhosa- and Venda-speaking respondents, it was concluded that these respondents might have had the most difficulty to respond to the items measuring the respective BTI factors.

From a CTT perspective, MANOVA indicated broadly that the language groups differed significantly in terms of the mean scores on the dependant variable (BTI factors). A '*post-hoc*' test (the Sheffe test) was administered afterwards to determine the mean differences between the English proficiency levels for the different language groups.

MTT analysis techniques, specifically Rasch analysis, were administered next to investigate at item level where the exact differences lay that was responsible for the identified mean differences on factor level.

5.7 PROFILE PLOTS

Profile plots summarise the estimated marginal means of BTI factors as respondents with different languages responded to the items in this instrument. From previous discussions it is clear that English proficiency has the highest effect size; therefore this was incorporated into all further analyses. The sample was divided into two subgroups,

namely the higher English proficiency group (top 25%) and the lower English proficiency group (bottom 25%).

In the current study, the response patterns with language as independent variable were compared (per BTI factor) for the total language group (blue/solid graph) to the response pattern of the sub-group 'higher English proficiency' (red/dotted graph) and to the response pattern of the sub-group 'lower English proficiency' (orange/dashed graph).

Comparisons per BTI factor were done for the total group and for the two different English proficiency groups (higher and lower English proficiency) for each language.

Figures 5.1 to 5.6 show the statistically significant ($p<.05$) differences in the mean values of the BTI factors for the total group (language), as well as for the sub-groups (according to their English proficiency scores) per language group. The scales on the graphs differ according to the number of items per factor and the total scores to be achieved per BTI factor.

Tables 5.12 to 5.17 present only the mean differences that have a statistically significance level of $p<.05$ (95%) for the higher and lower English proficiency groups for each of the BTI factors.

5.7.1 Extraversion

The mean differences for Extraversion for the total group (language), as well as for the sub-groups (according to English proficiency scores) per language group are presented in Figure 5.1.

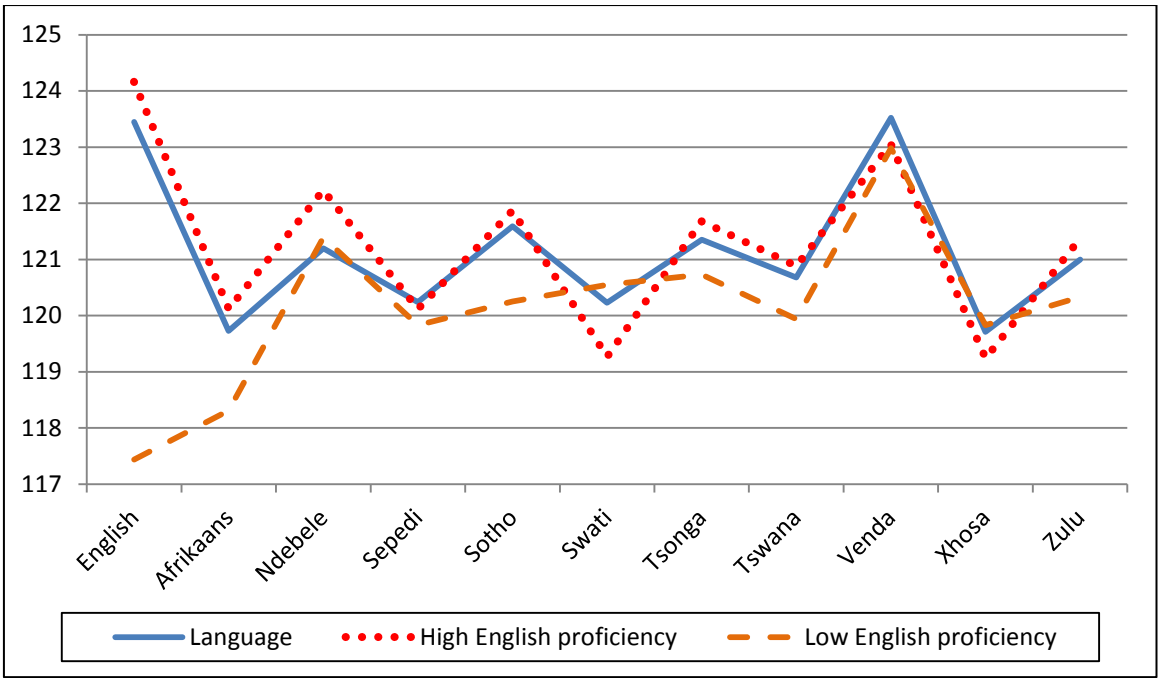


Figure 5.1. Estimated Marginal Means: EXTRAVERSION

From the profile plots illustrated in Figure 5.1 (blue/solid graph) and Table 5.6 earlier in this chapter, the largest mean difference (at a $p<.05$ significance level) was identified between Venda and Xhosa (3.80). The mean differences (at a $p<.05$ significance level) between English and Afrikaans (3.72), English and Xhosa (3.73) and between Afrikaans and Venda (-3.79) were also large for Extraversion.

When the group was split and the mean values of the language groups were compared for the higher English proficiency group (red/dotted graph) and the lower English proficiency group (orange/dash graph), the English-speaking respondents with a higher English proficiency score were identified as those who were significantly more inclined to endorse the items measuring Extraversion.

The mean differences between the two English proficiency groups (higher and lower) at a significance level of $p<.05$ for the factor Extraversion are presented in Table 5.12.

Table 5.12

Extraversion (36 items) – Statistically Significant Mean Differences between Languages per English Proficiency Groups

							95% Confidence interval	
Language	*n*	Mean (Lower EP*)	Mean (Higher EP*)	Mean Difference (p<.05)	Standard Error	Effect size (*d*)	Lower Bound	Upper Bound
English	2 261	117.44	124.16	-6.73	1.58	-.39	-9.83	-3.62
Afrikaans	6 786	118.31	120.12	-1.81	.84	-.10	-3.46	-.15
Sotho	7 517	120.25	121.87	-1.62	.53	-.01	-2.67	-.57
Tsonga	10 857	120.73	121.68	-.95	.44	-.06	-1.82	-.09
Zulu	19 472	120.33	121.37	-1.04	.33	-.06	-1.68	-.41

*EP = English proficiency

The largest mean difference for Extraversion (at a significance level of p<.05) was identified for the English group between the lower and higher English proficiency groups (-6.73, *d*=-.39 moderate effect). Hence, the higher English proficiency group with a home language of English were significantly more inclined to endorse items measuring the factor Extraversion of the BTI.

5.7.2 Neuroticism

Figure 5.2 illustrates the differences in the mean values of the factor Neuroticism for the total language group (blue/solid graph), as well as for the sub-groups (according to English proficiency scores) per language group.

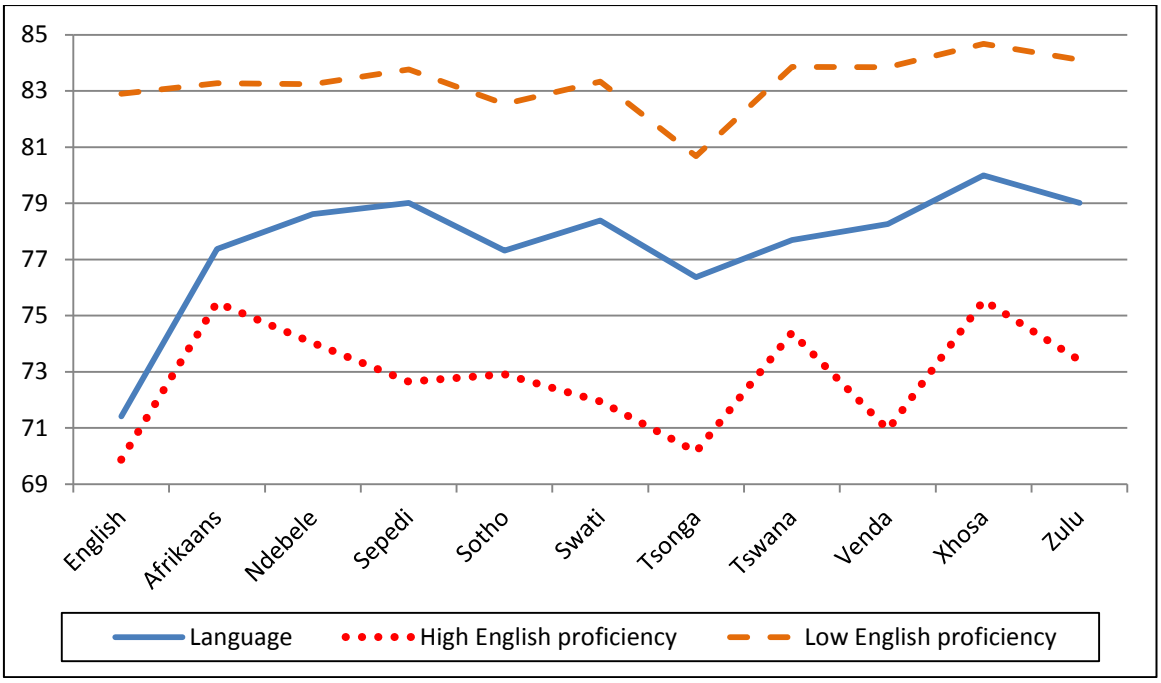


Figure 5.2. Estimated Marginal Means: NEUROTICISM

It is clear from Figure 5.2 that the lower English proficiency group had significantly larger mean values for Neuroticism than did the higher English proficiency group, for the eleven official languages. According to Table 5.7, the largest mean difference (at a significance level of $p<.05$) was identified between English and Xhosa (-8.58). The other large mean differences for Neuroticism (at a $p<.05$ significance level) were found between English and Ndebele (-7.2), Sepedi (-7.6) and Zulu (-7.65) respectively.

The significant mean differences between the two English proficiency groups (higher and lower) at a level of $p<.05$ for the factor Neuroticism are presented in Table 5.13.

Table 5.13

Neuroticism (34 items) – Statistically Significant Mean Differences between Languages per English Proficiency Groups

							95% Confidence interval	
Language	*n*	Mean (Lower EP*)	Mean (Higher EP*)	Mean Difference (p<.05)	Standard Error	Effect size (*d*)	Lower Bound	Upper Bound
English	2 261	82.90	69.87	13.04	1.77	.68	9.56	16.51
Afrikaans	6 786	83.27	75.46	7.81	.95	.39	5.96	9.66
Ndebele	2 002	83.24	74.03	9.21	1.06	.51	7.13	11.28
Sepedi	23 825	83.76	72.65	11.12	.32	.61	10.49	11.74
Sotho	7 517	82.53	72.91	9.62	.57	.49	8.50	10.74
Swati	3 628	83.33	71.95	11.39	.84	.61	9.74	13.04
Tsonga	10 857	80.68	70.16	10.52	.48	.57	9.58	11.45
Tswana	6 687	83.85	74.39	9.47	.63	.49	8.24	10.69
Venda	5 042	83.84	70.94	12.90	.70	.69	11.53	14.27
Xhosa	17 265	84.67	75.55	9.13	.37	.49	8.41	9.85
Zulu	19 472	84.11	73.41	10.70	.34	.59	10.03	11.37

*EP = English proficiency

The largest significant mean difference for the factor Neuroticism was identified for the English group between the lower and higher English proficiency groups (13.04, *d*=.68 large effect). This implies that the lower English proficiency group with a home language of English were more inclined to endorse items measuring the factor Neuroticism of the BTI. For all the language groups, those with lower English proficiency scores were significantly and practically (large effect sizes) more inclined than the higher English proficiency group to endorse items measuring Neuroticism.

5.7.3 Conscientiousness

Figure 5.3 shows the differences in the mean values (at a significance level of p<.05) of the factor Conscientiousness for the total language group (blue/solid graph), as well as for the sub-groups (according to English proficiency scores) per language group.

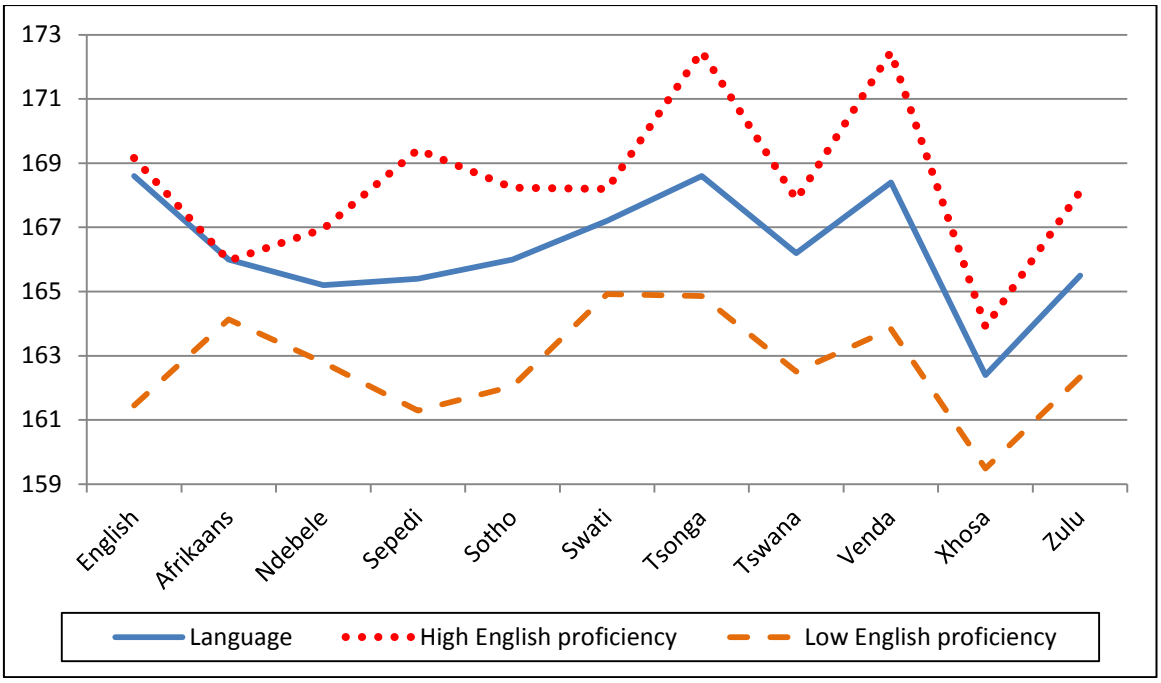


Figure 5.3. Estimated Marginal Means: CONSCIENTIOUSNESS

From Figure 5.3 it is evident that the mean values for the factor Conscientiousness are significantly larger for the respondents with high English proficiency scores from all of the eleven official language groups. The mean difference (at 95% significance level) for the languages in Table 5.8 indicates that the largest mean difference was between English and Xhosa (6.17). Large mean differences for the Conscientiousness factor were also reported between respondents speaking Tsonga and Xhosa (6.15), and Venda and Xhosa (5.95) respectively.

Table 5.14 presents the mean differences (at a significance level of $p<.05$) for the factor Conscientiousness between the two English proficiency groups (higher and lower).

Table 5.14

Conscientiousness (41 items) – Statistically Significant Mean Differences between Languages per English Proficiency Groups

							95% Confidence interval	
Language	*n*	Mean (Lower EP*)	Mean (Higher EP*)	Mean Difference (p<.05)	Standard Error	Effect size (*d*)	Lower Bound	Upper Bound
English	2 261	161.45	169.16	-7.70	2.01	-.36	-11.65	-3.76
Ndebele	2 002	162.79	166.95	-4.16	1.24	-.19	-6.59	-1.72
Sepedi	23 825	161.29	169.42	-8.13	.39	-.36	-8.90	-7.37
Sotho	7 517	162.05	168.24	-6.20	.65	-.28	-7.47	-4.92
Swati	3 628	164.92	168.20	-3.28	.93	-.17	-5.11	-1.46
Tsonga	10 857	164.86	172.48	-7.62	.57	-.35	-8.74	-6.50
Tswana	6 687	162.51	167.87	-5.36	.70	-.25	-6.73	-3.99
Venda	5 042	163.83	172.46	-8.64	.84	-.39	-10.27	-7.00
Xhosa	17 265	159.49	163.90	-4.42	.44	-.20	-5.27	-3.56
Zulu	19 472	162.34	168.12	-5.78	.40	-.27	-6.56	-5.01

*EP = English proficiency

In the case of the Conscientiousness factor, the largest mean difference (at a significance level of p<.05) between the lower and higher English proficiency groups (-8.64, *d*=-.39 moderate effect) was identified for the Venda group. Thus, the higher English proficiency group with Venda as home language were significantly more inclined (than the lower English proficiency group) to endorse items measuring the factor Conscientiousness. For all the language groups, those with higher English proficiency scores were significantly more inclined than those with lower English proficiency scores to endorse items measuring Conscientiousness.

5.7.4 Openness to experience

Figure 5.4 illustrates the differences in the mean values (at a 95% significance level) of the factor Openness to experience for the total language group (blue/solid graph), as well as for the sub-groups (according to English proficiency scores) per language group.

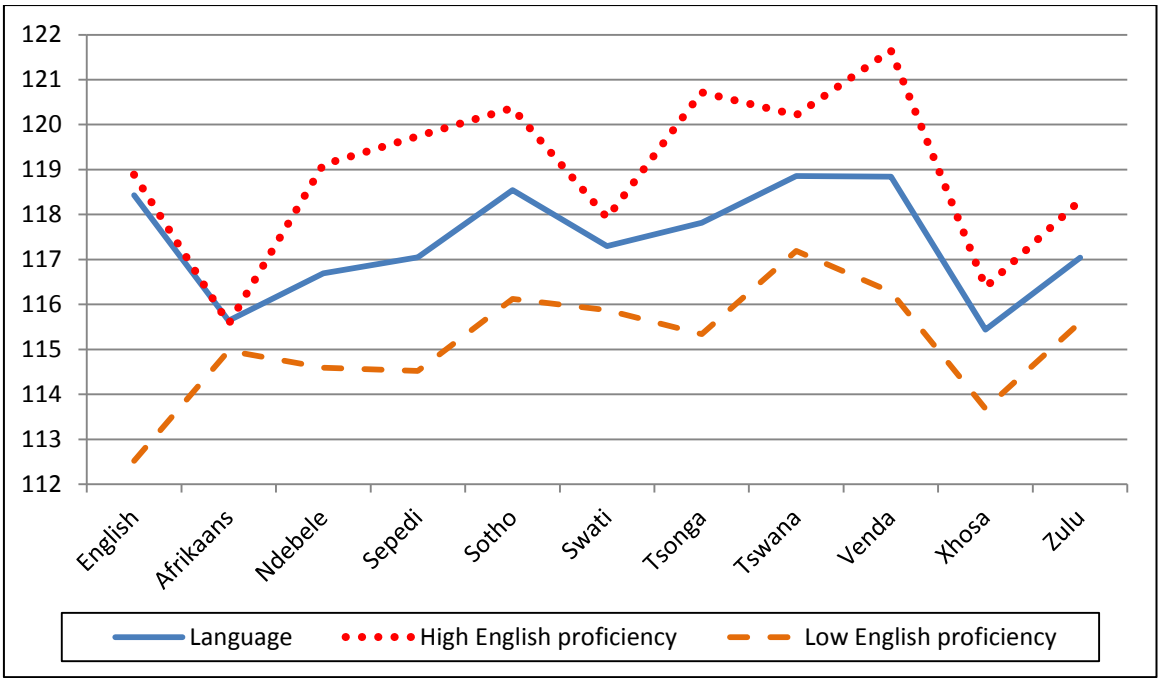


Figure 5.4. Estimated Marginal Means: OPENNESS TO EXPERIENCE

The mean values for the factor Openness to experience are significantly larger for the respondents with higher English proficiency scores. The mean difference (at a significance level of p<.05) for the factor Openness to experience identified between the languages in Table 5.9 indicates that the largest mean difference was between Tswana and Xhosa (3.43), with another large mean difference between Venda and Xhosa (3.41).

The mean differences (at a significance level of p<.05) for the factor Openness to experience between the two English proficiency groups (higher and lower) are presented in Table 5.15.

Table 5.15

Openness to Experience (32 items) – Statistically Significant Mean Differences between Languages per English Proficiency Groups

							95% Confidence interval	
Language	*n*	Mean (Lower EP*)	Mean (Higher EP*)	Mean Difference (p<.05)	Standard Error	Effect size (*d*)	Lower Bound	Upper Bound
English	2 261	112.52	118.89	-6.36	1.45	-.41	-9.20	-3.52
Ndebele	2 002	114.59	119.11	-4.53	1.08	-.24	-6.64	-2.41
Sepedi	23 825	114.52	119.74	-5.22	.35	-.28	-5.90	-4.54
Sotho	7 517	116.12	120.37	-4.24	.50	-.25	-5.23	-3.26
Swati	3 628	115.87	117.93	-2.06	.79	-.12	-3.61	-.50
Tsonga	10 857	115.34	120.72	-5.38	.50	-.28	-6.37	-4.40
Tswana	6 687	117.19	120.21	-3.01	.53	-.19	-4.05	-1.98
Venda	5 042	116.28	121.65	-5.38	.69	-.29	-6.74	-4.02
Xhosa	17 265	113.68	116.38	-2.70	.37	-.13	-3.43	-1.97
Zulu	19 472	115.60	118.31	-2.72	.32	-.16	-3.35	-2.09

*EP = English proficiency

The largest significant mean difference for the Openness to experience factor was identified for the English group between the lower and higher English proficiency groups (-6.36, *d*=-.41 moderate effect). This is an indication that the higher English proficiency group with a home language of English were more inclined to endorse items measuring the factor Openness to experience. For all the language groups, those with higher English proficiency scores were significantly more inclined than those with lower English proficiency scores to endorse items measuring the factor Openness to experience.

5.7.5 Agreeableness

Figure 5.5 shows the differences in the mean values (at a significance level of p<.05) for the factor Agreeableness for the total language group (blue/solid graph), as well as for the sub-groups (according to English proficiency scores) per language group.

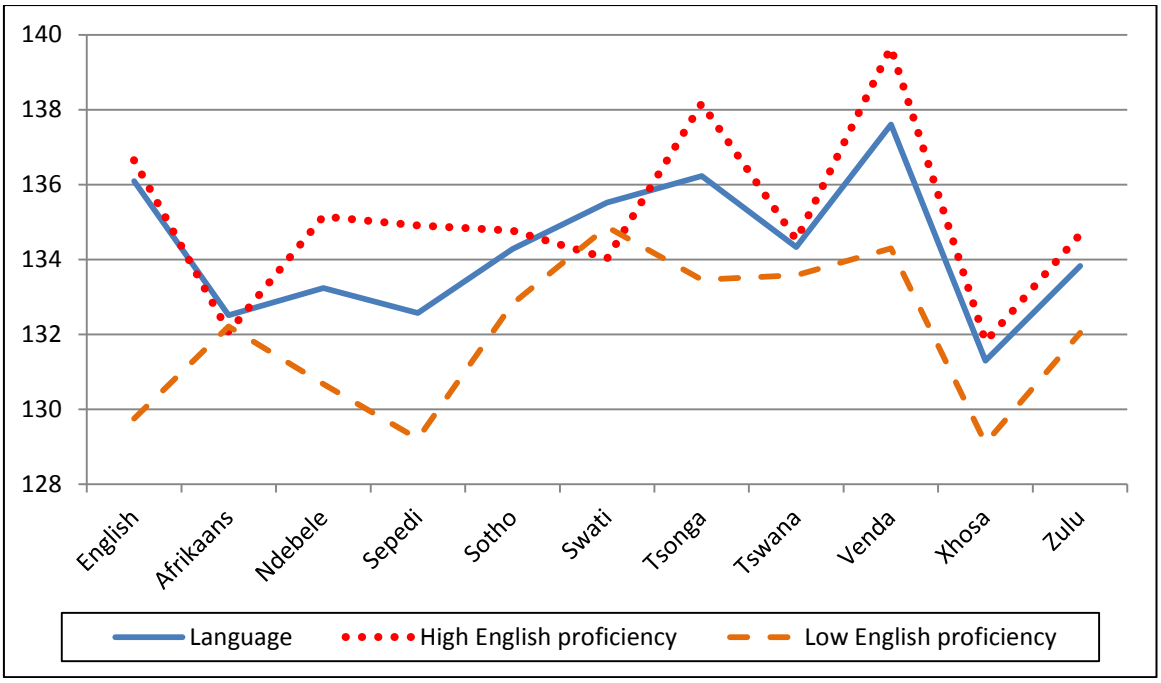


Figure 5.5. Estimated Marginal Means: AGREEABLENESS

The mean values (at a significance level of p<.05) for the factor Agreeableness are significantly larger for all respondents with high English proficiency scores, except for Swati-speaking respondents. The mean difference identified between the languages in Table 5.10 indicates that the largest mean difference (6.30) was between Venda- and Xhosa-speaking respondents. Other large mean differences for the BTI factor Agreeableness were identified between respondents speaking Afrikaans and Venda (-5.09) and between those speaking Sepedi and Venda (-5.03). The conclusion was reached that Venda-speaking respondents were more inclined to endorse Agreeableness items than Afrikaans- and Sepedi-speaking respondents.

The mean differences (at a significance level of p<.05) for the factor Agreeableness between the two English proficiency groups (higher and lower) are presented in Table 5.16.

Table 5.16

Agreeableness (37 items) – Statistically Significant Mean Differences between Languages per English Proficiency Groups

							95% Confidence interval	
Language	*n*	Mean (Lower EP*)	Mean (Higher EP*)	Mean Difference (p<.05)	Standard Error	Effect size (*d*)	Lower Bound	Upper Bound
English	2 261	129.75	136.65	-6.90	1.84	-.35	-10.51	-3.28
Ndebele	2 002	130.67	135.15	-4.475	1.42	-.18	-7.25	-1.70
Sepedi	23 825	129.21	134.91	-5.70	.51	-.19	-6.71	-4.70
Sotho	7 517	132.82	134.77	-1.95	.66	-.09	-3.25	-.65
Tsonga	10 857	133.46	138.16	-4.70	.69	-.18	-6.05	-3.35
Venda	5 042	134.30	139.66	-5.36	.93	-.29	-7.19	-3.53
Xhosa	17 265	129.09	131.81	-2.73	.55	-.10	-3.80	-1.66
Zulu	19 472	132.04	134.67	-2.63	.43	-.11	-3.48	-1.79

*EP = English proficiency

The largest mean difference (at a significance level of p<.05) for the Agreeableness factor was identified for the English group between the lower and higher English proficiency groups (-6.90, *d*=-.35 moderate effect). This means that the higher English proficiency group with a home language of English were more inclined to endorse items measuring Agreeableness. For all the language groups, those with higher English proficiency scores were significantly more inclined than those with lower English proficiency scores to endorse items measuring the factor Agreeableness.

5.7.6 Social desirability

Figure 5.6 illustrates the differences in the mean values (at a significance level of p<.05) for the faking scale, Social desirability, for the total language group (blue/solid graph), as well as for the sub-groups (according to English proficiency scores) per language group.

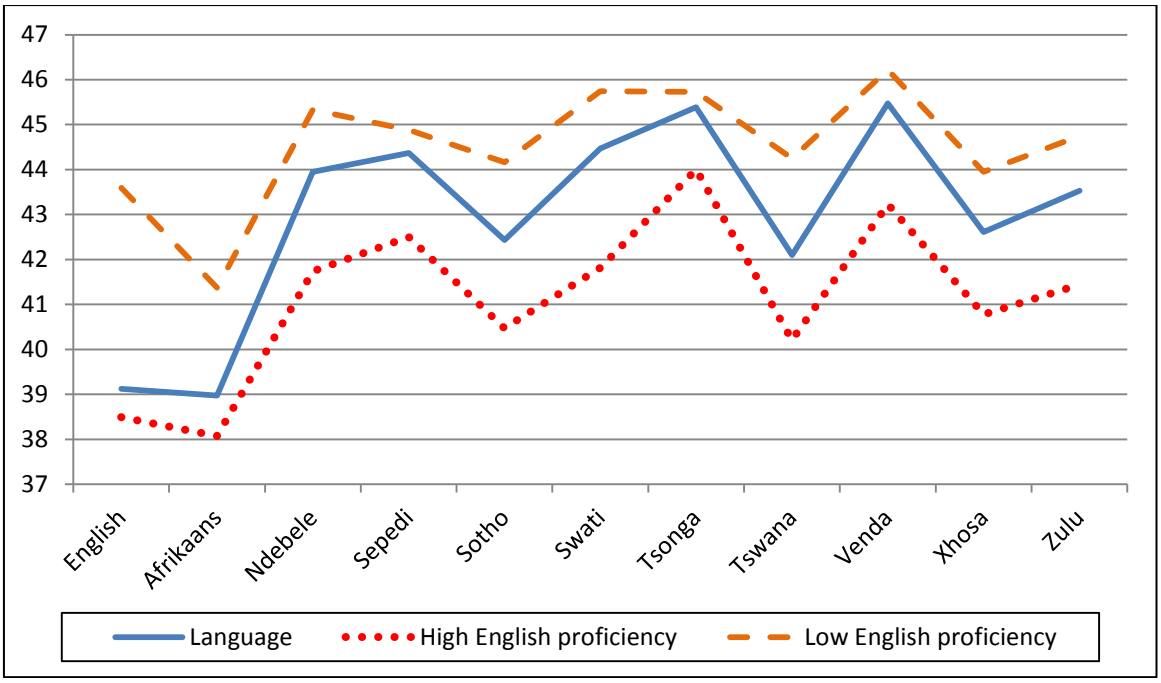


Figure 5.6. Estimated Marginal Means: SOCIAL DESIRABILITY

The mean values for the factor Social desirability are significantly larger for the respondents with lower English proficiency scores. The mean difference (at a significance level of p<.05) identified for the official language groups in Table 5.11 indicated that the largest statistically significant mean difference was between Afrikaans- and Venda-speaking respondents (-6.50, *d*=-.86 large effect). Other large mean differences for the Social desirability factor of the BTI were identified between Afrikaans and Tsonga (-6.42, *d*=-.83 large effect), English and Venda (-6.35, *d*=-.86 large effect) and English and Tsonga (-6.26, *d*=-.79 large effect) respectively.

The mean differences (at a significance level of p<.05) for the faking scale, Social desirability factor, between the two English proficiency groups (higher and lower) are presented in Table 5.17.

Table 5.17

Social Desirability (13 items) – Statistically Significant Mean Differences between Languages per English Proficiency Groups

							95% Confidence interval	
Language	*n*	Mean (Lower EP*)	Mean (Higher EP*)	Mean Difference (p<.05)	Standard Error	Effect size (*d*)	Lower Bound	Upper Bound
English	2 261	43.59	38.49	5.10	.68	.70	3.76	6.43
Afrikaans	6 786	41.37	38.07	3.30	.34	.46	2.64	3.96
Ndebele	2 002	45.33	41.74	3.59	.45	.46	2.70	4.48
Sepedi	23 825	44.88	42.50	2.39	.14	.30	2.11	2.66
Sotho	7 517	44.16	40.47	3.69	.23	.47	3.23	4.15
Swati	3 628	45.74	41.82	3.93	.34	.52	3.26	4.59
Tsonga	10 857	45.73	44.00	1.73	.21	.21	1.32	2.13
Tswana	6 687	44.25	40.21	4.04	.26	.50	3.52	4.55
Venda	5 042	46.22	43.23	2.99	.30	.37	2.40	3.57
Xhosa	17 265	43.95	40.78	3.17	.16	.30	2.87	3.48
Zulu	19 472	44.75	41.44	3.32	.15	.43	3.03	3.60

*EP = English proficiency

The largest mean difference (at a significance level of p<.05) for the Social desirability factor was identified for the English group between the lower and higher English proficiency groups (5.10, *d*=.70 large effect). This implies that the lower English proficiency group with English as home language were more inclined to endorse items measuring Social desirability. For all the language groups, those with lower English proficiency scores were significantly more inclined than those with higher English proficiency scores to endorse items measuring the factor Social desirability.

Both the MANOVA results and the profile plots pointed to statistically significant differences between the responses to BTI factors, especially when the level of English proficiency (higher and lower) was considered.

The current study further analysed the data in terms of the specific items responsible for the mean differences of each BTI factor. Therefore MTT in the form of Rasch analysis techniques were used to identify the significant differences on item level.

5.8 RASCH ANALYSIS

Rasch analysis allows for the investigation of item properties, not only factor properties. Such analysis can be done independent of the characteristics of the sample, and the investigation of individuals can also be done independent of the item properties (Henard, 2000). Rasch methods were used to further analyse the effect of language and English proficiency on the BTI responses and to identify the exact difference and the exact items that may be responsible for the differences seen in the MANOVA analysis.

5.8.1 Local independence (variance)

One of the assumptions of Rasch analysis requires the responses to the test items to be independent of one another and to be restricted to the latent trait. The variance between responses was therefore analysed (Bond & Fox, 2001).

Table 5.18 provides a summary of the items with a correlation higher than .5, which identifies those items that share more than half their 'random' variance with another item and suggests that only one of the two items is needed for measurement.

Due to the extensive length of the variance table per item, it was not included in an appendix. The complete variance table for each item is available from the researcher on request.

This analysis may indicate these as the 'best' items, due to them having the highest point-biserial correlations according to CTT terms.

Table 5.18

Correlations of Residuals (Local Independence)

Correlation	Item	Item
.51	24 E Gregarious 26	25 E Gregarious 27
.51	29 E Excitement seeking 31	30 Excitement seeking 32

5.8.2 Unidimensionality

A second assumption of Rasch analysis is unidimensionality, which indicates that only one latent trait is measured by the items grouped within it (Wright, 1966). The variance of all items was tested and acceptable results were obtained for the unidimensionality of the items that measure the five different personality factors of the BTI.

Due to the extensive length of the dimensionality table, it was not included in an appendix. The complete dimensionality table is available from the researcher on request.

5.8.3 Item location parameters

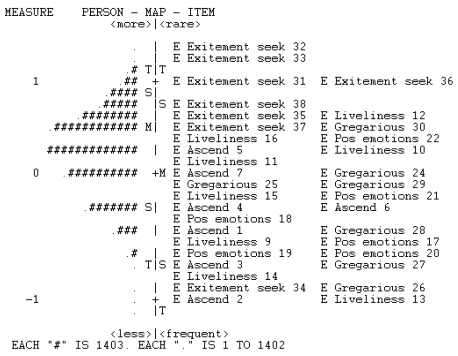
5.8.3.1 Rasch person-item map

The Rasch person-item map displays the logit scale down the middle of the map – in equal intervals – with the respondents located on the map according to their standing on the latent trait and the items located on the map according to their level of measurement of the latent trait (Bond & Fox, 2007).

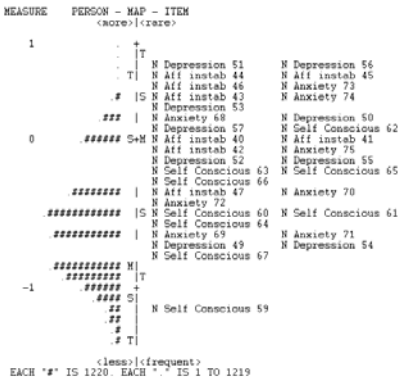
The relationship between the item difficulty (measurement level of latent trait) and the person ability (standing on latent trait) reported in the Rasch person-item map, the fit of respondents, reliabilities and item estimates is reported in other output tables (Bond & Fox, 2001), and will be discussed later in this chapter.

The person-item map is presented in Figure 5.7 for each item per BTI factor.

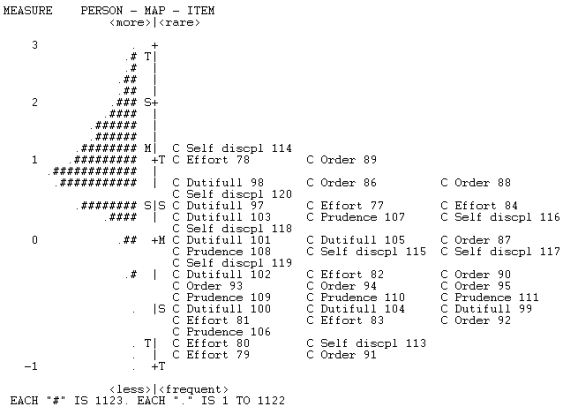
EXTRAVERSION



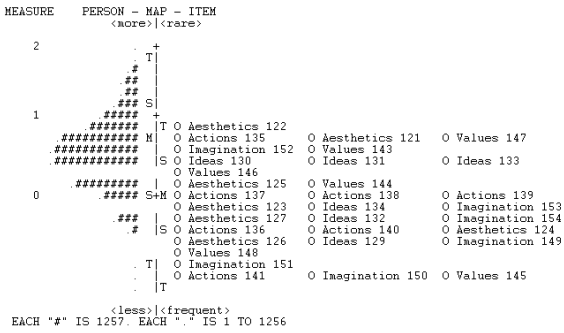
NEUROTICISM



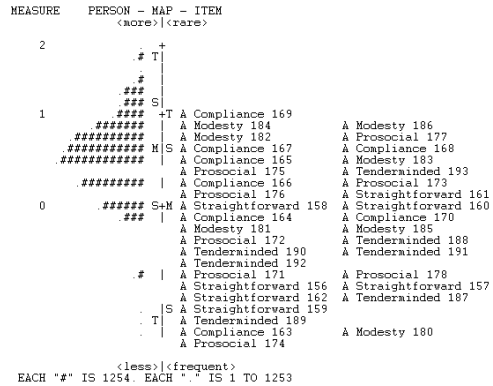
CONSCIENTIOUSNESS



OPENESS TO EXPERIENCE



AGREEABLENESS



SOCIAL DESIRABILITY

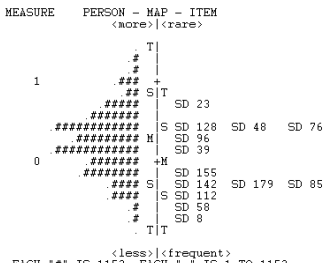


Figure 5.7. Person-Item Map for BTI Items per Factor

From Figure 5.7 it is evident that the items are distributed for each factor as follows:

- Extraversion – most items measure at a logit level of 1.5 to -1.5 which covers the levels on which the respondents are standing on the latent trait (logit 1 to -.8) sufficiently.
- Neuroticism – most items measure at a logit level of .9 to -.8, except item 59 which measures the Self-consciousness facet at a logit level of -1.4, while the respondents' standing on the latent trait measures at a logit level of .5 to -1.5. The measurement is mostly on a higher logit level than the respondent's standing on the latent trait.
- Conscientiousness – most items measure at a logit level of 1.1 to -1 which is mostly lower than the logit level of the respondent's standing on the latent trait (logit 3 to -.3).
- Openness to Experience – most items measure at a logit level of 1 to -.8 which is mostly lower than the logit level of the respondent's standing on the latent trait (logit 1.8 to -.4).
- Agreeableness – most items measure at a logit level of 1 to -.8 which is mostly lower than the logit level of the respondent's standing on the latent trait (logit 2 to -.5).
- Social desirability – most items measure at a logit level of .8 to -.8 which is acceptable as the respondent's standing on the latent trait measures at a logit level of 1.2 to -.8.

The conclusion can be reached that the respondents found it relatively easy to endorse all the items of the BTI, except the items measuring the factor Neuroticism, which were more difficult to endorse.

5.8.3.2 Fit indices

Rasch analysis techniques require the data to fit the model to ensure that person response to items is indeed as expected by determining the fit statistics. In Rasch analysis, two fit statistics are reported, namely infit and outfit statistics (Bond & Fox, 2001). Through the use of these fit statistics, the Rasch model helps to identify items that do not fit the model (thereby decreasing both the validity and reliability of the instrument).

It also identifies any respondents whose scores do not appear to be consistent with the model (Taylor, 2008). Wright and Linacre (1994) recommend that rating scale items with fit values above 1.40 (underfit) or below .60 (overfit) should be excluded from analyses. Only results of under-or overfit BTI items are summarised in Table 5.19.

Table 5.19

INFIT MNSQ – Item Location Parameters (MNSQ>1.4 and/or MNSQ<.6)

Factor	Facet	Item	Total score	Total count	Measure	Model S.E.	Infit MNSQ	Infit ZSTD
Neuroticism	Self-consciousness	59	401 889	104 928	-1.28	.00	1.76	9.9

For the total sample of 105 342, only item 59, which measures the facet Self-consciousness under the factor Neuroticism, indicated underfit with a MNSQ >1.4. This is an indication of unexpected, unrelated irregularities or too unpredictable responses to this item (Wright & Linacre, 1994).

However, the MANOVA results indicated clearly that proficiency in English influenced the responses on the BTI, therefore the sample was divided into two groups – top performers (top 25%) and low performers (bottom 25%) – based on their English proficiency results. The item location parameters were tested again for each of these groups and the results indicating over- or underfit items are displayed in Tables 5.20 and 5.21 respectively.

The INFIT results of over-or underfit items are displayed for lower performers on English proficiency (bottom 25%) are displayed in Table 5.20, and that of the higher performers on English proficiency (top 25%) in Table 5.21. Items with INFIT MNSQ values above 1.4 indicate underfit (too unpredictable), which means that there is an unwanted source of variance or the item does not measure the trait as well as is expected. Items with INFIT MNSQ values below .6 indicate overfit, which means that these items are too predictable.

In the group with a lower English proficiency score, no items had an INFIT MNSQ below .6. Furthermore, only two items were found to be a bit too unpredictable, namely item 59 (Self-consciousness from the Neuroticism factor) and item 85 (Social desirability factor).

Table 5.20

INFIT MNSQ – Lower Performers (Bottom 25%) on English Proficiency

Factor	Facet	Item	Total score	Total count	Measure	Model S.E.	Infit MNSQ	Infit ZSTD
Neuroticism	Self-consciousness	59	61 984	16 383	.33	.01	1.53	9.9
Social desirability		85	61 330	16 383	.36	.01	1.43	9.9

The results for the top performers on English proficiency (top 25%) are presented in Table 5.21.

Table 5.21

INFIT MNSQ – Higher Performers (Top 25%) on English Proficiency (MNSQ>1.4 and/or MNSQ<.6)

BTI Factor	Facet	Item	Total score	Total count	Measure	Model S.E.	Infit MNSQ	Infit ZSTD
Extraversion	Liveliness	11	73 689	16 383	-.48	.01	.54	-7.2
Neuroticism	Self-Consciousness	59	61 983	16 383	.32	.01	1.46	9.9
Conscientiousness	Effort	79	73 696	16 383	-.48	.01	.54	-7.1
Conscientiousness	Effort	80	73 545	16 383	-.47	.01	.51	-7.5
Conscientiousness	Order	90	73 826	16 383	-.48	.01	.57	-6.6
Conscientiousness	Order	91	74 620	16 383	-.51	.01	.54	-8.3
Conscientiousness	Dutiful	99	72 256	16 383	-.41	.01	.52	-6.5
Conscientiousness	Dutiful	100	72 844	16 383	-.44	.01	.59	-5.5
Conscientiousness	Prudence	106	72 541	16 383	-.43	.01	.51	-6.7
Conscientiousness	Prudence	107	65 897	16 383	.08	.01	1.56	9.9
Openness to experience	Values	144	62 546	16 383	.29	.01	1.52	9.9
Social desirability	142	56 317	16 383	.61	.01	1.56	9.9	

Table 5.21 clearly indicates that eight items were found to be too predictable (INFIT MNSQ<.6), and four items were too unpredictable (INFIT MNSQ>1.4) in the group with a higher English proficiency level. The items that were too predictable (items 11, 79, 80, 90, 91, 99, 100 and 106) are not necessarily problematic, but they add little new or additional information about the underlying trait. The items that are too unpredictable (items 59, 107, 142 and 144) render unexpected and unrelated irregularities when respondents with a good understanding of English (high English proficiency) endorse these items.

Most of the BTI items show good fit to the Rasch model, and since they meet the basic assumptions of Rasch measurement, further analysis can be done.

Due to the extensive length of the fit tables, it was not included in an appendix. The complete fit tables are available from the researcher on request.

5.8.4 Differential item functioning (DIF)

Differential item functioning gives a DIF contrast value when comparing the item locations of different groups. According to Lai, Teresi and Gershon (2005), the DIF contrast value is seen to indicate a meaningful difference if this value is larger than .5 logits.

A comparison is drawn between the biased items identified by Taylor (2008) and those identified in the current study. In her study, Taylor (2008) numbered the items according to the factors to which they contribute, while the current study kept the item numbers of the instrument. The results for the DIF contrast values for the different languages are presented in alphabetical order.

The significant DIF contrast values are presented in Tables 5.22 to 5.27 for English as a contrast language.

Table 5.22

EXTRAVERSION – DIF Contrast Values for ENGLISH (N=2 261)

Facet	Item number	Contrast Language	DIF contrast value
Ascendance	3	Ndebele	.69
		Sepedi	.68
		Sotho	.66
		Swati	.56
		Tsonga	.65
		Tswana	.72
		Venda	.56
		Xhosa	.64
		Zulu	.69
Ascendance	4	Ndebele	.65
		Sepedi	.72
		Sotho	.59
		Swati	.70
		Tsonga	.79
		Tswana	.54
		Venda	.81
		Xhosa	.54
		Zulu	.63
Ascendance	5	Swati	.59
		Tsonga	.64
		Venda	.60
		Xhosa	.52
		Zulu	.58
Gregariousness	24	Venda	.57
Excitement seeking	33	Xhosa	.60
		Zulu	.65
Excitement seeking	37	Sepedi	.60
		Tsonga	.59
		Venda	.58

The high contrast values for items 3 and 4 indicate item bias between English respondents and almost all the African language respondents. Items 5, 24, 33 and 37 showed significant contrast values between English and some of the African languages.

The current study identified only six of the 36 items for Extraversion with significant DIF between English and the other languages, namely items 3, 4, 5, 24, 33 and 37.

In Taylor's (2008) study, 15 of the 36 items for Extraversion had significant DIF contrast values in each of the comparison groups, namely items E1, E3, E4, E7, E12, E16, E17, E18, E19, E20, E22, E23, E28, E30, and E34.

Only items 3 and 4 were identified both by Taylor (2008) and in the current study as items that indicate DIF when the results of English-speaking respondents were compared with those of Afrikaans and African language respondents.

Table 5.23
NEUROTICISM – DIF Contrast Values for ENGLISH (N=2 261)

Facet	Item number	Contrast Language	DIF contrast value
Affective instability	47	Ndebele	.67
		Sepedi	.56
		Sotho	.61
		Swati	.64
		Tsonga	.63
		Tswana	.54
		Venda	.60
		Xhosa	.67
		Zulu	.56
Depression	55	Ndebele	.55
		Sepedi	.61
		Swati	.54
		Tsonga	.62
		Venda	.60
		Zulu	.53
Self-consciousness	64	Ndebele	.84
		Sepedi	.83
		Sotho	.74
		Swati	.98
		Tsonga	.77
		Tswana	.72
		Venda	.83
		Xhosa	.90
		Zulu	.75
Anxiety	71	Swati	.67
		Tsonga	.58
		Venda	.56

The differences in responses to items 47, 55, 64 and 71 are clearly visible when the BTI is administered to English respondents and African language respondents. Item 64 resulted in very high DIF contrast values between English respondents and Ndebele, Sepedi, Sotho, Swati, Tsonga, Tswana, Venda, Xhosa and Zulu respondents.

The current study identified only 4 of the 34 items for Neuroticism with significant DIF between English and the other languages, namely items 47, 55, 64 and 71.

In the study by Taylor (2008), she found that 13 of the 34 Neuroticism items showed significant differences in each of the comparison groups, namely items N6 (item 45), N7

(item 46), N9 (item 49), N10 (item 50), N11 (item 51), N12 (item 52), N16 (item 56), N18 (item 59), N22 (item 62), N27 (item 68), N30 (item 71), N32 (item 73) and N33 (item 74).

The only item identified by Taylor (2008) and found in the current study as indicating significant DIF contrast values for English and Swati, Tsonga and Venda was N30 (item 71).

The results of Conscientiousness DIF contrast values with English as a comparison language are presented in Table 5.24.

Table 5.24
CONSCIENTIOUSNESS – DIF Contrast Values for ENGLISH (N=2 261)

Facet	Item number	Contrast Language	DIF contrast value
Order	89	Swati	.52
		Tsonga	.55
		Venda	.52
Order	90	Sepedi	.71
		Tsonga	.68
		Venda	.87
Order	92	Sepedi	.54
		Tsonga	.53
Prudence	107	Tsonga	.54
		Venda	.54
Prudence	110	Sepedi	.51
		Venda	.53
Self-discipline	120	Xhosa	.55
		Zulu	.62
Aesthetics	123	Ndebele	.52
		Sepedi	.53
		Swati	.51
		Tsonga	.55
		Venda	.53

The differences in responses to items 89, 90, 92, 107, 110, 120 and 123 are clearly visible when the BTI is administered to English and African languages. Item 90 resulted in very high DIF contrast values between English respondents and Sepedi (.71) and Venda (.87) respondents.

The current study identified only 7 of the 41 items for Conscientiousness with significant DIF between English and the other languages, namely items 89, 90, 92, 107, 110, 120 and 123.

The 18 (out of 41) Conscientiousness items identified by Taylor (2008) as having significant differences in item location across all groups, were items C1 (item 77), C2 (item 78), C4 (item 80), C10 (item 87), C11 (item 88), C12 (item 89), C14 (item 91), C15 (item 92), C20 (item 98), C24 (item 102), C25 (item 103), C27 (item 105), C28 (item 106), C29 (item 107), C31 (item 109), C33 (item 111), C35 (item 114) and C37 (item116).

Items C12 (item 89), C15 (item 92) and C29 (item 107) indicated different item location values in both studies (current study and that of Taylor (2008)).

Table 5.25 compares the DIF contrast values of English respondents with the other ten official languages of South Africa for the Openness to experience factor of the BTI.

Table 5.25
OPENNESS TO EXPERIENCE - DIF Contrast Values for ENGLISH (N=2 261)

Facet	Item number	Contrast Language	DIF contrast value
Aesthetics	126	Sepedi	.69
		Swati	.61
		Tsonga	.69
Values	143	Ndebele	.52
		Sepedi	.69
		Swati	.62
		Tsonga	.76
		Xhosa	.56
Values	144	Ndebele	.52
		Sepedi	.58
		Sotho	.54
		Tsonga	.62
		Tswana	.51
		Zulu	.62
Values	145	Ndebele	1.18
		Sepedi	1.24
		Sotho	.90
		Swati	1.06
		Tsonga	1.22
		Tswana	.82
		Xhosa	.84
		Zulu	1.0
Values	148	Sepedi	.65
		Swati	.57
		Tsonga	.65
		Tswana	.52
		Zulu	.55

From Table 5.25 it is clear that item 145 resulted in very high DIF contrast values between English and the African languages; even totally opposite responses were reported for

respondents that speak English and those speaking Ndebele, Sepedi, Swati, Tsonga and Zulu.

The current study identified five of the 32 items of the factor Openness to experience that had significant DIF when the results of English respondents were compared with those of the other official language groups, namely items 126, 143, 144, 145 and 148.

Taylor (2008) identified 14 of the 32 items that had significant differences in item locations across all the comparison groups, namely items O2 (item 122), O3 (item 123), O4 (item 124), O6 (item 126), O10 (item 131), O12 (133), O14 (item 135), O21 (item 143), O23 (item 145), O24 (item 146), O26 (item 148), O28 (item 150), O29 (item 151) and O30 (item 152).

Items O6 (item 126), O21 (item 143), O23 (item 145) and O26 (item 148) were identified in both studies as problematic items with regard to differences in item locations for the different language groups when compared to English-speaking respondents.

DIF contrast values for the BTI factor Agreeableness are presented in Table 5.26 for all the official language groups when compared with English respondents.

Table 5.26
AGREEABLENESS - DIF Contrast Values for ENGLISH (N=2 261)

Facet	Item number	Contrast Language	DIF contrast value
Straightforwardness	160	Ndebele	.77
		Sepedi	.68
		Sotho	.54
		Swati	.77
		Tsonga	.79
		Xhosa	.66
Compliance	168	Ndebele	.51
		Sepedi	.55
		Swati	.56
		Tsonga	.61
Prosocial tendencies	177	Ndebele	.60
		Sepedi	.70
		Sotho	.51
		Swati	.58
		Tsonga	.58
Modesty	181	Venda	.55
Tendermindedness	192	Ndebele	.68
		Sepedi	.76
		Swati	.73
		Tsonga	.86

Items 160, 168, 177, 181 and 192 resulted in DIF contrast values above .5 between English and African languages.

The current study identified five of the 37 items of the factor Agreeableness with significant DIF when the results of English respondents were compared with those of the other official language groups. These five items were 160, 168, 177, 181 and 192.

Previous results reported by Taylor (2008) for the factor Agreeableness revealed that 11 out of the 37 items had significant DIF contrast values in all three comparison groups, namely items A1 (item 156), A5 (item 160), A8 (item 163), A13 (item 168), A14 (item 169), A18 (item 173), A19 (item 174), A25 (item 181), A27 (item 183), A30 (186) and A33 (item 189).

Three of these items, namely A5 (item 160), A13 (item 168) and A25 (item 181) were identified both in the current study and in Taylor's (2008) study as problematic items with regard to item locations for English and the other official languages.

Table 5.27
SOCIAL DESIRABILITY – DIF Contrast Values for ENGLISH (N=2 261)

Item number	Contrast Language	DIF contrast value
96	Sepedi	.51
	Xhosa	.55
	Zulu	.51
112	Sepedi	.55
	Tsonga	.54
	Venda	.64
	Zulu	.54
128	Ndebele	.54
	Sepedi	.52
	Swati	.55
	Venda	.59
	Zulu	.51

From Table 5.27 it is evident that items 96, 112 and 128 resulted in significant differences in DIF contrast values between English and some African language respondents.

The significant DIF contrast values for Afrikaans as a contrast language are presented in Tables 5.28 to 5.33.

Table 5.28
EXTRAVERSION – DIF Contrast Values for AFRIKAANS (N= 6 786)

Facet	Item number	Contrast Language	DIF contrast value
Ascendance	3	Ndebele	.60
		Sepedi	.59
		Sotho	.56
		Tsonga	.55
		Tswana	.63
		Xhosa	.54
		Zulu	.59
Ascendance	4	Ndebele	.59
		Sepedi	.66
		Sotho	.54
		Swati	.64
		Tsonga	.73
		Venda	.76
		Zulu	.57
Liveliness	13	Sepedi	.51
		Tsonga	.60
Excitement seeking	37	Sepedi	.60
		Tsonga	.59
		Venda	.88

Items 3 and 4 showed significant DIF contrast values between Afrikaans and almost all the African languages.

Item 13 was interpreted differently by Afrikaans-speaking respondents and by Sepedi- and Tsonga-speaking respondents. Item 37 showed significant contrast values for Afrikaans and Sepedi, Tsonga and Venda.

Only four of the 36 items for Extraversion were identified with significant DIF contrast values when Afrikaans was used as the contrast language. These were items 3, 4, 13 and 37. Items 3 and 4 were also identified with significant DIF contrast values when English was used as the contrast language.

In Taylor's (2008) study, 15 of the 36 items for Extraversion had significant DIF contrast values in each of the comparison groups, namely items E1, E3, E4, E7, E12, E16, E17, E18, E19, E20, E22, E23, E28, E30, and E34.

Of these items, only E3 and E4 indicated DIF in the current study and in Taylor's (2008) study. Items E13 and E37 were not indicated as DIF items by Taylor (2008).

In Table 5.29, the DIF contrast values above .5 for the Neuroticism factor of the BTI are presented for the eleven official language groups, when compared with Afrikaans-speaking respondents.

Table 5.29
NEUROTICISM – DIF Contrast Values for AFRIKAANS (N= 6 786)

Facet	Item number	Contrast Language	DIF contrast value
Affective instability	47	Ndebele	.70
		Sepedi	.59
		Sotho	.64
		Swati	.66
		Tsonga	.65
		Tswana	.57
		Venda	.63
		Xhosa	.70
		Zulu	.59
Self-consciousness	64	Swati	.54
Anxiety	71	Swati	.61
		Tsonga	.52

Item 47 showed significant contrast values when the BTI was administered to Afrikaans and all the African languages, while responses to item 64 differed only between Afrikaans

and Swati respondents. Item 71 showed significant differences between Afrikaans and Swati, as well as between Afrikaans and Tsonga responses.

Only three of the 34 items for Neuroticism were identified with significant DIF contrast values when Afrikaans was used as the contrast language, namely items 3, 4, 13 and 37. Items 3 and 4 were also identified with significant DIF contrast values when English was used as the contrast language.

In the study by Taylor (2008), 13 of the 34 Neuroticism items showed significant differences in each of the comparison groups, namely items N6 (item 45), N7 (item 46), N9 (item 49), N10 (item 50), N11 (item 51), N12 (item 52), N16 (item 56), N18 (item 59), N22 (item 62), N27 (item 68), N30 (item 71), N32 (item 73) and N33 (item 74).

N30 (item 71) was the only item identified both by Taylor (2008) and in the current study as indicating significant contrast values for Afrikaans, and Swati and Tsonga.

The significant DIF contrast values for the factor Conscientiousness with Afrikaans as contrast language are presented in Table 5.30.

Table 5.30
CONSCIENTIOUSNESS – DIF Contrast Values for AFRIKAANS (N= 6 786)

Facet	Item number	Contrast Language	DIF contrast value
Effort	79	Sepedi	.51
		Swati	.53
		Tsonga	.56
Order	89	Ndebele	.59
		Sepedi	.63
		Sotho	.53
		Swati	.65
		Tsonga	.68
		Venda	.65
		Zulu	.59
Order	90	Sepedi	.62
		Tsonga	.58
		Venda	.77
Order	95	Tsonga	.54
Prudence	107	Tsonga	.61
		Venda	.60
Prudence	110	Sepedi	.63
		Sotho	.51
		Venda	.65
Self-discipline	120	Swati	.52
		Xhosa	.58
		Zulu	.66

Seven of the 41 items of the factor Conscientiousness indicated item bias in the current study, namely items 79, 89, 90, 95, 107, 110 and 120. Item 89 had the most significant difference in the contrast value between Afrikaans and most of the African languages.

Eighteen of the 41 Conscientiousness items were identified by Taylor (2008) as having significant differences in item location across all groups. They were items C1 (item 77), C2 (item 78), C4 (item 80), C10 (item 87), C11 (item 88), C12 (item 89), C14 (item 91), C15 (item 92), C20 (item 98), C24 (item 102), C25 (item 103), C27 (item105), C28 (item 106), C29 (item 107), C31 (item 109), C33 (item 111), C35 (item 114) and C37 (item 116).

Item C12 (item 89) indicated different item location values in both studies. For the current study, DIF was identified for respondents speaking Ndebele, Sepedi, Sotho, Swati, Tsonga, Venda and Zulu when compared to Afrikaans-speaking respondents. The same was found for item C29 (item 107) for Tsonga- and Venda-speaking respondents in relation to Afrikaans-speaking respondents. Items 89 and 107 were also identified as problematic items when English was used as the contrast language.

Table 5.31 presents the results of the current study for the BTI factor Openness to experience in terms of the significant DIF contrast values of the official language groups compared with Afrikaans respondents.

Table 5.31
OPENNESS TO EXPERIENCE - DIF Contrast Values for AFRIKAANS (N= 6 786)

Facet	Item number	Contrast Language	DIF contrast value
Aesthetics	126	Sepedi	.66
		Swati	.60
		Tsonga	.69
Values	143	Sepedi	.53
		Tsonga	.59
		Venda	.63
Values	144	Ndebele	.53
		Sepedi	.59
		Sotho	.55
		Tsonga	.63
		Tswana	.52
		Venda	.71
Values	145	Ndebele	.88
		Sepedi	.94
		Sotho	.61
		Swati	.76
		Tsonga	.92
		Tswana	.53
		Venda	.88
		Xhosa	.55
		Zulu	.70
Values	148	Sepedi	.64
		Swati	.56
		Tsonga	.65
		Venda	.68
		Xhosa	.52
		Zulu	.54

The current study identified five of the 32 items of the factor Openness to experience as items that have significant DIF contrast values when the results of Afrikaans-speaking respondents are compared with those of the other official language groups. The items concerned were 126, 143, 144, 145 and 148.

Items 144, 145 and 148 resulted in very high DIF contrast values between Afrikaans and the African languages. Item 145 had a very high DIF contrast value for Afrikaans and three African languages (.88 for Afrikaans and Ndebele, .94 for Afrikaans and Sepedi, and .88 for Afrikaans and Venda).

Taylor (2008) found that 14 of the 32 items had significant differences in item locations across all comparison groups, namely items O2 (item 122), O3 (item 123), O4 (item 124), O6 (item 126), O10 (item 131), O12 (item 133), O14 (item 135), O21 (item 143), O23 (item 145), O24 (item 146), O26 (item 148), O28 (item 150), O29 (item 151) and O30 (item 152).

Items 126, 143, 145 and 148 were identified as having significant DIF contrast values in both studies (i.e. current and Taylor's (2008)). These four items also indicated DIF when English was used as the contrast language.

Table 5.32 gives the results of the current study for the BTI factor Agreeableness in terms of the significant DIF contrast values of the official language groups compared with Afrikaans respondents.

Table 5.32
AGREEABLENESS – DIF Contrast Values for AFRIKAANS (N= 6 786)

Facet	Item number	Contrast Language	DIF contrast value
Straightforwardness	160	Ndebele	.75
		Sepedi	.66
		Sotho	.52
		Swati	.75
		Tsonga	.77
		Venda	.67
		Xhosa	.65
		Zulu	.57
Compliance	168	Ndebele	.60
		Sepedi	.64
		Sotho	.52
		Swati	.65
		Tsonga	.70
		Venda	.61
Prosocial tendencies	173	Tsonga	.52
Prosocial tendencies	177	Ndebele	.60
		Sepedi	.65
		Swati	.54
		Tsonga	.54
		Venda	.58
		Xhosa	.54
		Zulu	.51
Tendermindedness	192	Sepedi	.66
		Swati	.53
		Tsonga	.65
		Venda	.68

Only five of the 37 items measuring the factor Agreeableness showed significant DIF contrast values above .5 between Afrikaans and the African languages. The items concerned are 160, 168, 173, 177 and 192.

For the BTI factor Agreeableness, 11 out of the 37 items showed significant DIF contrast values in all three comparison groups, namely items A1, A5, A8, A13, A14, A18, A19, A25, A27, A30, and A33 (Taylor, 2008).

Based on the DIF contrast values indicated in Table 5.32 for the current study and the results presented by Taylor (2008), it can be concluded that three only items, A5 (item 160), A13 (item 168) and A18 (item 173) were identified in both studies as problematic items with regard to item locations for different languages. Items 160 and 168 were also problematic when English was the contrast language.

Table 5.33
SOCIAL DESIRABILITY - DIF Contrast Values for AFRIKAANS (N= 6 786)

Item number	Contrast Language	DIF contrast value
96	Sepedi	.54
	Tsonga	.52
	Xhosa	.58
	Zulu	.54

Significant contrast values were reported for responses to item 96 between Afrikaans and Sepedi (.54), Afrikaans and Tsonga (.52), Afrikaans and Xhosa (.58) and for Afrikaans and Zulu (.54). Item 96 also had significant DIF contrast values when English was used as the contrast language.

Taylor (2008) did not investigate the DIF contrast values for the factor Social desirability.

The significant DIF contrast values for African languages as contrast languages are presented in Table 5.34.

Table 5.34

DIF Contrast Values for AFRICAN LANGUAGES (N=96 295)

BTI factor	Facet	Item number	Contrast Languages	DIF contrast value
Conscientiousness	Order	90	Sepedi – Tswana	.61
			Sepedi - Xhosa	.66
			Sepedi - Zulu	.61
			Tsonga - Tswana	.58
			Tsonga - Xhosa	.62
			Tsonga – Zulu	.58
			Venda - Sotho	.55
			Venda - Swati	.58
			Venda - Tswana	.76
			Venda - Xhosa	**.81**
			Venda – Zulu	.77
Agreeableness	Modesty	181	Venda - Tswana	.55

Item 90 showed significant DIF contrast values between the African languages with the contrast value being up to .81 between Venda and Xhosa respondents. This item did not indicate different item locations in Taylor's (2008) study.

Item 181 showed a significant difference of .55 between the results of Venda and Tswana respondents for the factor Agreeableness. Taylor (2008) also identified A25 (item 181) as a problematic item when the BTI was administered to different language groups.

Across all the Big Five personality factors measured with the BTI, relatively fewer items indicated DIF among the African languages, than for the English and Afrikaans groups.

Due to the extensive length of the DIF contrast value table for the entire sample, it was not included in an appendix. The complete DIF contrast value table for the entire sample is available from the researcher on request.

The impact of home language and English proficiency was very clear from the MANOVA results, therefore the sample was divided into two groups based on their English proficiency results, namely a high-performing (top 25%) and low-performing (bottom 25%) group. The DIF analyses were repeated for both these groups.

5.8.4.1 DIF – Low performers on English proficiency (bottom 25%)

Table 5.35 presents the high DIF contrast values for the different BTI factors for all the official language groups compared to Afrikaans respondents, for those respondents who performed lower on the English proficiency tests.

Table 5.35
DIF Contrast Values for AFRIKAANS – Low Performers (Bottom 25%) on English Proficiency

BTI factor	Facet	Item number	Contrast Language	DIF contrast value
Extraversion	Liveliness	13	Sepedi	.53
			Tsonga	.54
Conscientiousness	Self-discipline	120	Xhosa	.51
Social desirability		85	Ndebele	.53
		128	Venda	.55
			Zulu	.51

Only a few items (13, 120, 85 and 128) indicated DIF between Afrikaans and some African languages for the lower English proficiency group. The DIF contrast values are just above .5, which is significant but not very high.

None of these items were indicated by Taylor (2008) as having different item locations.

No significant differences were reported between English and the African languages or among the African languages for the lower performers on English proficiency.

Due to the extensive length of the DIF contrast value table for the lower English proficiency group, it was not included in an appendix. The complete DIF contrast value table for the lower English proficiency group is available from the researcher on request.

5.8.4.2 DIF – High performers on English proficiency (top 25%)

Mostly the same items as identified for Afrikaans again indicated DIF between English and African languages for the higher performers on English proficiency. Items 3, 4, 6, 24, 31, 32, 37, 47, 64, 107, 126, 139, 168, 192 and 128 showed significant DIF contrast values, as indicated in Table 5.36.

Table 5.36

DIF Contrast Values for ENGLISH – High Performers (Top 25%) on English Proficiency

BTI factor	Facet	Item number	Contrast Language	DIF contrast value
Extraversion	Ascendance	3	Ndebele	.74
			Sepedi	.76
			Sotho	.61
			Swati	.51
			Tsonga	.75
			Tswana	.64
			Venda	.74
			Xhosa	.58
			Zulu	.65
	Ascendance	4	Ndebele	.57
			Sepedi	.57
			Swati	.59
			Tsonga	.68
			Venda	.72
			Zulu	.51
	Ascendance	6	Venda	.57
	Gregariousness	24	Venda	.54
	Excitement seeking	31	Tsonga	.51
			Venda	.54
	Excitement seeking	32	Venda	.54
	Excitement seeking	37	Sepedi	.61
			Tsonga	.64
			Venda	.69
Neuroticism	Affective instability	47	Ndebele	.53
			Xhosa	.63
	Self-consciousness	64	Swati	.58
			Venda	.66
Conscientiousness	Prudence	107	Venda	.53
Openness to experience	Aesthetics	126	Sepedi	.54
			Swati	.52
			Tsonga	.58
			Venda	.63
	Actions	139	Xhosa	.51
Agreeableness	Compliance	168	Ndebele	.58
			Sepedi	.65
			Swati	.61
			Tsonga	.67
			Venda	.56
	Tendermindedness	192	Sepedi	.52
			Tsonga	.57
			Venda	.59
Social desirability		128	Ndebele	.51
			Sepedi	.54
			Swati	.56
			Tsonga	.51
			Venda	.63
			Zulu	.52

Several of these items were also identified by Taylor (2008) as problematic with regard to bias, namely E3 (item 3), E4 (item 4), E22 (item 24), E34 (item 37), C29 (item 107), O6 (item 126) and A13 (item 168).

Item 128 that measures Social desirability was identified as a biased item when the Afrikaans and English language groups were compared. The item was particularly biased for the Venda-speaking respondents in the higher English proficiency group.

The significant DIF contrast values for the BTI factors for the official language groups compared with Afrikaans respondents are presented in Table 5.37 for the respondents who performed well on the English proficiency tests.

Various items indicated DIF for the higher performers on English proficiency, namely items 3, 4, 6, 32, 34, 37, 42, 51, 66, 93, 108, 110, 114, 126, 151, 160, 168 and 128, which showed significant DIF contrast values between Afrikaans and some African languages.

Several of these items were also identified by Taylor (2008) as problematic with regard to bias, namely E3 (item 3), E4 (item 4), E34 (item 37), N11 (item 51), C35 (item 114), O6 (item 126), O29 (item 151), A5 (item 160) and A13 (item 168).

Table 5.37

DIF Contrast Values for AFRIKAANS – High Performers (Top 25%) on English Proficiency

BTI factor	Facet	Item number	Contrast Language	DIF contrast value
Extraversion	Ascendance	3	Ndebele	.72
			Sepedi	.74
			Sotho	.59
			Tsonga	.73
			Tswana	.62
			Venda	.71
			Xhosa	.56
			Zulu	.62
	Ascendance	4	Tsonga	.55
			Venda	.59
	Ascendance	6	Tsonga	.52
			Venda	.61
	Excitement seeking	32	Venda	.55
	Excitement seeking	34	Venda	.54
	Excitement seeking	37	Sepedi	.57
			Tsonga	.60
			Venda	.65
Neuroticism	Affective instability	42	Venda	.55
	Depression	51	Venda	.56
	Self-consciousness	66	Tsonga	.52
			Venda	.59
Conscientiousness	Order	93	Tsonga	.53
			Venda	.51
	Prudence	108	Tsonga	.53
			Venda	.52
	Prudence	110	Sepedi	.52
			Venda	.57
	Self-discipline	114	Swati	.55
Openness to experience	Aesthetics	126	Sepedi	.53
			Swati	.51
			Tsonga	.57
			Venda	.62
	Imagination	151	Venda	.53
Agreeableness	Straightforwardness	160	Ndebele	.53
			Swati	.57
			Tsonga	.6
			Venda	.58
			Xhosa	.55
	Compliance	168	Ndebele	.57
			Sepedi	.63
			Swati	.59
			Tsonga	.66
			Venda	.55
Social desirability		128	Venda	.55

Table 5.38

DIF Contrast Values among AFRICAN LANGUAGES Separately – High Performers (Top 25%) on English Proficiency

BTI factor	Facet	Item number	Contrast Languages	DIF contrast value
Neuroticism	Self-consciousness	66	Xhosa – Tsonga	.51
			Xhosa – Venda	.58

DIF contrast values were calculated between all the African languages separately, but only one item, namely item 66, had significant DIF contrast values above .5 between Xhosa and Tsonga (.51) and Xhosa and Venda (.58). Taylor (2008) did not indicate any bias for this item.

Due to the extensive length of the DIF contrast value table for the higher English proficiency group, it was not included in an appendix. The complete DIF contrast value table for the higher English proficiency group is available from the researcher on request.

A summary of all the items indicating DIF per language and for the different sub-groups (low and high performers on English proficiency) is presented in Table 5.39. Items that repeat in between the different language groups are printed in bold face to highlight the repetition.

Table 5.39

Summary of Items Indicating DIF per Language

Between languages	Total sample	Low performers on English proficiency	High performers on English proficiency
English and African languages	**3**, **4**, 5, 24, 33, **37**, **47**, 55, **64**, **71**, **89**, **90**, 92, **96**, **107**, **110**, 112, **120**, 123, **126**, 128, **143**, **144**, **145**, **148**, **160**, **168**, **177**, 181, **192**	None	**3**, **4**, **6**, 24, 31, **32**, **37**, 47, 64, 107, 125, **128**, 139, **168**, 192
Afrikaans and African languages	**3**, **4**, 13, **37**, **47**, **64**, **71**, 79, **89**, **90**, 95, **96**, **107**, **110**, **120**, **126**, **143**, **144**, **145**, **148**, **160**, **168**, 173, **177**, **192**	13, 85, 120, 128	**3**, **4**, **6**, **32**, 34, **37**, 42, 51, 66, 93, 108, 110, 114, 126, **128**, 151, 160, **168**
Amongst African languages	**90**, 181	None	66

*Items that repeat within the different languages are bold faced

Most differences in item responses are between English respondents and African language respondents, and 30 items (out of 193 items in the BTI instrument) indicate

significant DIF contrast values. Differences in responses for 25 items were recorded between Afrikaans and African languages, while only 2 items had significant DIF contrast values among the African languages.

Only 4 items indicated significant DIF contrast values and these were only between Afrikaans and African languages for the lower English proficiency group.

For the higher English proficiency group, more items with significant DIF contrast values between Afrikaans and the African languages (18 items) were identified than for the lower English proficiency group, while only 15 items showed item bias between English and the African languages, and only one (item 66) was biased among the African languages.

The items that indicate DIF per BTI factor are summarised in Table 5.40 to highlight the number of DIF items per BTI factor, as well as the difference between the low performers on English proficiency and the number of DIF items identified for the high performers on English proficiency.

Table 5.40
Summary of Items Indicating DIF per BTI Factor

BTI factor	Total sample	Low performers on English proficiency	High performers on English proficiency	Items indicating DIF in both studies (Taylor (2008) and current study)
Extraversion	3, 4, 5, 13, 24, 33, 37	13	3, 4, 6, 24, 31, 32, 34, 37	3, 4
Neuroticism	47, 55, 64, 71		42, 47, 51, 64, 66	71
Conscientiousness	79, 89, 90, 92, 95, 107, 110, 120, 123	120	93, 107, 108, 110, 114	89, 107
Openness to experience	126, 143, 144, 145, 148		126, 139, 151	126, 143, 145, 148
Agreeableness	160, 168, 173, 177, 181, 192		160, 168, 192	160, 168
Social desirability	96, 112, 128	85, 128	128	96

The number of items with bias differs substantially between the higher and lower performers on English proficiency.

The sub-sample with higher English proficiency scores indicated more items with significant differences between languages than did the lower English proficiency group. Contrary to expectation, more biased (DIF) items were identified for the higher English proficiency group than for the lower English proficiency group. The conclusion can be drawn that the differences between the home language groups are due to intrinsic personality characteristics and therefore the respondents with higher English proficiency scores understand the items better and are more inclined to endorse these items. If respondents understand the item better, they should only be more inclined to endorse the item if they have more of the underlying construct being measured with that specific item. The intrinsic characteristics of the respondents, rather than measurement errors/item bias of the BTI instrument, lead to different response patterns for the different home language groups.

Differences in response levels on the factors measured should be evidence of 'real' differences on the constructs being measured. Thus it is recommended that characteristic differences between the response patterns of the different home language groups should be investigated in future research.

The following items indicated significant DIF in both studies (the current study and Taylor's (2008)) for all the different languages, namely items E3 (item 3), E4 (item 4), N29 (item 71), C12 (item 89), C29 (item 107), O6 (item 126), O21 (item 143), O23 (item 145), O26 (item 148), A5 (item 160), A13 (item 168) and item 96 that measures Social desirability.

5.9 SUMMARY

Internationally, various studies (Boyle, 2008; Heuchert et al., 2000; Hull et al., 2010; McCrae, Costa, Del Pilar, Rolland & Parker, 1998; McCrae et al., 1996; Rolland, Parker & Stumpf, 1998; Taylor, 2000, 2004; Zhang & Akande, 2002) have been conducted on the cross-cultural applicability of personality instruments, focusing on the effect of culture, race and gender on the response patterns. Rasch analysis techniques are known to identify the differences between response patterns as they are not sample dependent

and can give an indication of the persons' standing on the latent trait, as well as the level on which the items measure the different factors of the personality instrument.

Differential item functioning (DIF), or the presence of item bias, is perhaps the main cause of frustration for the test developer (Taylor, 2008). Therefore test developers and researchers need to make sure that the differences in responding to personality items are due to real differences in personality, and not differences in the understanding of the meaning of the items for different (language) groups (Meiring et al., 2005).

When interpreting personality tests for diverse ethnic groups (or in this case different language groups), the test user must be certain that any difference in item responses is due to actual group differences and not the result of biased test items (Taylor, 2008). Item bias in personality assessment occurs when different groups of equal standing on a trait or personality factor respond differently to the items measuring that trait or factor.

Different item responses suggest that the item interacts with the group characteristic, rather than being a pure indicator of the trait (Taylor, 2008). The analysis of differential item functioning (DIF) in psychological instruments is a valuable technique for understanding the differences and similarities in how certain psychological constructs manifest in different cultural groups (Meiring et al., 2005).

Although recent studies have been conducted regarding the investigation of item bias in psychological instruments in South Africa (Meiring et al., 2005), there is little evidence of any investigation into the impact of all of South Africa's eleven official languages on personality instruments. The current study is at present the only available one with sub-sample sizes large enough for bias analysis in all eleven official languages separately and hence will contribute towards the better understanding and measurement of personality in South Africa. The current study further contributes in terms of the analysis done for two different English proficiency levels for each of the official languages of South Africa. The BTI responses were analysed for the different language groups and for two different English proficiency levels with the dependent variable, the BTI factors.

The results were reported in this chapter according to the CTT methods, Manova with *post-hoc* Sheffe test, as well as MTT methods, focusing on Rasch analysis.

The implications of the results, limitations, conclusions and recommendations will be presented in Chapter 6.

CHAPTER 6: DISCUSSION AND CONCLUSION

6.1 INTRODUCTION

Personality characteristics refer to important, relatively stable and long-lasting aspects that have a strong influence on human behaviour (Ewen, 2010). Patel (2006) indicated that each of the many personality theories and instruments available to measure personality, come with its own set of strengths and weaknesses and that none of them should be classified as being better than another. The best way to capture the uniqueness of personality characteristics more accurately is to integrate the best qualities of each theory with the best personality instrument (Johnson, 1997).

The language diversity of South Africa is not always accommodated in the development of personality instruments, since these instruments are mostly imported and adapted for local use (Van de Vijver & Rothman, 2004). South Africa has eleven official languages in terms of Section 6 of the Constitution (Government Gazette, 1996). Meiring (2007) highlighted that the language in which the psychometric instrument is administered impacts on the responses, as it is mostly not done in the respondent's home language. Therefore the possiblity of bias needs to be included in any research studies on the psychological properties of instruments.

Taylor and De Bruin (2006) identified the FFM as the most applicable personality theory for the South African context and integrated it with previous research by De Bruin (1997) on the way items are presented and the factor descriptions of the NEO PI-R (Costa & McCrae, 1992b), to develop a personality instrument for South Africa, namely the BTI. The BTI is based on the Big Five personality factors. This instrument had to meet the personality assessment needs within the unique multicultural and multilingual environment of South Africa. The BTI (Taylor & De Bruin, 2006) was developed in an attempt to contribute to the availability of locally developed and validated personality instruments. Research by Taylor (2004; 2008), and Taylor and De Bruin (2006) indicated that the BTI can be administered with some success within the multicultural and multilingual environment of South Africa.

Taylor (2008) however identified some problematic items when she analysed the construct, item and response bias of the BTI across cultures for three language groups, namely Afrikaans, English and indigenous African languages, and consequently acknowledged a need for further research in this regard. In her study limited language group comparisons were done for the student sample group used. Taylor (2008) recommended that working samples should be used and that more language groups should be compared. These recommendations were addressed in the current study.

Throughout the current study, previous research results as well as the description of the personality instrument was made in terms of two broad categories of personality instruments, namely a general category (16PF, 16PF (SA92), 16PF5, 15FQ, 15FQ+ and SAPQ) and a category for personality instruments based on the Big Five theory and Five-Factor Model (FFM) (Comrey, NEO PI-R, BTI).

The purpose of the current study was to extend the research done on the BTI and to investigate the impact that each of the eleven official languages of South Africa and the understanding of the administration language (i.e. English proficiency) has on the responses to the BTI items for a working adult group. The researcher identified the need in South Africa for a comprehensive study on the impact of each of the eleven official languages on the responses of the BTI and the need for a large enough sample group.

Internationally the current study contributes towards the understanding of the impact that home language and language proficiency have on personality assessment, since it explored the impact of each of the eleven official South African languages in terms of the response patterns on the BTI. The sample per official language group was large enough to analyse each language's impact individually on each item of the BTI. The current study addressed shortcomings of previous literature and sensitised researchers and test developers to further refine and improve the BTI. Research methods used in the current study set an example for the development of other new personality instruments for use in South Africa in adherence to the prescriptions of the Employment Equity Act (Government Gazette, 1998).

The current study enhanced the declaration made by Matsumoto et al. (2001) which was to continue the development and refinement of analysis methods in cross-cultural research in order to further enhance the contribution to psychological practice throughout the world.

6.2 RELIABILITY

In the current study the Cronbach alpha reliability estimates indicated very good internal consistency reliabilities for the BTI factors for all eleven official languages of South Africa. Cronbach alpha coefficients above .84 were reported for the Big Five factors measured with the BTI and above .70 for the faking scale (Social desirability) for all the languages. The fact that the BTI showed good internal consistency reliability for all eleven languages in South Africa was considered very significant evidence, and this fact provided supportive evidence for future use of the BTI in the South African context.

With regard to the MTT, Rasch analysis produces reliability measures in terms of the item separation index (ISI) and each person's responses or the person separation index (PSI). The PSI describes the number of levels that could be created for people with different abilities or standings on the latent trait (Wright & Stone, 1999). It determines how well the items differentiate between persons with different ability levels or different standings on the particular personality factor being measured (Bond & Fox, 2001). The ISI is generated to determine the item reliability in Rasch terms, which is an indication of the replicability of item difficulty/level of measurement. Should the analyses be repeated with another sample of participants, it could be expected that the difficulty order or level of measurement of each item would remain the same and that the items will be well separated in terms of their difficulty or level of measurement parameters (Bond & Fox, 2007).

ISI and PSI values are expressed as reliabilities and range from .0 to 1.0 (Wright & Stone, 1999). Higher separation values indicate better separation between items or persons and therefore show more precise measurement of the instrument (Wright & Stone, 1999).

The ISI calculated for the different Big Five personality factors measured by the BTI was 1.00 for each of the factors, as well as for the faking scale (Social desirability). This is an indication that the items were well separated in terms of their location parameters and that the order of the items should remain the same, should the analysis be repeated with another sample.

Very high reliability coefficients were reported in the most recently study on the BTI factors, reported Cronbach alpha coefficients and PSI values were Extraversion (α=.90; PSI=.89), Neuroticism (α=.94; PSI=.93), Conscientiousness (α=.94; PSI=.92), Openness to experience (α=.88; PSI=.85), and Agreeableness (α=.88; PSI=.86) (Taylor, 2008). Eventhough the reliability in terms of Cronbach alpha coefficients (α) and the PSI were reported a bit lower in the current study; it is still acceptable and can be considered as high values. The Cronbach alpha coefficients and PSI values reported in the current study were as follows: Extraversion (α=.86; PSI=.85), Neuroticism (α=.89; PSI=.86), Conscientiousness (α=.93; PSI=.88), Openness to experience (α=.90; PSI=.84), Agreeableness (α=.94; PSI=.86) and Social desirability (α=.72; PSI=.70).

These high reliability values indicated that the BTI items effectively separated respondents (any language) in terms of their standing on the different traits/factors measured. It was concluded that the BTI is a very reliable instrument that measures the Big Five personality factors very accurately for all of the eleven official languages in South Africa.

6.3 MULTIVARIATE ANALYSIS (MANOVA)

To further investigate if there was a difference between the response patterns of the different language groups in South Africa on the BTI items, CTT methods were used. The Komogorov-Smirnov test was first used to assess whether the distribution was normal and whether parametrical or non-parametrical analysis methods should be used. Even though the Komogorov-Smirnov test indicated that all the factors were not normally distributed, the central limit theorem was applied and the decision was made –

considering the large sample sizes available - to continue with MANOVA analysis techniques.

MANOVA comprises multivariate analyses where F-ratios are obtained to indicate the influence that more than one independent variable have on the dependent variable. The MANOVA analyses indicated that there are significant differences between the responses to the BTI factors (dependent variable), for home language (first independent variable) and the level of English proficiency (second independent variable).

Cohen's *d* (1988) guidelines were used to interpret the practical significance of the mean difference between groups in terms of standard deviation units, namely:

- < 0.1 = trivial effect
- 0.1 - 0.3 = small effect
- 0.3 - 0.5 = moderate effect
- > 0.5 = large difference effect

The MANOVA analysis revealed significant differences in the BTI factors by respondents with different home languages (Wilks' Lambda = .917, p<.001, Eta^2=.01) and for the different levels of English proficiency (Wilks' Lambda =.865, p<.001, Eta^2=.14).

Even though most languages had small effect sizes (Cohen's *d*), some factors were identified with high statistical significance and moderate to high practical significance. Moderate practical significance were identified for Neuroticism, specifically between English and Xhosa speaking respondents (mean difference=-8.58, *d*=-.46), English and Ndebele (mean difference=-7.2, *d*=-.39), English and Sepedi (mean difference=-7.6, *d*=-.41) and English and Zulu (mean difference=-7.65, *d*=-.41).

Even though some high statistical significant mean differences were found for the factor Agreeableness, all the effect sizes were small.

All the official languages had statistically significant mean differences for the factor Social desirability but only the following were identified as having large effect sizes (practical

significance): between Afrikaans- and Venda speaking respondents (mean difference=-6.50, *d*=-.86), Afrikaans and Tsonga (mean difference=-6.42, *d*=-.83), English and Venda (mean difference=-6.35, *d*=-.86) and between English and Tsonga (mean difference=-6.26, *d*=-.79).

The most language groups identified with the most statistically significantly mean differences were identified for Xhosa- and Venda-speaking respondents, therefore it was concluded that these respondents might have had the most difficulty to endorse the items of the BTI.

In terms of the English proficiency levels, more factors were identified with statistical and practical significance. For the factor Extraversion the highest statistical significant mean difference between the lower and higher English proficiency groups was reported for the English speaking respondents (mean difference=-6.73, *d*=-.39), which is a moderate practical significance. The largest statistically significant mean difference for the factor Neuroticism was also reported for the English group, between the lower and higher English proficiency groups, but with a large practical significance (mean difference=13.04, *d*=.68). However, all the language groups with lower English proficiency scores were significantly and practically (large effect sizes) more inclined than the higher English proficiency group to endorse items measuring Neuroticism.

In the case of the Conscientiousness factor, the largest statistically significant mean difference between the lower and higher English proficiency groups (-8.64, *d*=-.39 moderate effect) was identified for the Venda group. However, for all the language groups, those with higher English proficiency scores were significantly more inclined than those with lower English proficiency scores to endorse items measuring Conscientiousness.

The largest significant mean difference for the Openness to experience factor was identified for the English group between the lower and higher English proficiency groups (mean difference=-6.36, *d*=-.41 moderate effect). However, for all the language groups, those with higher English proficiency scores were significantly more inclined than those

with lower English proficiency scores to endorse items measuring the factor Openness to experience.

The largest mean difference (at a significance level of $p<.05$) for the Agreeableness factor was identified for the English group between the lower and higher English proficiency groups (-6.90, d=-.35 moderate effect). However, for all the language groups, those with higher English proficiency scores were significantly more inclined than those with lower English proficiency scores to endorse items measuring the factor Agreeableness.

For all the language groups, those with lower English proficiency scores were significantly more inclined than those with higher English proficiency scores to endorse items measuring the factor Social desirability. The largest mean difference (at a significance level of $p<.05$) for the Social desirability factor was identified for the English group between the lower and higher English proficiency groups (5.10, d=.70 large effect).

MTT in the form of Rasch analysis was used to determine at an item level which items within each of the Big Five factors measured with the BTI were responsible for the significant differences indicated in the MANOVA.

The main research hypotheses for this research were the following:
H_1: Home language influences the responses to BTI items.
H_2: English proficiency, as an additional independent variable, influences the response patterns on the BTI.

These hypotheses were confirmed.

6.4 RASCH ASSUMPTIONS

Rasch analysis have two basic assumptions. These two assumptions, namely local independence and dimensionality were tested before Rasch analysis techniques were applied.

6.4.1 Local independence

The local independence for all items was tested to ensure that the responses to each item were independent of one another (Embretson & Reise, 2000). It was found that the variance of the responses was acceptable for all the items, except for items 26 and 27 (measuring the facet Gregariousness), which might be related to each other, and also items 31 and 32 (measuring the facet Excitement seeking), which might be related to each other for the BTI factor Extraversion.

6.4.2 Dimensionality

The dimensionality of the BTI items was analysed and indicated that only one latent trait (dimension/factor) was measured per item (Embretson & Reise, 2000).

6.5 FIT INDICES

The logical pattern of responses was investigated to determine the fit of the items and individuals who responded to these specific items in terms of the Rasch model. Only item 59 indicated underfit, meaning that this item might be too unpredictable in measuring the facet Self-consciousness within the BTI factor Neuroticism.

However, the logical pattern of responses changed dramatically when the sample was divided into the lower performers (bottom 25%) and higher performers (top 25%) on the English proficiency tests. Item 59 (Neuroticism factor, facet Self-consciousness) again indicated underfit as well as item 85 (Social desirability item), which indicated underfit for the lower English proficiency group, meaning that these items might be too unpredictable. No overfit items were indicated for the low English proficiency group.

For the high performance group on English proficiency, four items (items 59, 107, 142 and 144) indicated underfit (too unpredictable), these four items measured low on the person-item map – which should have been an indication that it was easy to endorse, but these items were even more difficult to endorse for the high English proficiency group,

compared to the low English proficiency group. These items can be seen as not fitting the model as the model expects them to be easier to endorse, therefore the conclusion was made that these items are too unpredictable.

For the high performance group on English proficiency, eight items (items 11, 79, 80, 90, 91, 99, 100 and 106) indicated overfit and could therefore be considered too predictable. All these items are from the Conscientiousness factor.

6.6 DIFFERENTIAL ITEM FUNCTIONING

A number of items showed statistically significant differences in item responses, which according to Taylor (2008) indicates item bias. Therefore it was deemed necessary to further investigate the DIF of each BTI item in the current study.

Based on the MANOVA results, the impact of home language and English proficiency was very clear and therefore the sample was divided into two groups according to their English proficiency results. DIF analysis was subsequently done for the total sample, the lower English proficiency group and the higher English proficiency group. Contrary to expectation, the higher English proficiency group had more items with significant DIF contrast values, especially for Extraversion and Neuroticism, but fewer items for the other three BTI factors. The lower English proficiency group indicated fewer items with significant DIF contrast values for all the BTI factors.

In the total sample, seven of the 36 items (items 3, 4, 5, 13, 24, 33 and 37) had significant DIF contrast values for the Extraversion factor, only one item (item 13) indicated bias for the lower English proficiency group, but eight of the 36 items (items 3,4,6,24,31,32,43 and 37) had significant DIF contrast values.

Four of the 34 Neuroticism items (items 47, 55, 64 and 71) indicated item bias for the total sample, none showed bias for the lower English proficiency group, and five of the 34 items (items 42, 47, 51, 64 and 66) showed significant differences in the DIF contrast values for the higher English proficiency group.

The nine out of 41 Conscientiousness items that showed significant differences in item bias were items 79, 89, 90, 92, 95, 107, 110, 120 and 123 for the total sample. For the lower English proficiency group only one item had a significant difference in DIF contrast value, namely item 120, whereas five items indicated bias for the higher English proficiency group, namely items 93, 107, 108, 110 and 114.

For the Openness to Experience scale, five of the 32 items had significant differences in item bias, namely items 126, 143, 144, 145 and 148 for the total sample. No items indicated item bias for the lower English proficiency group and only three items (items 126, 139 and 151) had significant DIF contrasting values for the higher English proficiency group.

Six out of 37 items (items 160, 168, 173, 177, 181 and 192) from the Agreeableness scale showed significant DIF contrast values for the total sample; although none indicated bias in the lower English proficiency group, three did for the higher English proficiency group, namely items 160, 168 and 192.

For the Social desirability scale, three items indicated significant DIF contrast values for the total sample, namely items 96, 112 and 128. Only two items indicated significant DIF contrast values for the lower English proficiency group, namely items 85 and 128, and only item 128 had a significant DIF contrast value for the higher English proficiency group.

The biased items were compared with the items identified by Taylor (2008) for all the different languages and only 12 out of 193 items were identified that indicated significant DIF in both studies (current and Taylor (2008)) for all the different languages. These were items E3 (item 3), E4 (item 4), N29 (item 71), C12 (item 89), C29 (item 107), O6 (item 126), O21 (item 143), O23 (item 145), O26 (item 148), A5 (item 160), A13 (item 168) and item 96 (measuring Social desirability). The recommendation is made that the content of these items should be investigated as possible reasons for the DIF between the different language groups.

Because of the relatively small number of biased items (34 out of 193) identified in the current study, the conclusion was drawn that the differences between traits for the different home language groups are due to intrinsic personality characteristics, rather than an indication of bias on the items. The fact that more items indicated bias for the higher English proficiency group was also an indication that the intrinsic personality characteristics may have resulted in differences in the mean scores rather than the items of the BTI. It was assumed that the respondents with higher English proficiency scores understood the items better and would have been more inclined to endorse those items measuring the trait on which they showed a higher standing. In other words, if respondents understand an item better, they will be more inclined to endorse that item when they have more of the underlying construct being measured with that specific item. It is therefore the intrinsic characteristics that result in different response patterns between the different home language groups, rather than measurement errors/item bias of the BTI instrument. Other instruments on the traits measured are available and the differences between the intrinsic characteristics of the different official languages should therefore be further investigated in future studies.

6.7 IMPLICATIONS OF THE RESULTS

Psychologists need to keep in mind that multicultural and multilingual environments influence responses to personality items. When the same personality instrument is administered in English to respondents with other home languages, the individuals' understanding of the items will influence their responses. The response to a personality instrument's items is therefore a result of many variables, among others the standing on the trait, home language, the intrinsic characteristics related to the respondents' language/culture and the level of understanding of the administration language.

Van de Vijver and Hambleton (1996) summarised practical guidelines for the traslation of tests, as well as methods and methodological issues (Van de Vijver & Leung, 1997, 2001) for cross-cultural data analyses. Multiple sources of error and bias inherent to cross-cultural personality assessment were identified by Van de Vijver and Poortinga (1997) and Van de Vijver and Tanzer (1997) highlighted analysis needed in terms of bias and equivalence in

cross-cultural assessments. Cheung et al. (2011) stated that personality instruments should be evaluated thoroughly for comparibility across different languages and culture groups, before any decisions or predictions can be made on the basis of the assessment results.

Meiring et al. (2005) proposed that scientifically scrutinising of personality instruments are needed and that it is essential to use advanced research methodologies and representative samples, specifically for cross-cultural research on personality instruments.

Within South Africa, a multilingual and multicultural environment, limited studies with regard to personality instruments are available. Examples of research are Meiring et al. (2006) who investigated the bias in an adapted version of the 15FQ+; Taylor and Boeyens (1991) who researched the comparability of the scores of blacks and whites on the South African Personality Questionnaire (SAPQ); and Taylor and De Bruin (2004) who did research on personality (measured with the BTI) across the South African cultures. The findings of these studies emphasised the general need for further research in South Africa with regard to the impact of the multicultural and multilingual environment on personality assessment.

Additionally a few examples of research on the impact of language on personality assessment are the research projects of Abrahams (1996) and Abrahams and Mauer (1999a, 1999b) on the non-applicability of the 16PF. However Prinsloo and Ebersöhn (2002) confirmed the applicability of the 16PF especially in terms of its fairness towards different South African language groups, and they concluded that the research methodologies used in the Abrahams (1996) study were responsible for the negative results. The recommendations by Prinsloo and Ebersöhn (2002) were implemented in a study by McDonald (2011) where different research techniques were used to investigate the level of understanding of the vocabulary used in the 16PF5 by students (native and non-native English speaking students).

Taylor (2008) did a comprehensive bias analysis on the BTI, but she did not have a large enough sample to analise the data for each of South Africa's official languages individually. The current study was done as an extention of the research done by Taylor (2008) but with a large enough sample for each of the official languages. The current study

had a large enough sample to assessed the impact of each of the eleven official South African languages individually on the responses to the BTI items, meticulously.

Additionally the impact of two levels of English proficiency (top 25% - high performers and bottom 25% - lower performers) were reported for responses to each item of the BTI. The extended contribution of the current study lies in the advanced methodology used, namely the Rasch analysis techniques.

The methodology and results of the current study can be utilised to sensitise researchers and test developers on requirements that need to be adhered to in terms of bias analyses when new personality instruments are developed and implemented in South Africa.

6.8 LIMITATIONS

The following limitations of the current study were identified.

Even though the sample was large, it was a sample of convenience and the results cannot necessarily be considered entirely representative of the total population. Although the sample was large enough to analyse all the official languages separately, it only included respondents that applied to be employed in the government organisation. The contrast groups (lower English proficiency and higher English proficiency) were not compared within each language group.

The focus of this study was on personality assessment and not FFM and Big Five assessment, which might have been too broad. It was assumed that the BTI would measure the Big Five personality characteristics that it was supposed to measure and that the interpretation of the data would accurately reflect the personality traits of the respondents (as concluded earlier by Taylor (2008)). Additionally, no other personality instruments measuring the Big Five traits were administered for comparison purposes. Other personality instruments could be administered to confirm the presence of the Big Five factors.

A limitation to the current study was that many variables outside the control of the researcher may have impacted on the response patterns on the BTI. These variables could include human error, faking, motivation, socialisation, age, gender, race, culture, etc. Analysis of these variables was not discussed in this thesis. The BTI was administered as part of a selection battery which might have influenced the responses due to the anxiety of respondents.

The intrinsic personality characteristics of each of the official languages or cultures of South Africa were not investigated as sources of bias. No attempt was made to investigate the reasons underlying the possible response styles.

Furthermore, structural equation modelling (SEM) methods like construct equivalence, differential item functioning and response styles were not investigated. Comprehensive CTT and detailed MTT analysis were not included in this study. Only the INFIT mean squares were reported on and a recommendation is made to also analyse OUTFIT mean squares as an indication of items that were too difficult to endorse.

Additional analysis could be done to assist with the explanation of the findings of the current study and to stimulate other directions in personality assessment research.

6.9 PRACTICAL AND THEORETICAL CONTRIBUTION

Internationally the current study contributed in terms of the ITC criteria (International Test Commission, 2011) for good test use practice. Test users, researchers and test developers were sensitised on the methodology for cross-cultural and multilingual research to promote the ethical administration of personality instruments. Furthermore the statement made by Matsumoto et al. (2001) on the constant development and refinement of analysis methods in cross-cultural research, was adhered to.

The current study has extended the existing body of knowledge about the impact that home language, and specifically the eleven official languages of South Africa, have on personality assessment. The large sample of adults from all eleven South African language

groups with Grade 12 education were included; this ensured that limitations of previous studies were addressed.

The practical contribution of this study resides in the substantiation of a Big Five personality instrument that fairly assesses the personality factors of all individuals in the multicultural environment of South Africa. It further highlighted the need to include English proficiency tests before personality instruments are administered.

Theoretically this study contributed to the explanation of advanced statistical methods, specifically Modern test theory, available for assessing the psychometric properties of instruments on item level.

The current study furthermore identified the need for research with regard to the intrinsic personality characteristics of individuals that influence their responses to personality instruments, especially in a multicultural environment like South Africa with eleven different official language groups.

6.10 RECOMMENDATIONS

The reported results from the current study and identified limitations have led to the following recommendations.

It is recommended that all personality instruments administered in South Africa be subjected to similar research on the impact of language on each item within the instrument. Researchers, psychologists and test developers should be aware of advanced research methodology available to assess the cross-cultural performance of personality instruments.

Different sampling methods should be used to ensure that the research represents the entire population.

Additional independent variables could be included in a similar study to identify their impact on the response patterns on the BTI. These variables could include motivation, socialisation, age, gender, race, culture, etc.

Studies focussing on the impact of language on FFM and Big Five instruments might highlight the intrinsic personality traits of different language groups in South Africa. Further studies should be conducted to determine whether the Big Five personality factors measured by the BTI are higher intrinsic personality characteristics for a specific language group, for example: Are Xhosa- and Zulu-speaking people more extraverted and therefore any personality instrument will measure their Extraversion higher? Further mean comparisons between the contrast groups, namely lower English proficiency and higher English proficiency, within each language group can be done to identify the exact impact of language proficiency for each language group.

Structural equation modelling (SEM) methods, comprehensive CTT and detailed MTT should be used in future research to investigate the internal structures of the BTI, and to report on the factor loadings, intercepts, item loadings and factorial invariances to determine whether the BTI measures equally for each of the eleven official languages in South Africa.

In terms of the BTI, 12 items were identified in research by Taylor (2008) as well as the current study indicating DIF. The content of these 12 items should be further investigated in future studies. As the INFIT mean square reports on the inlier items - items targeted on the person and the pattern of responses to these items, the researcher decided to only report on the INFIT mean squares. The OUTFIT mean square indicates the responses to items that were too difficult to endorse and these are not a true reflection of the person's standing on the latent trait. Future research can be done on the items with high OUTFIT mean square values.

6.11 CONCLUSION

The purpose of the current study was to investigate the impact that home language has on responses to the BTI personality instrument. The level of the respondents' understanding of English as the administration language was also considered (English proficiency was measured) to improve the level of understanding of the personality instrument's items. The conclusion was reached that home language and especially the level of English proficiency definitely influence the way in which respondents endorse the English version of the BTI items.

Acceptable internal consistency reliability of the BTI was reported for all eleven official languages of South Africa. The high internal consistency reliability promotes confidence in the use of the BTI within the multicultural and multilingual South African context.

Even though some items indicated DIF, the BTI can be confidently administered to all the official language groups of South Africa. It is recommended that English proficiency tests be administered together with the BTI to assess the respondents' level of English understanding, as this influences their responses to BTI items significantly. The BTI is a published and commercialised personality instrument (standardised and widely used in South Africa) and for the sake of comparison of items in previous and future studies, it was decided that problematic items should not be removed in the current research project. In the analysis of the results of the current study, the conclusion was reached that the BTI can be used with confidence within the multicultural and multilingual environment of South Africa to assess the Big Five personality factors.

Investigating item bias used to be limited to research using CTT methods, where the results are consistently bound to the characteristics of the sample. The current study made use of both CTT and MTT to identify the items that indicate possible bias when the BTI is administered to respondents with different home languages and different levels of English proficiency. From a cross-cultural perspective, the current study has shown that methods other than the CTT can be useful to investigate the psychometric properties of personality assessment instruments.

No published literature was found on item bias across all eleven official languages in South Africa separately, particularly with regard to personality assessment. No literature was found on the impact of different English proficiency levels when personality instruments were administered to different language groups. The current study made a contribution towards personality assessment in this regard, locally as well as internationally. The current study is furthermore likely to stimulate research with regard to the response patterns of personality instruments and the investigation of intrinsic personality characteristics of respondents from the different official language groups in South Africa.

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Appendix A: Mean Differences between the Official Language Groups

General Linear Model

Between-Subjects Factors

		Value Label	N
Language	1.00	Afrikaans	6786
	2.00	English	2261
	3.00	Ndebele	2002
	4.00	Sepedi	23825
	5.00	Sotho	7517
	6.00	Swati	3628
	7.00	Tsonga	10857
	8.00	Tswana	6687
	9.00	Venda	5042
	10.00	Xhosa	17265
	11.00	Zulu	19472

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.
Intercept	Pillai's Trace	.98	1017566.18[b]	6.00	105326.00	.00
	Wilks' Lambda	.01	1017566.18[b]	6.00	105326.00	.00
	Hotelling's Trace	57.96	1017566.18[b]	6.00	105326.00	.00
	Roy's Largest Root	57.96	1017566.18[b]	6.00	105326.00	.00
NLanguage	Pillai's Trace	.08	150.23	60.00	631986.00	.00
	Wilks' Lambda	.91	153.63	60.00	551840.74	.00
	Hotelling's Trace	.08	156.81	60.00	631946.00	.00
	Roy's Largest Root	.07	758.38[c]	10.00	105331.00	.00

a. Design: Intercept + NLanguage

b. Exact statistic

c. The statistic is an upper bound on F that yields a lower bound on the significance level

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	EXTRAVERSION	98740.70[a]	10	9874.07	33.11	.00
	NEUROTICISM	235129.33[b]	10	23512.93	65.43	.00
	CONSCIENTIOUSNESS	343839.02[c]	10	34383.90	74.83	.00
	OPENTOEXPERIENCE	124221.83[d]	10	12422.18	39.39	.00
	AGREEABLENESS	315918.43[e]	10	31591.84	51.98	.00
	SOCIALDESIRABILITY	295051.69[f]	10	29505.17	473.54	.00
Intercept	EXTRAVERSION	850197736.45	1	850197736.45	2851345.51	.0
	NEUROTICISM	348686123.86	1	348686123.86	970416.14	.00
	CONSCIENTIOUSNESS	1602007940.91	1	1602007940.91	3486887.87	.00
	OPENTOEXPERIENCE	798627015.00	1	798627015.00	2532794.93	.00
	AGREEABLENESS	1044997698.66	1	1044997698.66	1719643.06	.00
	SOCIALDESIRABILITY	106826441.66	1	106826441.66	1714514.84	.00
NLanguage	EXTRAVERSION	98740.70	10	9874.07	33.11	.00
	NEUROTICISM	235129.33	10	23512.93	65.43	.00
	CONSCIENTIOUSNESS	343839.02	10	34383.90	74.83	.00
	OPENTOEXPERIENCE	124221.83	10	12422.18	39.39	.00
	AGREEABLENESS	315918.43	10	31591.84	51.98	.00
	SOCIALDESIRABILITY	295051.69	10	29505.17	473.54	.00
Error	EXTRAVERSION	31406989.20	105331	298.17		
	NEUROTICISM	37847121.81	105331	359.31		
	CONSCIENTIOUSNESS	48393038.31	105331	459.43		
	OPENTOEXPERIENCE	33212393.48[a]	105331	315.31		
	AGREEABLENESS	64007848.47[b]	105331	607.68		
	SOCIALDESIRABILITY	6562868.76[c]	105331	62.30		
Total	EXTRAVERSION	1567285801.00[d]	105342			
	NEUROTICISM	685043017.00[e]	105342			
	CONSCIENTIOUSNESS	2939339598.00[f]	105342			
	OPENTOEXPERIENCE	1478080336.00	105342			
	AGREEABLENESS	1945503105.00	105342			
	SOCIALDESIRABILITY	204687501.00	105342			
Corrected Total	EXTRAVERSION	31505729.91	105341			
	NEUROTICISM	38082251.15	105341			
	CONSCIENTIOUSNESS	48736877.33	105341			
	OPENTOEXPERIENCE	33336615.31	105341			
	AGREEABLENESS	64323766.91	105341			
	SOCIALDESIRABILITY	6857920.45	105341			

a. R Squared = .003 (Adjusted R Squared = .003)
b. R Squared = .006 (Adjusted R Squared = .006)
c. R Squared = .007 (Adjusted R Squared = .007)
d. R Squared = .004 (Adjusted R Squared = .004)
e. R Squared = .005 (Adjusted R Squared = .005)
f. R Squared = .043 (Adjusted R Squared = .043)

***Post-Hoc* (*Scheffe*) Tests Language**

Multiple Comparisons: EXTRAVERSION

Dependent Variable	(I) Language	(J) Language	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
EXTRAVERSION	Afr	Eng	-3.72*	.41	.00	-5.51	-1.93
		Ndebele	-1.47	.43	.33	-3.35	.40
		Sepedi	-.51	.23	.91	-1.53	.51
		Sotho	-1.86*	.28	.00	-3.10	-.63
		Swati	-.51	.35	.99	-2.03	1.01
		Tsonga	-1.62*	.26	.00	-2.76	-.48
		Tswana	-.95	.29	.41	-2.23	.32
		Venda	-3.79*	.32	.00	-5.17	-2.42
		Xhosa	.01	.24	1.00	-1.05	1.07
		Zulu	-1.27*	.24	.00	-2.31	-.23
	Eng	Afr	3.72*	.41	.00	1.93	5.51
		Ndebele	2.24	.53	.05	-.02	4.51
		Sepedi	3.21*	.38	.00	1.58	4.83
		Sotho	1.86*	.41	.02	.08	3.63
		Swati	3.21*	.46	.00	1.23	5.19
		Tsonga	2.10*	.39	.00	.39	3.81
		Tswana	2.77*	.42	.00	.97	4.56
		Venda	-.07	.43	1.00	-1.94	1.80
		Xhosa	3.73*	.38	.00	2.08	5.38
		Zulu	2.45*	.38	.00	.81	4.09
	Ndebele	Afr	1.47	.43	.33	-.40	3.35
		Eng	-2.24	.53	.05	-4.51	.02
		Sepedi	.96*	.40	.83	-.76	2.68
		Sotho	-.39	.43	1.00	-2.25	1.47
		Swati	.97*	.48	.94	-1.09	3.03
		Tsonga	-.14	.42	1.00	-1.94	1.65
		Tswana	.52*	.44	.99	-1.36	2.40
		Venda	-2.32	.45	.00	-4.27	-.37
		Xhosa	1.49*	.40	.20	-.26	3.23
		Zulu	.20*	.40	1.00	-1.53	1.94
	Sepedi	Afr	.51	.23	.91	-.51	1.53
		Eng	-3.21*	.38	.00	-4.83	-1.58
		Ndebele	-.96*	.40	.83	-2.68	.76
		Sotho	-1.35*	.22	.00	-2.33	-.38
		Swati	.01*	.30	1.00	-1.31	1.32
		Tsonga	-1.11*	.20	.00	-1.96	-.25
		Tswana	-.44	.23	.96	-1.47	.58
		Venda	-3.28*	.26	.00	-4.43	-2.13
		Xhosa	.52*	.17	.51	-.21	1.26
		Zulu	-.76	.16	.02	-1.47	-.05

***Post-Hoc* (*Scheffe*) Tests Language**

Multiple Comparisons: EXTRAVERSION

Dependent Variable	(I) Language	(J) Language	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
EXTRAVERSION	Sotho	Afr	1.86	.28	.00	.63	3.10
		Eng	-1.86*	.41	.02	-3.63	-.08
		Ndebele	.39	.43	1.00	-1.47	2.25
		Sepedi	1.35*	.22	.00	.38	2.33
		Swati	1.36	.34	.12	-.14	2.85
		Tsonga	.25*	.25	1.00	-.86	1.35
		Tswana	.91	.29	.45	-.33	2.15
		Venda	-1.93*	.31	.00	-3.27	-.58
		Xhosa	1.88*	.23	.00	.86	2.90
		Zulu	.59	.23	.78	-.41	1.60
	Swati	Afr	.51*	.35	.99	-1.01	2.03
		Eng	-3.21*	.46	.00	-5.19	-1.23
		Ndebele	-.97*	.48	.94	-3.03	1.09
		Sepedi	-.01*	.30	1.00	-1.32	1.31
		Sotho	-1.36*	.34	.12	-2.85	.14
		Tsonga	-1.11	.33	.33	-2.53	.30
		Tswana	-.45*	.35	.99	-1.97	1.08
		Venda	-3.29*	.37	.00	-4.89	-1.68
		Xhosa	.52	.31	.98	-.83	1.87
		Zulu	-.76	.31	.81	-2.10	.57
	Tsonga	Afr	1.62*	.26	.00	.48	2.76
		Eng	-2.10	.39	.00	-3.81	-.39
		Ndebele	.14*	.42	1.00	-1.65	1.94
		Sepedi	1.11	.20	.00	.25	1.96
		Sotho	-.25*	.25	1.00	-1.35	.86
		Swati	1.11	.33	.33	-.30	2.53
		Tswana	.67*	.26	.80	-.48	1.81
		Venda	-2.17*	.29	.00	-3.43	-.91
		Xhosa	1.63	.21	.00	.73	2.54
		Zulu	.35*	.20	.98	-.54	1.23
	Tswana	Afr	.95*	.29	.41	-.32	2.23
		Eng	-2.77*	.42	.00	-4.56	-.97
		Ndebele	-.52*	.44	.99	-2.40	1.36
		Sepedi	.44*	.23	.96	-.58	1.47
		Sotho	-.91	.29	.45	-2.15	.33
		Swati	.45*	.35	.99	-1.08	1.97
		Tsonga	-.67*	.26	.80	-1.81	.48
		Venda	-2.84	.32	.00	-4.22	-1.46
		Xhosa	.97	.24	.12	-.10	2.03
		Zulu	-.32*	.24	.99	-1.36	.73

***Post-Hoc* (*Scheffe*) Tests Language**

Multiple Comparisons: EXTRAVERSION

Dependent Variable	(I) Language	(J) Language	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
EXTRAVERSION	Venda	Afr	3.79	.32	.00	2.42	5.17
		Eng	.07*	.43	1.00	-1.80	1.94
		Ndebele	2.32	.45	.00	.37	4.27
		Sepedi	3.28*	.26	.00	2.13	4.43
		Sotho	1.93	.31	.00	.58	3.27
		Swati	3.29*	.37	.00	1.68	4.89
		Tsonga	2.17*	.29	.00	.91	3.43
		Tswana	2.84	.32	.00	1.46	4.22
		Xhosa	3.80*	.27	.00	2.62	4.99
		Zulu	2.52*	.27	.00	1.35	3.69
	Xhosa	Afr	-.01*	.24	1.00	-1.07	1.05
		Eng	-3.73*	.38	.00	-5.38	-2.08
		Ndebele	-1.49*	.40	.20	-3.23	.26
		Sepedi	-.52	.17	.51	-1.26	.21
		Sotho	-1.88*	.23	.00	-2.90	-.86
		Swati	-.52*	.31	.98	-1.87	.83
		Tsonga	-1.63	.21	.00	-2.54	-.73
		Tswana	-.97	.24	.12	-2.03	.10
		Venda	-3.80*	.27	.00	-4.99	-2.62
		Zulu	-1.28	.18	.00	-2.06	-.51
	Zulu	Afr	1.27*	.24	.00	.23	2.31
		Eng	-2.45	.38	.00	-4.09	-.81
		Ndebele	-.20*	.40	1.00	-1.94	1.53
		Sepedi	.76	.16	.02	.05	1.47
		Sotho	-.59*	.23	.78	-1.60	.41
		Swati	.76*	.31	.81	-.57	2.10
		Tsonga	-.35	.20	.98	-1.23	.54
		Tswana	.32*	.24	.99	-.73	1.36
		Venda	-2.52*	.27	.00	-3.69	-1.35
		Xhosa	1.28*	.18	.00	.51	2.06

***Post-Hoc* (*Scheffe*) Tests Language**

Multiple Comparisons: NEUROTICISM

Dependent Variable	(I) Language	(J) Language	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
NEUROTICISM	Afr	Eng	5.96*	.46	.00	3.99	7.93
		Ndebele	-1.24*	.48	.76	-3.30	.82
		Sepedi	-1.64	.26	.00	-2.76	-.52
		Sotho	.04*	.31	1.00	-1.31	1.40
		Swati	-1.03*	.39	.73	-2.70	.64
		Tsonga	.99	.29	.32	-.26	2.25
		Tswana	-.33	.32	1.00	-1.73	1.07
		Venda	-.90*	.35	.76	-2.41	.61
		Xhosa	-2.62	.27	.00	-3.78	-1.46
		Zulu	-1.69*	.26	.00	-2.83	-.54
	Eng	Afr	-5.96	.46	.00	-7.93	-3.99
		Ndebele	-7.20*	.58	.00	-9.69	-4.71
		Sepedi	-7.60	.41	.00	-9.39	-5.82
		Sotho	-5.92*	.45	.00	-7.86	-3.97
		Swati	-6.99*	.50	.00	-9.16	-4.82
		Tsonga	-4.97	.43	.00	-6.84	-3.09
		Tswana	-6.29*	.46	.00	-8.27	-4.32
		Venda	-6.86*	.48	.00	-8.92	-4.81
		Xhosa	-8.58*	.42	.00	-10.40	-6.77
		Zulu	-7.65*	.42	.00	-9.45	-5.85
	Ndebele	Afr	1.24*	.48	.76	-.82	3.30
		Eng	7.20	.58	.00	4.71	9.69
		Sepedi	-.40*	.44	1.00	-2.29	1.49
		Sotho	1.28*	.47	.70	-.76	3.32
		Swati	.21	.52	1.00	-2.05	2.47
		Tsonga	2.23	.46	.00	.26	4.21
		Tswana	.91*	.48	.96	-1.16	2.97
		Venda	.34	.50	1.00	-1.80	2.48
		Xhosa	-1.38*	.44	.48	-3.30	.53
		Zulu	-.45	.44	1.00	-2.35	1.46
	Sepedi	Afr	1.64*	.26	.00	.52	2.76
		Eng	7.60	.41	.00	5.82	9.39
		Ndebele	.40*	.44	1.00	-1.49	2.29
		Sotho	1.68*	.25	.00	.61	2.76
		Swati	.61	.33	.97	-.83	2.06
		Tsonga	2.63*	.21	.00	1.69	3.57
		Tswana	1.31*	.26	.00	.19	2.43
		Venda	.74*	.29	.78	-.52	2.00
		Xhosa	-.98*	.18	.00	-1.79	-.17
		Zulu	-.05*	.18	1.00	-.83	.74

***Post-Hoc* (*Scheffe*) Tests Language**

Multiple Comparisons: NEUROTICISM

Dependent Variable	(I) Language	(J) Language	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
NEUROTICISM	Sotho	Afr	-.04	.31	1.00	-1.40	1.31
		Eng	5.92*	.45	.00	3.97	7.86
		Ndebele	-1.28*	.47	.70	-3.32	.76
		Sepedi	-1.68	.25	.00	-2.76	-.61
		Swati	-1.07	.38	.64	-2.71	.57
		Tsonga	.95*	.28	.34	-.27	2.17
		Tswana	-.38	.31	.99	-1.74	.99
		Venda	-.95*	.34	.67	-2.42	.53
		Xhosa	-2.66	.26	.00	-3.79	-1.54
		Zulu	-1.73*	.25	.00	-2.83	-.63
	Swati	Afr	1.03	.39	.73	-.64	2.70
		Eng	6.99*	.50	.00	4.82	9.16
		Ndebele	-.21*	.52	1.00	-2.47	2.05
		Sepedi	-.61	.33	.97	-2.06	.83
		Sotho	1.07*	.38	.64	-.57	2.71
		Tsonga	2.02*	.36	.00	.47	3.58
		Tswana	.70*	.39	.97	-.98	2.37
		Venda	.13*	.41	1.00	-1.64	1.89
		Xhosa	-1.59*	.34	.02	-3.07	-.11
		Zulu	-.66	.34	.96	-2.13	.81
	Tsonga	Afr	-.99*	.29	.32	-2.25	.26
		Eng	4.97*	.43	.00	3.09	6.84
		Ndebele	-2.23	.46	.00	-4.21	-.26
		Sepedi	-2.63	.21	.00	-3.57	-1.69
		Sotho	-.95*	.28	.34	-2.17	.27
		Swati	-2.02	.36	.00	-3.58	-.47
		Tswana	-1.33*	.29	.02	-2.59	-.06
		Venda	-1.89	.32	.00	-3.28	-.51
		Xhosa	-3.61*	.23	.00	-4.61	-2.62
		Zulu	-2.68	.22	.00	-3.65	-1.71
	Tswana	Afr	.33*	.32	1.00	-1.07	1.73
		Eng	6.29*	.46	.00	4.32	8.27
		Ndebele	-.91	.48	.96	-2.97	1.16
		Sepedi	-1.31*	.26	.00	-2.43	-.19
		Sotho	.38*	.31	.99	-.99	1.74
		Swati	-.70*	.39	.97	-2.37	.98
		Tsonga	1.33*	.29	.02	.06	2.59
		Venda	-.57*	.35	.98	-2.08	.94
		Xhosa	-2.29	.27	.00	-3.46	-1.12
		Zulu	-1.36*	.26	.00	-2.51	-.21

***Post-Hoc* (*Scheffe*) Tests Language**

Multiple Comparisons: NEUROTICISM

Dependent Variable	(I) Language	(J) Language	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
NEUROTICISM	Venda	Afr	.90*	.35	.76	-.61	2.41
		Eng	6.86	.48	.00	4.81	8.92
		Ndebele	-.34	.50	1.00	-2.48	1.80
		Sepedi	-.74*	.29	.78	-2.00	.52
		Sotho	.95	.34	.67	-.53	2.42
		Swati	-.13*	.41	1.00	-1.89	1.64
		Tsonga	1.89	.32	.00	.51	3.28
		Tswana	.57*	.35	.98	-.94	2.08
		Xhosa	-1.72	.30	.00	-3.02	-.42
		Zulu	-.79*	.30	.73	-2.07	.50
	Xhosa	Afr	2.62*	.27	.00	1.46	3.78
		Eng	8.58	.42	.00	6.77	10.40
		Ndebele	1.38*	.44	.48	-.53	3.30
		Sepedi	.98*	.18	.00	.17	1.79
		Sotho	2.66*	.26	.00	1.54	3.79
		Swati	1.59*	.34	.02	.11	3.07
		Tsonga	3.61*	.23	.00	2.62	4.61
		Tswana	2.29	.27	.00	1.12	3.46
		Venda	1.72*	.30	.00	.42	3.02
		Zulu	.93*	.19	.01	.09	1.78
	Zulu	Afr	1.69	.26	.00	.54	2.83
		Eng	7.65	.42	.00	5.85	9.45
		Ndebele	.45*	.44	1.00	-1.46	2.35
		Sepedi	.05	.18	1.00	-.74	.83
		Sotho	1.73*	.25	.00	.63	2.83
		Swati	.66	.34	.96	-.81	2.13
		Tsonga	2.68*	.22	.00	1.71	3.65
		Tswana	1.36	.26	.00	.21	2.51
		Venda	.79*	.30	.73	-.50	2.07
		Xhosa	-.93*	.19	.01	-1.78	-.09

***Post-Hoc* (*Scheffe*) Tests Language**

Multiple Comparisons: CONSCIENTIOUSNESS

Dependent Variable	(I) Language	(J) Language	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
CONSCIENTIOUSNESS	Afr	Eng	-2.64	.52	.00	-4.87	-.41
		Ndebele	.73*	.54	.99	-1.60	3.06
		Sepedi	.57*	.29	.96	-.69	1.83
		Sotho	.00*	.35	1.00	-1.53	1.54
		Swati	-1.28*	.44	.59	-3.16	.61
		Tsonga	-2.61*	.33	.00	-4.03	-1.19
		Tswana	-.23	.36	1.00	-1.81	1.35
		Venda	-2.41*	.39	.00	-4.12	-.71
		Xhosa	3.53*	.30	.00	2.22	4.85
		Zulu	.44	.30	.99	-.85	1.73
	Eng	Afr	2.64	.52	.00	.41	4.87
		Ndebele	3.37*	.65	.00	.56	6.19
		Sepedi	3.21	.47	.00	1.19	5.23
		Sotho	2.64*	.51	.00	.44	4.84
		Swati	1.36	.57	.84	-1.09	3.82
		Tsonga	.03*	.49	1.00	-2.09	2.15
		Tswana	2.41	.52	.01	.18	4.64
		Venda	.23*	.54	1.00	-2.09	2.55
		Xhosa	6.17*	.47	.00	4.12	8.22
		Zulu	3.08	.47	.00	1.04	5.12
	Ndebele	Afr	-.73*	.54	.99	-3.06	1.60
		Eng	-3.37*	.65	.00	-6.19	-.56
		Sepedi	-.16*	.49	1.00	-2.30	1.97
		Sotho	-.73*	.53	.99	-3.04	1.58
		Swati	-2.01*	.59	.33	-4.56	.54
		Tsonga	-3.34	.52	.00	-5.57	-1.11
		Tswana	-.96*	.54	.97	-3.30	1.37
		Venda	-3.14*	.56	.00	-5.57	-.72
		Xhosa	2.80	.50	.00	.64	4.97
		Zulu	-.29	.50	1.00	-2.44	1.86
	Sepedi	Afr	-.57*	.29	.96	-1.83	.69
		Eng	-3.21	.47	.00	-5.23	-1.19
		Ndebele	.16*	.49	1.00	-1.97	2.30
		Sotho	-.57	.28	.94	-1.78	.65
		Swati	-1.85*	.38	.01	-3.48	-.21
		Tsonga	-3.18	.24	.00	-4.24	-2.12
		Tswana	-.80*	.29	.70	-2.07	.47
		Venda	-2.98*	.33	.00	-4.40	-1.56
		Xhosa	2.97	.21	.00	2.05	3.88
		Zulu	-.13*	.20	1.00	-1.01	.76

***Post-Hoc* (*Scheffe*) Tests Language**

Multiple Comparisons: CONSCIENTIOUSNESS

Dependent Variable	(I) Language	(J) Language	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
CONSCIENTIOUSNESS	Sotho	Afr	.00*	.35	1.00	-1.54	1.53
		Eng	-2.64*	.51	.00	-4.84	-.44
		Ndebele	.73*	.53	.99	-1.58	3.04
		Sepedi	.57*	.28	.94	-.65	1.78
		Swati	-1.28	.43	.56	-3.13	.58
		Tsonga	-2.61*	.32	.00	-3.99	-1.24
		Tswana	-.23*	.36	1.00	-1.78	1.31
		Venda	-2.41	.39	.00	-4.08	-.74
		Xhosa	3.53	.29	.00	2.26	4.80
		Zulu	.44*	.29	.99	-.81	1.68
	Swati	Afr	1.28	.44	.59	-.61	3.16
		Eng	-1.36*	.57	.84	-3.82	1.09
		Ndebele	2.01	.59	.33	-.54	4.56
		Sepedi	1.85*	.38	.01	.21	3.48
		Sotho	1.28	.43	.56	-.58	3.13
		Tsonga	-1.33*	.41	.39	-3.09	.42
		Tswana	1.05*	.44	.84	-.85	2.94
		Venda	-1.14	.46	.82	-3.13	.86
		Xhosa	4.81*	.39	.00	3.14	6.49
		Zulu	1.72*	.38	.03	.06	3.38
	Tsonga	Afr	2.61*	.33	.00	1.19	4.03
		Eng	-.03*	.49	1.00	-2.15	2.09
		Ndebele	3.34*	.52	.00	1.11	5.57
		Sepedi	3.18	.24	.00	2.12	4.24
		Sotho	2.61*	.32	.00	1.24	3.99
		Swati	1.33*	.41	.39	-.42	3.09
		Tswana	2.38	.33	.00	.95	3.81
		Venda	.20	.36	1.00	-1.36	1.76
		Xhosa	6.15*	.26	.00	5.02	7.27
		Zulu	3.05	.25	.00	1.95	4.15
	Tswana	Afr	.23*	.36	1.00	-1.35	1.81
		Eng	-2.41	.52	.01	-4.64	-.18
		Ndebele	.96*	.54	.97	-1.37	3.30
		Sepedi	.80	.29	.70	-.47	2.07
		Sotho	.23*	.36	1.00	-1.31	1.78
		Swati	-1.05*	.44	.84	-2.94	.85
		Tsonga	-2.38	.33	.00	-3.81	-.95
		Venda	-2.18*	.40	.00	-3.89	-.47
		Xhosa	3.76*	.30	.00	2.44	5.09
		Zulu	.67*	.30	.89	-.63	1.97

***Post-Hoc* (*Scheffe*) Tests Language**

Multiple Comparisons: CONSCIENTIOUSNESS

Dependent Variable	(I) Language	(J) Language	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
CONSCIENTIOUSNESS	Venda	Afr	2.41*	.39	.00	.71	4.12
		Eng	-.23*	.54	1.00	-2.55	2.09
		Ndebele	3.14	.56	.00	.72	5.57
		Sepedi	2.98*	.33	.00	1.56	4.40
		Sotho	2.41*	.39	.00	.74	4.08
		Swati	1.14	.46	.82	-.86	3.13
		Tsonga	-.20	.36	1.00	-1.76	1.36
		Tswana	2.18*	.40	.00	.47	3.89
		Xhosa	5.95	.34	.00	4.48	7.41
		Zulu	2.85*	.33	.00	1.40	4.30
	Xhosa	Afr	-3.53	.30	.00	-4.85	-2.22
		Eng	-6.17*	.47	.00	-8.22	-4.12
		Ndebele	-2.80	.50	.00	-4.97	-.64
		Sepedi	-2.97*	.21	.00	-3.88	-2.05
		Sotho	-3.53*	.29	.00	-4.80	-2.26
		Swati	-4.81	.39	.00	-6.49	-3.14
		Tsonga	-6.15*	.26	.00	-7.27	-5.02
		Tswana	-3.76*	.30	.00	-5.09	-2.44
		Venda	-5.95*	.34	.00	-7.41	-4.48
		Zulu	-3.09*	.22	.00	-4.05	-2.13
	Zulu	Afr	-.44*	.30	.99	-1.73	.85
		Eng	-3.08	.47	.00	-5.12	-1.04
		Ndebele	.29*	.50	1.00	-1.86	2.44
		Sepedi	.13*	.20	1.00	-.76	1.01
		Sotho	-.44	.29	.99	-1.68	.81
		Swati	-1.72	.38	.03	-3.38	-.06
		Tsonga	-3.05*	.25	.00	-4.15	-1.95
		Tswana	-.67	.30	.89	-1.97	.63
		Venda	-2.85*	.33	.00	-4.30	-1.40
		Xhosa	3.09	.22	.00	2.13	4.05

***Post-Hoc* (*Scheffe*) Tests Language**

Multiple Comparisons: OPEN TO EXPERIENCE

Dependent Variable	(I) Language	(J) Language	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
OPENTOEXPERIENCE	Afr	Eng	-2.79*	.43	.00	-4.64	-.95
		Ndebele	-1.05	.45	.86	-2.99	.88
		Sepedi	-1.41*	.24	.00	-2.45	-.36
		Sotho	-2.90*	.29	.00	-4.17	-1.63
		Swati	-1.66	.36	.02	-3.23	-.10
		Tsonga	-2.18*	.27	.00	-3.36	-1.01
		Tswana	-3.22*	.30	.00	-4.53	-1.91
		Venda	-3.20*	.33	.00	-4.61	-1.79
		Xhosa	.20*	.25	1.00	-.88	1.29
		Zulu	-1.40*	.25	.00	-2.47	-.33
	Eng	Afr	2.79	.43	.00	.95	4.64
		Ndebele	1.74*	.54	.42	-.59	4.07
		Sepedi	1.38*	.39	.24	-.29	3.06
		Sotho	-.11	.42	1.00	-1.93	1.71
		Swati	1.13	.47	.84	-.91	3.16
		Tsonga	.61*	.41	.99	-1.15	2.37
		Tswana	-.43	.43	1.00	-2.28	1.42
		Venda	-.41*	.44	1.00	-2.33	1.51
		Xhosa	2.99	.39	.00	1.30	4.69
		Zulu	1.39*	.39	.26	-.30	3.08
	Ndebele	Afr	1.05	.45	.86	-.88	2.99
		Eng	-1.74*	.54	.42	-4.07	.59
		Sepedi	-.35*	.41	1.00	-2.12	1.41
		Sotho	-1.85	.44	.07	-3.76	.06
		Swati	-.61*	.49	.99	-2.73	1.50
		Tsonga	-1.13*	.43	.74	-2.98	.72
		Tswana	-2.17*	.45	.01	-4.11	-.24
		Venda	-2.15*	.46	.02	-4.16	-.14
		Xhosa	1.26*	.41	.53	-.54	3.05
		Zulu	-.35	.41	1.00	-2.13	1.43
	Sepedi	Afr	1.41*	.24	.00	.36	2.45
		Eng	-1.38*	.39	.24	-3.06	.29
		Ndebele	.35	.41	1.00	-1.41	2.12
		Sotho	-1.49	.23	.00	-2.50	-.49
		Swati	-.26*	.31	1.00	-1.61	1.10
		Tsonga	-.78	.20	.16	-1.66	.10
		Tswana	-1.82*	.24	.00	-2.87	-.77
		Venda	-1.80	.27	.00	-2.97	-.62
		Xhosa	1.61*	.17	.00	.85	2.37
		Zulu	.00	.17	1.00	-.73	.74

***Post-Hoc* (*Scheffe*) Tests Language**

Multiple Comparisons: OPEN TO EXPERIENCE

Dependent Variable	(I) Language	(J) Language	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
OPENTOEXPERIENCE	Sotho	Afr	2.90*	.29	.00	1.63	4.17
		Eng	.11*	.42	1.00	-1.71	1.93
		Ndebele	1.85	.44	.07	-.06	3.76
		Sepedi	1.49*	.23	.00	.49	2.50
		Swati	1.24*	.35	.29	-.30	2.77
		Tsonga	.72*	.26	.69	-.42	1.86
		Tswana	-.32*	.29	1.00	-1.60	.95
		Venda	-.30*	.32	1.00	-1.68	1.08
		Xhosa	3.10	.24	.00	2.05	4.15
		Zulu	1.50*	.24	.00	.47	2.53
	Swati	Afr	1.66*	.36	.02	.10	3.23
		Eng	-1.13	.47	.84	-3.16	.91
		Ndebele	.61	.49	.99	-1.50	2.73
		Sepedi	.26*	.31	1.00	-1.10	1.61
		Sotho	-1.24	.35	.29	-2.77	.30
		Tsonga	-.52*	.34	.99	-1.97	.94
		Tswana	-1.56	.36	.05	-3.13	.01
		Venda	-1.54*	.38	.10	-3.19	.12
		Xhosa	1.87	.32	.00	.48	3.26
		Zulu	.26*	.32	1.00	-1.11	1.64
	Tsonga	Afr	2.18*	.27	.00	1.01	3.36
		Eng	-.61	.41	.99	-2.37	1.15
		Ndebele	1.13*	.43	.74	-.72	2.98
		Sepedi	.78*	.20	.16	-.10	1.66
		Sotho	-.72*	.26	.69	-1.86	.42
		Swati	.52*	.34	.99	-.94	1.97
		Tswana	-1.04*	.27	.16	-2.22	.14
		Venda	-1.02	.30	.33	-2.31	.28
		Xhosa	2.39*	.21	.00	1.46	3.32
		Zulu	.78*	.21	.20	-.13	1.69
	Tswana	Afr	3.22	.30	.00	1.91	4.53
		Eng	.43	.43	1.00	-1.42	2.28
		Ndebele	2.17*	.45	.01	.24	4.11
		Sepedi	1.82	.24	.00	.77	2.87
		Sotho	.32*	.29	1.00	-.95	1.60
		Swati	1.56	.36	.05	-.01	3.13
		Tsonga	1.04*	.27	.16	-.14	2.22
		Venda	.02	.33	1.00	-1.40	1.44
		Xhosa	3.43*	.25	.00	2.33	4.52
		Zulu	1.82*	.25	.00	.74	2.90

***Post-Hoc* (*Scheffe*) Tests Language**

Multiple Comparisons: OPEN TO EXPERIENCE

Dependent Variable	(I) Language	(J) Language	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
OPENTOEXPERIENCE	Venda	Afr	3.20	.33	.00	1.79	4.61
		Eng	.41*	.44	1.00	-1.51	2.33
		Ndebele	2.15*	.46	.02	.14	4.16
		Sepedi	1.80*	.27	.00	.62	2.97
		Sotho	.30*	.32	1.00	-1.08	1.68
		Swati	1.54*	.38	.10	-.12	3.19
		Tsonga	1.02	.30	.33	-.28	2.31
		Tswana	-.02*	.33	1.00	-1.44	1.40
		Xhosa	3.41*	.28	.00	2.19	4.62
		Zulu	1.80	.28	.00	.60	3.00
	Xhosa	Afr	-.20	.25	1.00	-1.29	.88
		Eng	-2.99*	.39	.00	-4.69	-1.30
		Ndebele	-1.26	.41	.53	-3.05	.54
		Sepedi	-1.61*	.17	.00	-2.37	-.85
		Sotho	-3.10	.24	.00	-4.15	-2.05
		Swati	-1.87*	.32	.00	-3.26	-.48
		Tsonga	-2.39	.21	.00	-3.32	-1.46
		Tswana	-3.43*	.25	.00	-4.52	-2.33
		Venda	-3.41*	.28	.00	-4.62	-2.19
		Zulu	-1.61	.18	.00	-2.40	-.81
	Zulu	Afr	1.40*	.25	.00	.33	2.47
		Eng	-1.39*	.39	.26	-3.08	.30
		Ndebele	.35*	.41	1.00	-1.43	2.13
		Sepedi	.00*	.17	1.00	-.74	.73
		Sotho	-1.50*	.24	.00	-2.53	-.47
		Swati	-.26	.32	1.00	-1.64	1.11
		Tsonga	-.78*	.21	.20	-1.69	.13
		Tswana	-1.82*	.25	.00	-2.90	-.74
		Venda	-1.80	.28	.00	-3.00	-.60
		Xhosa	1.61	.18	.00	.81	2.40

***Post-Hoc* (*Scheffe*) Tests Language**

Multiple Comparisons: AGREEABLENESS

Dependent Variable	(I) Language	(J) Language	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
AGREEABLENESS	Afr	Eng	-3.58*	.59	.00	-6.14	-1.02
		Ndebele	-.73	.62	.99	-3.41	1.95
		Sepedi	-.06*	.33	1.00	-1.51	1.39
		Sotho	-1.76	.41	.05	-3.53	.00
		Swati	-3.01*	.50	.00	-5.18	-.84
		Tsonga	-3.72	.38	.00	-5.35	-2.09
		Tswana	-1.81*	.42	.05	-3.63	.00
		Venda	-5.09*	.45	.00	-7.05	-3.13
		Xhosa	1.21	.35	.30	-.30	2.72
		Zulu	-1.31*	.34	.15	-2.80	.17
	Eng	Afr	3.58*	.59	.00	1.02	6.14
		Ndebele	2.85*	.75	.16	-.39	6.08
		Sepedi	3.52*	.54	.00	1.20	5.84
		Sotho	1.81*	.59	.49	-.72	4.34
		Swati	.57	.66	1.00	-2.26	3.39
		Tsonga	-.14*	.57	1.00	-2.58	2.30
		Tswana	1.76*	.60	.56	-.80	4.33
		Venda	-1.51	.62	.82	-4.18	1.16
		Xhosa	4.79	.55	.00	2.43	7.15
		Zulu	2.26*	.54	.07	-.08	4.61
	Ndebele	Afr	.73	.62	.99	-1.95	3.41
		Eng	-2.85*	.75	.16	-6.08	.39
		Sepedi	.67	.57	.99	-1.78	3.13
		Sotho	-1.03*	.62	.98	-3.69	1.62
		Swati	-2.28	.68	.35	-5.22	.66
		Tsonga	-2.99*	.60	.00	-5.55	-.42
		Tswana	-1.08*	.62	.98	-3.77	1.60
		Venda	-4.36	.65	.00	-7.15	-1.57
		Xhosa	1.94*	.58	.34	-.55	4.43
		Zulu	-.58*	.57	1.00	-3.06	1.89
	Sepedi	Afr	.06*	.33	1.00	-1.39	1.51
		Eng	-3.52*	.54	.00	-5.84	-1.20
		Ndebele	-.67*	.57	.99	-3.13	1.78
		Sotho	-1.71	.32	.00	-3.10	-.31
		Swati	-2.95*	.43	.00	-4.83	-1.07
		Tsonga	-3.66*	.28	.00	-4.88	-2.44
		Tswana	-1.76	.34	.00	-3.22	-.30
		Venda	-5.03	.38	.00	-6.67	-3.40
		Xhosa	1.27*	.24	.00	.21	2.32
		Zulu	-1.26	.23	.00	-2.28	-.24

***Post-Hoc* (*Scheffe*) Tests Language**

Multiple Comparisons: AGREEABLENESS

Dependent Variable	(I) Language	(J) Language	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
AGREEABLENESS	Sotho	Afr	1.76*	.41	.05	.00	3.53
		Eng	-1.81	.59	.49	-4.34	.72
		Ndebele	1.03*	.62	.98	-1.62	3.69
		Sepedi	1.71	.32	.00	.31	3.10
		Swati	-1.25*	.49	.79	-3.38	.89
		Tsonga	-1.95*	.37	.00	-3.54	-.37
		Tswana	-.05	.41	1.00	-1.82	1.72
		Venda	-3.33*	.44	.00	-5.25	-1.41
		Xhosa	2.97*	.34	.00	1.52	4.43
		Zulu	.45*	.33	.99	-.98	1.88
	Swati	Afr	3.01*	.50	.00	.84	5.18
		Eng	-.57*	.66	1.00	-3.39	2.26
		Ndebele	2.28	.68	.35	-.66	5.22
		Sepedi	2.95*	.43	.00	1.07	4.83
		Sotho	1.25*	.49	.79	-.89	3.38
		Tsonga	-.71	.47	.99	-2.73	1.32
		Tswana	1.20	.50	.85	-.98	3.37
		Venda	-2.08*	.53	.13	-4.38	.22
		Xhosa	4.22	.45	.00	2.29	6.15
		Zulu	1.70*	.44	.15	-.21	3.60
	Tsonga	Afr	3.72	.38	.00	2.09	5.35
		Eng	.14*	.57	1.00	-2.30	2.58
		Ndebele	2.99	.60	.00	.42	5.55
		Sepedi	3.66*	.28	.00	2.44	4.88
		Sotho	1.95*	.37	.00	.37	3.54
		Swati	.71	.47	.99	-1.32	2.73
		Tswana	1.90*	.38	.00	.26	3.54
		Venda	-1.37*	.42	.38	-3.17	.43
		Xhosa	4.93*	.30	.00	3.64	6.22
		Zulu	2.40*	.29	.00	1.14	3.67
	Tswana	Afr	1.81*	.42	.05	.00	3.63
		Eng	-1.76	.60	.56	-4.33	.80
		Ndebele	1.08*	.62	.98	-1.60	3.77
		Sepedi	1.76*	.34	.00	.30	3.22
		Sotho	.05	.41	1.00	-1.72	1.82
		Swati	-1.20	.50	.85	-3.37	.98
		Tsonga	-1.90*	.38	.00	-3.54	-.26
		Venda	-3.28	.46	.00	-5.24	-1.31
		Xhosa	3.02*	.35	.00	1.50	4.54
		Zulu	.50	.34	.99	-1.00	1.99

***Post-Hoc* (*Scheffe*) Tests Language**

Multiple Comparisons: AGREEABLENESS

Dependent Variable	(I) Language	(J) Language	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
AGREEABLENESS	Venda	Afr	5.09*	.45	.00	3.13	7.05
		Eng	1.51	.62	.82	-1.16	4.18
		Ndebele	4.36*	.65	.00	1.57	7.15
		Sepedi	5.03*	.38	.00	3.40	6.67
		Sotho	3.33	.44	.00	1.41	5.25
		Swati	2.08*	.53	.13	-.22	4.38
		Tsonga	1.37*	.42	.38	-.43	3.17
		Tswana	3.28*	.46	.00	1.31	5.24
		Xhosa	6.30*	.39	.00	4.61	7.99
		Zulu	3.78*	.39	.00	2.11	5.44
	Xhosa	Afr	-1.21	.35	.30	-2.72	.30
		Eng	-4.79*	.55	.00	-7.15	-2.43
		Ndebele	-1.94*	.58	.34	-4.43	.55
		Sepedi	-1.27	.24	.00	-2.32	-.21
		Sotho	-2.97	.34	.00	-4.43	-1.52
		Swati	-4.22*	.45	.00	-6.15	-2.29
		Tsonga	-4.93	.30	.00	-6.22	-3.64
		Tswana	-3.02*	.35	.00	-4.54	-1.50
		Venda	-6.30	.39	.00	-7.99	-4.61
		Zulu	-2.52*	.25	.00	-3.63	-1.42
	Zulu	Afr	1.31	.34	.15	-.17	2.80
		Eng	-2.26*	.54	.07	-4.61	.08
		Ndebele	.58*	.57	1.00	-1.89	3.06
		Sepedi	1.26	.23	.00	.24	2.28
		Sotho	-.45*	.33	.99	-1.88	.98
		Swati	-1.70*	.44	.15	-3.60	.21
		Tsonga	-2.40*	.29	.00	-3.67	-1.14
		Tswana	-.50*	.34	.99	-1.99	1.00
		Venda	-3.78*	.39	.00	-5.44	-2.11
		Xhosa	2.52	.25	.00	1.42	3.63

***Post-Hoc* (*Scheffe*) Tests Language**

Multiple Comparisons: SOCIAL DESIRABILITY

Dependent Variable	(I) Language	(J) Language	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
SOCIAL DESIRABILITY	Afr	Eng	-.16*	.19	1.00	-.98	.66
		Ndebele	-4.98*	.20	.00	-5.84	-4.13
		Sepedi	-5.40	.10	.00	-5.86	-4.93
		Sotho	-3.47	.13	.00	-4.03	-2.90
		Swati	-5.50*	.16	.00	-6.20	-4.81
		Tsonga	-6.42	.12	.00	-6.94	-5.90
		Tswana	-3.13*	.13	.00	-3.71	-2.55
		Venda	-6.50	.14	.00	-7.13	-5.88
		Xhosa	-3.65*	.11	.00	-4.13	-3.16
		Zulu	-4.56	.11	.00	-5.04	-4.09
	Eng	Afr	.16*	.19	1.00	-.66	.98
		Ndebele	-4.83*	.24	.00	-5.86	-3.79
		Sepedi	-5.24	.17	.00	-5.99	-4.50
		Sotho	-3.31*	.18	.00	-4.12	-2.50
		Swati	-5.35*	.21	.00	-6.25	-4.44
		Tsonga	-6.26*	.18	.00	-7.04	-5.48
		Tswana	-2.98*	.19	.00	-3.80	-2.15
		Venda	-6.35*	.20	.00	-7.20	-5.49
		Xhosa	-3.49	.17	.00	-4.25	-2.74
		Zulu	-4.41*	.17	.00	-5.16	-3.66
	Ndebele	Afr	4.98*	.20	.00	4.13	5.84
		Eng	4.83	.24	.00	3.79	5.86
		Sepedi	-.42	.18	.88	-1.20	.37
		Sotho	1.52*	.19	.00	.67	2.37
		Swati	-.52	.22	.85	-1.46	.42
		Tsonga	-1.43*	.19	.00	-2.26	-.61
		Tswana	1.85	.20	.00	.99	2.71
		Venda	-1.52*	.20	.00	-2.41	-.63
		Xhosa	1.34	.18	.00	.54	2.13
		Zulu	.42*	.18	.88	-.37	1.21
	Sepedi	Afr	5.40*	.10	.00	4.93	5.86
		Eng	5.24	.17	.00	4.50	5.99
		Ndebele	.42*	.18	.88	-.37	1.20
		Sotho	1.93*	.10	.00	1.49	2.38
		Swati	-.10*	.14	1.00	-.70	.50
		Tsonga	-1.02*	.09	.00	-1.41	-.63
		Tswana	2.27*	.10	.00	1.80	2.73
		Venda	-1.10	.12	.00	-1.63	-.58
		Xhosa	1.75*	.07	.00	1.41	2.09
		Zulu	.84*	.07	.00	.51	1.16

***Post-Hoc* (*Scheffe*) Tests Language**

Multiple Comparisons: SOCIAL DESIRABILITY

Dependent Variable	(I) Language	(J) Language	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
SOCIAL DESIRABILITY	Sotho	Afr	3.47	.13	.00	2.90	4.03
		Eng	3.31	.18	.00	2.50	4.12
		Ndebele	-1.52*	.19	.00	-2.37	-.67
		Sepedi	-1.93	.10	.00	-2.38	-1.49
		Swati	-2.04*	.16	.00	-2.72	-1.35
		Tsonga	-2.95	.11	.00	-3.46	-2.45
		Tswana	.33*	.13	.78	-.23	.90
		Venda	-3.04	.14	.00	-3.65	-2.42
		Xhosa	-.18*	.10	.98	-.65	.28
		Zulu	-1.10*	.10	.00	-1.56	-.64
	Swati	Afr	5.50	.16	.00	4.81	6.20
		Eng	5.35*	.21	.00	4.44	6.25
		Ndebele	.52*	.22	.85	-.42	1.46
		Sepedi	.10*	.14	1.00	-.50	.70
		Sotho	2.04*	.16	.00	1.35	2.72
		Tsonga	-.92*	.15	.00	-1.56	-.27
		Tswana	2.37	.16	.00	1.67	3.07
		Venda	-1.00*	.17	.00	-1.74	-.27
		Xhosa	1.85*	.14	.00	1.24	2.47
		Zulu	.94	.14	.00	.33	1.55
	Tsonga	Afr	6.42	.12	.00	5.90	6.94
		Eng	6.26*	.18	.00	5.48	7.04
		Ndebele	1.43	.19	.00	.61	2.26
		Sepedi	1.02*	.09	.00	.63	1.41
		Sotho	2.95	.11	.00	2.45	3.46
		Swati	.92*	.15	.00	.27	1.56
		Tswana	3.29	.12	.00	2.76	3.81
		Venda	-.08*	.13	1.00	-.66	.49
		Xhosa	2.77*	.09	.00	2.36	3.18
		Zulu	1.85	.09	.00	1.45	2.26
	Tswana	Afr	3.13*	.13	.00	2.55	3.71
		Eng	2.98*	.19	.00	2.15	3.80
		Ndebele	-1.85*	.20	.00	-2.71	-.99
		Sepedi	-2.27*	.10	.00	-2.73	-1.80
		Sotho	-.33*	.13	.78	-.90	.23
		Swati	-2.37	.16	.00	-3.07	-1.67
		Tsonga	-3.29*	.12	.00	-3.81	-2.76
		Venda	-3.37*	.14	.00	-4.00	-2.74
		Xhosa	-.52	.11	.02	-1.00	-.03
		Zulu	-1.43	.11	.00	-1.91	-.95

***Post-Hoc* (*Scheffe*) Tests Language**

Multiple Comparisons: SOCIAL DESIRABILITY

Dependent Variable	(I) Language	(J) Language	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
SOCIALDESIRABILITY	Venda	Afr	6.50*	.14	.00	5.88	7.13
		Eng	6.35	.20	.00	5.49	7.20
		Ndebele	1.52*	.20	.00	.63	2.41
		Sepedi	1.10	.12	.00	.58	1.63
		Sotho	3.04*	.14	.00	2.42	3.65
		Swati	1.00	.17	.00	.27	1.74
		Tsonga	.08*	.13	1.00	-.49	.66
		Tswana	3.37*	.14	.00	2.74	4.00
		Xhosa	2.86	.12	.00	2.31	3.40
		Zulu	1.94*	.12	.00	1.41	2.47
	Xhosa	Afr	3.65*	.11	.00	3.16	4.13
		Eng	3.49*	.17	.00	2.74	4.25
		Ndebele	-1.34*	.18	.00	-2.13	-.54
		Sepedi	-1.75*	.07	.00	-2.09	-1.41
		Sotho	.18	.10	.98	-.28	.65
		Swati	-1.85*	.14	.00	-2.47	-1.24
		Tsonga	-2.77*	.09	.00	-3.18	-2.36
		Tswana	.52	.11	.02	.03	1.00
		Venda	-2.86	.12	.00	-3.40	-2.31
		Zulu	-.92*	.08	.00	-1.27	-.56
	Zulu	Afr	4.56	.11	.00	4.09	5.04
		Eng	4.41*	.17	.00	3.66	5.16
		Ndebele	-.42	.18	.88	-1.21	.37
		Sepedi	-.84*	.07	.00	-1.16	-.51
		Sotho	1.10	.10	.00	.64	1.56
		Swati	-.94*	.14	.00	-1.55	-.33
		Tsonga	-1.85*	.09	.00	-2.26	-1.45
		Tswana	1.43	.11	.00	.95	1.91
		Venda	-1.94*	.12	.00	-2.47	-1.41
		Xhosa	.92*	.08	.00	.56	1.27

Based on observed means.

The error term is Mean Square(Error) = 62.307.

*. The mean difference is significant at the .05 level.

Homogeneous Subsets

EXTRAVERSION

Scheffe

Language	N	Subset		
		1	2	3
Xhosa	17265	119.71		
Afr	6786	119.73		
Swati	3628	120.23	120.23	
Sepedi	23825	120.24	120.24	
Tswana	6687	120.68	120.68	
Zulu	19472	121.00	121.00	
Ndebele	2002		121.20	
Tsonga	10857		121.35	
Sotho	7517		121.59	
Eng	2261			123.45
Venda	5042			123.52
Sig.		.149	.092	1.000

Means for groups in homogeneous subsets are displayed.
Based on observed means.
The error term is Mean Square(Error) = 298.174.
a. Uses Harmonic Mean Sample Size = 5265.566.
b. Alpha = .05.

NEUROTICISM

Scheffe

Language	N	Subset				
		1	2	3	4	5
Eng	2261	71.40				
Tsonga	10857		76.37			
Sotho	7517		77.32	77.32		
Afr	6786		77.37	77.37		
Tswana	6687		77.70	77.70	77.70	
Venda	5042			78.27	78.27	
Swati	3628			78.39	78.39	
Ndebele	2002			78.61	78.61	78.61
Sepedi	23825				79.01	79.01
Zulu	19472				79.05	79.05
Xhosa	17265					79.99
Sig.		1.000	.231	.279	.199	.175

Means for groups in homogeneous subsets are displayed.
Based on observed means.
The error term is Mean Square(Error) = 359.316.
a. Uses Harmonic Mean Sample Size = 5265.566.
b. Alpha = .05.

CONSCIENTIOUSNESS

Scheffe

Language	N	Subset			
		1	2	3	4
Xhosa	17265	162.42			
Ndebele	2002		165.22		
Sepedi	23825		165.39		
Zulu	19472		165.51	165.51	
Sotho	7517		165.95	165.95	
Afr	6786		165.95	165.95	
Tswana	6687		166.19	166.19	
Swati	3628			167.23	167.23
Venda	5042				168.37
Tsonga	10857				168.57
Eng	2261				168.59
Sig.		1.000	.869	.076	.386

Means for groups in homogeneous subsets are displayed.
Based on observed means.
The error term is Mean Square(Error) = 459.438.
a. Uses Harmonic Mean Sample Size = 5265.566.
b. Alpha = .05.

OPENTOEXPERIENCE

Scheffe

Language	N	Subset					
		1	2	3	4	5	6
Xhosa	17265	115.44					
Afr	6786	115.64	115.64				
Ndebele	2002	116.69	116.69	116.69			
Zulu	19472		117.04	117.04	117.04		
Sepedi	23825		117.05	117.05	117.05		
Swati	3628			117.30	117.30	117.30	
Tsonga	10857			117.82	117.82	117.82	117.82
Eng	2261				118.43	118.43	118.43
Sotho	7517					118.54	118.54
Venda	5042						118.84
Tswana	6687						118.86
Sig.		.214	.086	.385	.097	.237	.528

Means for groups in homogeneous subsets are displayed.
Based on observed means.
The error term is Mean Square(Error) = 315.315.
a. Uses Harmonic Mean Sample Size = 5265.566.
b. Alpha = .05.

AGREEABLENESS

Scheffe

Language	N	Subset				
		1	2	3	4	5
Xhosa	17265	131.30				
Afr	6786	132.51	132.51			
Sepedi	23825	132.57	132.57			
Ndebele	2002	133.24	133.24			
Zulu	19472		133.83	133.83		
Sotho	7517		134.28	134.28	134.28	
Tswana	6687		134.33	134.33	134.33	
Swati	3628			135.52	135.52	
Eng	2261				136.09	136.09
Tsonga	10857				136.23	136.23
Venda	5042					137.60
Sig.		.091	.162	.255	.085	.448

Means for groups in homogeneous subsets are displayed.
Based on observed means.
The error term is Mean Square(Error) = 607.683.
a. Uses Harmonic Mean Sample Size = 5265.566.
b. Alpha = .05.

SOCIALDESIRABILITY

Scheffe

Language	N	Subset				
		1	2	3	4	5
Afr	6786	38.97				
Eng	2261	39.12				
Tswana	6687		42.10			
Sotho	7517		42.43			
Xhosa	17265		42.61			
Zulu	19472			43.53		
Ndebele	2002			43.95	43.95	
Sepedi	23825				44.37	
Swati	3628				44.47	
Tsonga	10857					45.39
Venda	5042					45.47
Sig.		1.000	.340	.682	.332	1.000

Means for groups in homogeneous subsets are displayed.
Based on observed means.
The error term is Mean Square(Error) = 62.307.
a. Uses Harmonic Mean Sample Size = 5265.566.
b. Alpha = .05.

Appendix B: Mean Differences between the Levels of English Proficiency

T-Test

Language = AFRIKAANS

Group Statistics[a]

	English_Proficiency	N	Mean	Std. Deviation	Std. Error Mean
EXTRAVERSION	Lower Proficiency Score	493	118.31	20.435	.920
	Higher Proficiency Score	4410	120.12	17.458	.263
NEUROTICISM	Lower Proficiency Score	493	83.27	22.559	1.016
	Higher Proficiency Score	4410	75.46	19.583	.295
CONSCIENTIOUSNESS	Lower Proficiency Score	493	164.13	25.704	1.158
	Higher Proficiency Score	4410	165.96	21.389	.322
OPENTOEXPERIENCE	Lower Proficiency Score	493	114.97	18.975	.855
	Higher Proficiency Score	4410	115.57	14.930	.225
AGREEABLENESS	Lower Proficiency Score	493	132.21	23.772	1.071
	Higher Proficiency Score	4410	132.06	18.800	.283
SOCIALDESIRABILITY	Lower Proficiency Score	493	41.37	7.653	.345
	Higher Proficiency Score	4410	38.07	7.005	.105

a. Language = Afr

Independent Samples Test[a]

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
EXTRAVERSION	Equal variances assumed	9.859	.002	-2.142	4901	.032	-1.809
	Equal variances not assumed			-1.890	575.136	.059	-1.809
NEUROTICISM	Equal variances assumed	17.281	.000	8.262	4901	.000	7.809
	Equal variances not assumed			7.381	577.922	.000	7.809
CONSCIENTIOUSNESS	Equal variances assumed	14.268	.000	-1.764	4901	.078	-1.832
	Equal variances not assumed			-1.524	570.739	.128	-1.832
OPENTOEXPERIENCE	Equal variances assumed	23.609	.000	-.829	4901	.407	-.605
	Equal variances not assumed			-.685	562.157	.494	-.605
AGREEABLENESS	Equal variances assumed	14.818	.000	.164	4901	.869	.151
	Equal variances not assumed			.136	562.898	.892	.151
SOCIALDESIRABILITY	Equal variances assumed	4.038	.045	9.824	4901	.000	3.300

Independent Samples Test[a]

		t-test for Equality of Means		
		Std. Error Difference	95% Confidence Interval of the Difference	
			Lower	Upper
EXTRAVERSION	Equal variances assumed	.844	-3.464	-.154
	Equal variances not assumed	.957	-3.689	.071
NEUROTICISM	Equal variances assumed	.945	5.956	9.662
	Equal variances not assumed	1.058	5.731	9.887
CONSCIENTIOUSNESS	Equal variances assumed	1.038	-3.867	.204
	Equal variances not assumed	1.202	-4.192	.529
OPENTOEXPERIENCE	Equal variances assumed	.731	-2.038	.827
	Equal variances not assumed	.884	-2.341	1.130
AGREEABLENESS	Equal variances assumed	.919	-1.651	1.953
	Equal variances not assumed	1.107	-2.024	2.326
SOCIALDESIRABILITY	Equal variances assumed	.336	2.641	3.958

Independent Samples Test[a]

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
SOCIALDESIRABILITY	Equal variances not assumed			9.154	587.907	.000	3.300

Independent Samples Test[a]

		t-test for Equality of Means		
		Std. Error Difference	95% Confidence Interval of the Difference	
			Lower	Upper
SOCIALDESIRABILITY	Equal variances not assumed	.360	2.592	4.007

a. Language = Afr

Language = ENGLISH

Group Statistics[a]

	English_Proficiency	N	Mean	Std. Deviation	Std. Error Mean
EXTRAVERSION	Lower Proficiency Score	124	117.44	19.279	1.731
	Higher Proficiency Score	1869	124.16	16.914	.391
NEUROTICISM	Lower Proficiency Score	124	82.90	22.198	1.993
	Higher Proficiency Score	1869	69.87	18.879	.437
CONSCIENTIOUSNESS	Lower Proficiency Score	124	161.45	28.279	2.539
	Higher Proficiency Score	1869	169.16	21.205	.490
OPENTOEXPERIENCE	Lower Proficiency Score	124	112.52	24.179	2.171
	Higher Proficiency Score	1869	118.89	14.887	.344
AGREEABLENESS	Lower Proficiency Score	124	129.75	31.343	2.815
	Higher Proficiency Score	1869	136.65	18.862	.436
SOCIALDESIRABILITY	Lower Proficiency Score	124	43.59	8.422	.756
	Higher Proficiency Score	1869	38.49	7.262	.168

a. Language = Eng

Independent Samples Test[a]

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
EXTRAVERSION	Equal variances assumed	2.345	.126	-4.249	1991	.000	-6.726
	Equal variances not assumed			-3.789	135.860	.000	-6.726
NEUROTICISM	Equal variances assumed	5.542	.019	7.359	1991	.000	13.036
	Equal variances not assumed			6.388	135.068	.000	13.036
CONSCIENTIOUSNESS	Equal variances assumed	4.826	.028	-3.827	1991	.000	-7.704
	Equal variances not assumed			-2.979	132.336	.003	-7.704
OPENTOEXPERIENCE	Equal variances assumed	25.147	.000	-4.392	1991	.000	-6.363
	Equal variances not assumed			-2.894	129.259	.004	-6.363
AGREEABLENESS	Equal variances assumed	30.030	.000	-3.744	1991	.000	-6.896
	Equal variances not assumed			-2.421	128.977	.017	-6.896
SOCIALDESIRABILITY	Equal variances assumed	3.093	.079	7.488	1991	.000	5.096

Independent Samples Test[a]

		t-test for Equality of Means		
		Std. Error Difference	95% Confidence Interval of the Difference	
			Lower	Upper
EXTRAVERSION	Equal variances assumed	1.583	-9.830	-3.621
	Equal variances not assumed	1.775	-10.236	-3.216
NEUROTICISM	Equal variances assumed	1.771	9.562	16.510
	Equal variances not assumed	2.041	9.000	17.072
CONSCIENTIOUSNESS	Equal variances assumed	2.013	-11.652	-3.756
	Equal variances not assumed	2.586	-12.820	-2.588
OPENTOEXPERIENCE	Equal variances assumed	1.449	-9.204	-3.522
	Equal variances not assumed	2.198	-10.713	-2.013
AGREEABLENESS	Equal variances assumed	1.842	-10.508	-3.284
	Equal variances not assumed	2.848	-12.531	-1.260
SOCIALDESIRABILITY	Equal variances assumed	.681	3.762	6.431

Independent Samples Test[a]

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
SOCIALDESIRABILITY	Equal variances not assumed			6.578	135.414	.000	5.096

Independent Samples Test[a]

		t-test for Equality of Means		
		Std. Error Difference	95% Confidence Interval of the Difference	
			Lower	Upper
SOCIALDESIRABILITY	Equal variances not assumed	.775	3.564	6.629

a. Language = Eng

Language = NDEBELE

Group Statistics[a]

	English_Proficiency	N	Mean	Std. Deviation	Std. Error Mean
EXTRAVERSION	Lower Proficiency Score	717	121.39	17.229	.643
	Higher Proficiency Score	508	122.23	17.906	.794
NEUROTICISM	Lower Proficiency Score	717	83.24	18.758	.701
	Higher Proficiency Score	508	74.03	17.455	.774
CONSCIENTIOUSNESS	Lower Proficiency Score	717	162.79	22.398	.836
	Higher Proficiency Score	508	166.95	19.931	.884
OPENTOEXPERIENCE	Lower Proficiency Score	717	114.59	21.320	.796
	Higher Proficiency Score	508	119.11	13.822	.613
AGREEABLENESS	Lower Proficiency Score	717	130.67	28.759	1.074
	Higher Proficiency Score	508	135.15	16.445	.730
SOCIALDESIRABILITY	Lower Proficiency Score	717	45.33	7.793	.291
	Higher Proficiency Score	508	41.74	7.898	.350

a. Language = Ndebele

Independent Samples Test[a]

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
EXTRAVERSION	Equal variances assumed	1.817	.178	-.831	1223	.406	-.844
	Equal variances not assumed			-.825	1065.625	.409	-.844
NEUROTICISM	Equal variances assumed	1.777	.183	8.707	1223	.000	9.205
	Equal variances not assumed			8.815	1137.074	.000	9.205
CONSCIENTIOUSNESS	Equal variances assumed	.922	.337	-3.347	1223	.001	-4.156
	Equal variances not assumed			-3.414	1161.634	.001	-4.156
OPENTOEXPERIENCE	Equal variances assumed	16.457	.000	-4.199	1223	.000	-4.525
	Equal variances not assumed			-4.503	1214.079	.000	-4.525
AGREEABLENESS	Equal variances assumed	21.052	.000	-3.160	1223	.002	-4.475
	Equal variances not assumed			-3.447	1175.748	.001	-4.475
SOCIALDESIRABILITY	Equal variances assumed	1.192	.275	7.894	1223	.000	3.588

Independent Samples Test[a]

		t-test for Equality of Means		
		Std. Error Difference	95% Confidence Interval of the Difference	
			Lower	Upper
EXTRAVERSION	Equal variances assumed	1.016	-2.836	1.149
	Equal variances not assumed	1.022	-2.850	1.162
NEUROTICISM	Equal variances assumed	1.057	7.131	11.279
	Equal variances not assumed	1.044	7.156	11.254
CONSCIENTIOUSNESS	Equal variances assumed	1.242	-6.592	-1.720
	Equal variances not assumed	1.217	-6.544	-1.768
OPENTOEXPERIENCE	Equal variances assumed	1.078	-6.639	-2.411
	Equal variances not assumed	1.005	-6.497	-2.553
AGREEABLENESS	Equal variances assumed	1.416	-7.254	-1.697
	Equal variances not assumed	1.298	-7.023	-1.928
SOCIALDESIRABILITY	Equal variances assumed	.454	2.696	4.480

Independent Samples Test[a]

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
SOCIALDESIRABILITY	Equal variances not assumed			7.876	1082.848	.000	3.588

Independent Samples Test[a]

		t-test for Equality of Means		
		Std. Error Difference	95% Confidence Interval of the Difference	
			Lower	Upper
SOCIALDESIRABILITY	Equal variances not assumed	.456	2.694	4.482

a. Language = Ndebele

Language = SEPEDI

Group Statistics[a]

	English_Proficiency	N	Mean	Std. Deviation	Std. Error Mean
EXTRAVERSION	Lower Proficiency Score	9840	119.83	16.987	.171
	Higher Proficiency Score	4944	120.12	16.060	.228
NEUROTICISM	Lower Proficiency Score	9840	83.76	18.961	.191
	Higher Proficiency Score	4944	72.65	17.071	.243
CONSCIENTIOUSNESS	Lower Proficiency Score	9840	161.29	23.711	.239
	Higher Proficiency Score	4944	169.42	19.404	.276
OPENTOEXPERIENCE	Lower Proficiency Score	9840	114.52	21.842	.220
	Higher Proficiency Score	4944	119.74	15.764	.224
AGREEABLENESS	Lower Proficiency Score	9840	129.21	32.301	.326
	Higher Proficiency Score	4944	134.91	22.780	.324
SOCIALDESIRABILITY	Lower Proficiency Score	9840	44.88	8.029	.081
	Higher Proficiency Score	4944	42.50	7.818	.111

a. Language = Sepedi

Independent Samples Test[a]

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
EXTRAVERSION	Equal variances assumed	2.618	.106	-.998	14782	.318	-.290
	Equal variances not assumed			-1.017	10409.411	.309	-.290
NEUROTICISM	Equal variances assumed	43.102	.000	34.746	14782	.000	11.115
	Equal variances not assumed			35.971	10871.184	.000	11.115
CONSCIENTIOUSNESS	Equal variances assumed	83.342	.000	-20.858	14782	.000	-8.131
	Equal variances not assumed			-22.272	11804.046	.000	-8.131
OPENTOEXPERIENCE	Equal variances assumed	187.396	.000	-14.957	14782	.000	-5.219
	Equal variances not assumed			-16.607	13000.424	.000	-5.219
AGREEABLENESS	Equal variances assumed	196.151	.000	-11.105	14782	.000	-5.703
	Equal variances not assumed			-12.416	13204.465	.000	-5.703
SOCIALDESIRABILITY	Equal variances assumed	.000	.999	17.188	14782	.000	2.385

Independent Samples Test[a]

		t-test for Equality of Means		
		Std. Error Difference	95% Confidence Interval of the Difference	
			Lower	Upper
EXTRAVERSION	Equal variances assumed	.291	-.860	.280
	Equal variances not assumed	.285	-.850	.269
NEUROTICISM	Equal variances assumed	.320	10.488	11.742
	Equal variances not assumed	.309	10.510	11.721
CONSCIENTIOUSNESS	Equal variances assumed	.390	-8.896	-7.367
	Equal variances not assumed	.365	-8.847	-7.416
OPENTOEXPERIENCE	Equal variances assumed	.349	-5.903	-4.535
	Equal variances not assumed	.314	-5.835	-4.603
AGREEABLENESS	Equal variances assumed	.514	-6.710	-4.697
	Equal variances not assumed	.459	-6.604	-4.803
SOCIALDESIRABILITY	Equal variances assumed	.139	2.113	2.657

Independent Samples Test[a]

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
SOCIALDESIRABILITY	Equal variances not assumed			17.340	10138.915	.000	2.385

Independent Samples Test[a]

		t-test for Equality of Means		
		Std. Error Difference	95% Confidence Interval of the Difference	
			Lower	Upper
SOCIALDESIRABILITY	Equal variances not assumed	.138	2.115	2.654

a. Language = Sepedi

Language = SOTHO

Group Statistics[a]

	English_Proficiency	N	Mean	Std. Deviation	Std. Error Mean
EXTRAVERSION	Lower Proficiency Score	2119	120.25	18.543	.403
	Higher Proficiency Score	2475	121.87	17.569	.353
NEUROTICISM	Lower Proficiency Score	2119	82.53	20.170	.438
	Higher Proficiency Score	2475	72.91	18.535	.373
CONSCIENTIOUSNESS	Lower Proficiency Score	2119	162.05	23.849	.518
	Higher Proficiency Score	2475	168.24	20.263	.407
OPENTOEXPERIENCE	Lower Proficiency Score	2119	116.12	19.334	.420
	Higher Proficiency Score	2475	120.37	14.493	.291
AGREEABLENESS	Lower Proficiency Score	2119	132.82	25.447	.553
	Higher Proficiency Score	2475	134.77	19.355	.389
SOCIALDESIRABILITY	Lower Proficiency Score	2119	44.16	8.093	.176
	Higher Proficiency Score	2475	40.47	7.695	.155

a. Language = Sotho

Independent Samples Test[a]

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
EXTRAVERSION	Equal variances assumed	2.131	.144	-3.037	4592	.002	-1.620
	Equal variances not assumed			-3.024	4399.879	.003	-1.620
NEUROTICISM	Equal variances assumed	12.513	.000	16.837	4592	.000	9.621
	Equal variances not assumed			16.727	4343.776	.000	9.621
CONSCIENTIOUSNESS	Equal variances assumed	15.976	.000	-9.520	4592	.000	-6.196
	Equal variances not assumed			-9.402	4178.575	.000	-6.196
OPENTOEXPERIENCE	Equal variances assumed	69.460	.000	-8.485	4592	.000	-4.244
	Equal variances not assumed			-8.303	3877.861	.000	-4.244
AGREEABLENESS	Equal variances assumed	44.504	.000	-2.946	4592	.003	-1.951
	Equal variances not assumed			-2.886	3913.758	.004	-1.951
SOCIALDESIRABILITY	Equal variances assumed	1.570	.210	15.827	4592	.000	3.692

Independent Samples Test[a]

		t-test for Equality of Means		
		Std. Error Difference	95% Confidence Interval of the Difference	
			Lower	Upper
EXTRAVERSION	Equal variances assumed	.533	-2.666	-.574
	Equal variances not assumed	.536	-2.670	-.570
NEUROTICISM	Equal variances assumed	.571	8.500	10.741
	Equal variances not assumed	.575	8.493	10.748
CONSCIENTIOUSNESS	Equal variances assumed	.651	-7.472	-4.920
	Equal variances not assumed	.659	-7.488	-4.904
OPENTOEXPERIENCE	Equal variances assumed	.500	-5.225	-3.263
	Equal variances not assumed	.511	-5.246	-3.242
AGREEABLENESS	Equal variances assumed	.662	-3.249	-.652
	Equal variances not assumed	.676	-3.276	-.625
SOCIALDESIRABILITY	Equal variances assumed	.233	3.234	4.149

Independent Samples Test[a]

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
SOCIALDESIRABILITY	Equal variances not assumed			15.766	4406.083	.000	3.692

Independent Samples Test[a]

		t-test for Equality of Means		
		Std. Error Difference	95% Confidence Interval of the Difference	
			Lower	Upper
SOCIALDESIRABILITY	Equal variances not assumed	.234	3.233	4.151

a. Language = Sotho

Language = SWATI

Group Statistics[a]

	English_Proficiency	N	Mean	Std. Deviation	Std. Error Mean
EXTRAVERSION	Lower Proficiency Score	1316	120.55	17.351	.478
	Higher Proficiency Score	779	119.27	16.621	.596
NEUROTICISM	Lower Proficiency Score	1316	83.33	19.128	.527
	Higher Proficiency Score	779	71.95	17.659	.633
CONSCIENTIOUSNESS	Lower Proficiency Score	1316	164.92	21.336	.588
	Higher Proficiency Score	779	168.20	19.145	.686
OPENTOEXPERIENCE	Lower Proficiency Score	1316	115.87	18.735	.516
	Higher Proficiency Score	779	117.93	15.275	.547
AGREEABLENESS	Lower Proficiency Score	1316	134.87	23.644	.652
	Higher Proficiency Score	779	134.03	21.631	.775
SOCIALDESIRABILITY	Lower Proficiency Score	1316	45.74	7.516	.207
	Higher Proficiency Score	779	41.82	7.534	.270

a. Language = Swati

Independent Samples Test[a]

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
EXTRAVERSION	Equal variances assumed	1.443	.230	1.654	2093	.098	1.277
	Equal variances not assumed			1.672	1689.541	.095	1.277
NEUROTICISM	Equal variances assumed	3.523	.061	13.545	2093	.000	11.387
	Equal variances not assumed			13.825	1738.015	.000	11.387
CONSCIENTIOUSNESS	Equal variances assumed	2.434	.119	-3.534	2093	.000	-3.283
	Equal variances not assumed			-3.634	1774.859	.000	-3.283
OPENTOEXPERIENCE	Equal variances assumed	9.726	.002	-2.596	2093	.010	-2.057
	Equal variances not assumed			-2.733	1892.638	.006	-2.057
AGREEABLENESS	Equal variances assumed	3.380	.066	.810	2093	.418	.839
	Equal variances not assumed			.829	1749.804	.407	.839
SOCIALDESIRABILITY	Equal variances assumed	.147	.702	11.549	2093	.000	3.927

Independent Samples Test[a]

		t-test for Equality of Means		
		Std. Error Difference	95% Confidence Interval of the Difference	
			Lower	Upper
EXTRAVERSION	Equal variances assumed	.772	-.237	2.792
	Equal variances not assumed	.764	-.221	2.775
NEUROTICISM	Equal variances assumed	.841	9.738	13.035
	Equal variances not assumed	.824	9.771	13.002
CONSCIENTIOUSNESS	Equal variances assumed	.929	-5.105	-1.462
	Equal variances not assumed	.904	-5.056	-1.511
OPENTOEXPERIENCE	Equal variances assumed	.792	-3.611	-.503
	Equal variances not assumed	.752	-3.533	-.581
AGREEABLENESS	Equal variances assumed	1.036	-1.192	2.871
	Equal variances not assumed	1.013	-1.147	2.825
SOCIALDESIRABILITY	Equal variances assumed	.340	3.261	4.594

Independent Samples Test[a]

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
SOCIALDESIRABILITY	Equal variances not assumed			11.542	1630.002	.000	3.927

Independent Samples Test[a]

		t-test for Equality of Means		
		Std. Error Difference	95% Confidence Interval of the Difference	
			Lower	Upper
SOCIALDESIRABILITY	Equal variances not assumed	.340	3.260	4.595

a. Language = Swati

Language = TSONGA

Group Statistics[a]

	English_Proficiency	N	Mean	Std. Deviation	Std. Error Mean
EXTRAVERSION	Lower Proficiency Score	4617	120.73	17.270	.254
	Higher Proficiency Score	2228	121.68	16.634	.352
NEUROTICISM	Lower Proficiency Score	4617	80.68	18.965	.279
	Higher Proficiency Score	2228	70.16	17.621	.373
CONSCIENTIOUSNESS	Lower Proficiency Score	4617	164.86	23.306	.343
	Higher Proficiency Score	2228	172.48	19.394	.411
OPENTOEXPERIENCE	Lower Proficiency Score	4617	115.34	21.169	.312
	Higher Proficiency Score	2228	120.72	15.527	.329
AGREEABLENESS	Lower Proficiency Score	4617	133.46	29.207	.430
	Higher Proficiency Score	2228	138.16	20.181	.428
SOCIALDESIRABILITY	Lower Proficiency Score	4617	45.73	7.993	.118
	Higher Proficiency Score	2228	44.00	8.046	.170

a. Language = Tsonga

Independent Samples Test[a]

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
EXTRAVERSION	Equal variances assumed	1.768	.184	-2.162	6843	.031	-.952
	Equal variances not assumed			-2.191	4552.286	.029	-.952
NEUROTICISM	Equal variances assumed	7.127	.008	21.991	6843	.000	10.516
	Equal variances not assumed			22.562	4703.672	.000	10.516
CONSCIENTIOUSNESS	Equal variances assumed	30.379	.000	-13.360	6843	.000	-7.619
	Equal variances not assumed			-14.236	5195.101	.000	-7.619
OPENTOEXPERIENCE	Equal variances assumed	68.012	.000	-10.689	6843	.000	-5.380
	Equal variances not assumed			-11.875	5772.944	.000	-5.380
AGREEABLENESS	Equal variances assumed	77.847	.000	-6.847	6843	.000	-4.699
	Equal variances not assumed			-7.752	6031.281	.000	-4.699
SOCIALDESIRABILITY	Equal variances assumed	1.424	.233	8.356	6843	.000	1.727

Independent Samples Test[a]

		t-test for Equality of Means		
		Std. Error Difference	95% Confidence Interval of the Difference	
			Lower	Upper
EXTRAVERSION	Equal variances assumed	.440	-1.815	-.089
	Equal variances not assumed	.434	-1.804	-.100
NEUROTICISM	Equal variances assumed	.478	9.579	11.454
	Equal variances not assumed	.466	9.603	11.430
CONSCIENTIOUSNESS	Equal variances assumed	.570	-8.737	-6.501
	Equal variances not assumed	.535	-8.669	-6.570
OPENTOEXPERIENCE	Equal variances assumed	.503	-6.367	-4.393
	Equal variances not assumed	.453	-6.268	-4.492
AGREEABLENESS	Equal variances assumed	.686	-6.045	-3.354
	Equal variances not assumed	.606	-5.888	-3.511
SOCIALDESIRABILITY	Equal variances assumed	.207	1.321	2.132

Independent Samples Test[a]

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
SOCIALDESIRABILITY	Equal variances not assumed			8.336	4374.379	.000	1.727

Independent Samples Test[a]

		t-test for Equality of Means		
		Std. Error Difference	95% Confidence Interval of the Difference	
			Lower	Upper
SOCIALDESIRABILITY	Equal variances not assumed	.207	1.320	2.133

a. Language = Tsonga

Language = TSWANA

Group Statistics[a]

	English_Proficiency	N	Mean	Std. Deviation	Std. Error Mean
EXTRAVERSION	Lower Proficiency Score	1430	119.94	18.928	.501
	Higher Proficiency Score	2694	120.88	16.998	.327
NEUROTICISM	Lower Proficiency Score	1430	83.85	20.928	.553
	Higher Proficiency Score	2694	74.39	18.124	.349
CONSCIENTIOUSNESS	Lower Proficiency Score	1430	162.51	24.076	.637
	Higher Proficiency Score	2694	167.87	19.774	.381
OPENTOEXPERIENCE	Lower Proficiency Score	1430	117.19	19.327	.511
	Higher Proficiency Score	2694	120.21	14.170	.273
AGREEABLENESS	Lower Proficiency Score	1430	133.58	26.607	.704
	Higher Proficiency Score	2694	134.52	18.047	.348
SOCIALDESIRABILITY	Lower Proficiency Score	1430	44.25	8.491	.225
	Higher Proficiency Score	2694	40.21	7.747	.149

a. Language = Tswana

Independent Samples Test[a]

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
EXTRAVERSION	Equal variances assumed	9.824	.002	-1.632	4122	.103	-.944
	Equal variances not assumed			-1.579	2655.959	.115	-.944
NEUROTICISM	Equal variances assumed	35.212	.000	15.114	4122	.000	9.466
	Equal variances not assumed			14.466	2576.526	.000	9.466
CONSCIENTIOUSNESS	Equal variances assumed	22.686	.000	-7.669	4122	.000	-5.361
	Equal variances not assumed			-7.225	2467.644	.000	-5.361
OPENTOEXPERIENCE	Equal variances assumed	47.509	.000	-5.701	4122	.000	-3.012
	Equal variances not assumed			-5.197	2263.063	.000	-3.012
AGREEABLENESS	Equal variances assumed	84.565	.000	-1.347	4122	.178	-.943
	Equal variances not assumed			-1.202	2144.279	.229	-.943
SOCIALDESIRABILITY	Equal variances assumed	10.817	.001	15.400	4122	.000	4.037

Independent Samples Test[a]

		t-test for Equality of Means		
		Std. Error Difference	95% Confidence Interval of the Difference	
			Lower	Upper
EXTRAVERSION	Equal variances assumed	.579	-2.079	.190
	Equal variances not assumed	.598	-2.117	.229
NEUROTICISM	Equal variances assumed	.626	8.238	10.694
	Equal variances not assumed	.654	8.183	10.750
CONSCIENTIOUSNESS	Equal variances assumed	.699	-6.731	-3.990
	Equal variances not assumed	.742	-6.815	-3.906
OPENTOEXPERIENCE	Equal variances assumed	.528	-4.047	-1.976
	Equal variances not assumed	.579	-4.148	-1.875
AGREEABLENESS	Equal variances assumed	.700	-2.316	.430
	Equal variances not assumed	.785	-2.483	.596
SOCIALDESIRABILITY	Equal variances assumed	.262	3.523	4.551

Independent Samples Test[a]

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
SOCIALDESIRABILITY	Equal variances not assumed			14.974	2692.066	.000	4.037

Independent Samples Test[a]

		t-test for Equality of Means		
		Std. Error Difference	95% Confidence Interval of the Difference	
			Lower	Upper
SOCIALDESIRABILITY	Equal variances not assumed	.270	3.509	4.566

a. Language = Tswana

Language = Venda

Group Statistics[a]

	English_Proficiency	N	Mean	Std. Deviation	Std. Error Mean
EXTRAVERSION	Lower Proficiency Score	2048	122.98	17.886	.395
	Higher Proficiency Score	1113	123.05	16.047	.481
NEUROTICISM	Lower Proficiency Score	2048	83.84	19.327	.427
	Higher Proficiency Score	1113	70.94	17.519	.525
CONSCIENTIOUSNESS	Lower Proficiency Score	2048	163.83	23.834	.527
	Higher Proficiency Score	1113	172.46	19.575	.587
OPENTOEXPERIENCE	Lower Proficiency Score	2048	116.28	20.381	.450
	Higher Proficiency Score	1113	121.65	14.854	.445
AGREEABLENESS	Lower Proficiency Score	2048	134.30	27.845	.615
	Higher Proficiency Score	1113	139.66	18.887	.566
SOCIALDESIRABILITY	Lower Proficiency Score	2048	46.22	7.934	.175
	Higher Proficiency Score	1113	43.23	8.147	.244

a. Language = Venda

Independent Samples Test[a]

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
EXTRAVERSION	Equal variances assumed	11.295	.001	-.116	3159	.907	-.075
	Equal variances not assumed			-.120	2501.122	.904	-.075
NEUROTICISM	Equal variances assumed	12.472	.000	18.513	3159	.000	12.899
	Equal variances not assumed			19.057	2480.026	.000	12.899
CONSCIENTIOUSNESS	Equal variances assumed	33.661	.000	-10.340	3159	.000	-8.636
	Equal variances not assumed			-10.953	2680.416	.000	-8.636
OPENTOEXPERIENCE	Equal variances assumed	55.259	.000	-7.752	3159	.000	-5.376
	Equal variances not assumed			-8.490	2901.539	.000	-5.376
AGREEABLENESS	Equal variances assumed	50.148	.000	-5.742	3159	.000	-5.359
	Equal variances not assumed			-6.409	3009.545	.000	-5.359
SOCIALDESIRABILITY	Equal variances assumed	2.763	.097	10.016	3159	.000	2.988

Independent Samples Test[a]

		t-test for Equality of Means		
		Std. Error Difference	95% Confidence Interval of the Difference	
			Lower	Upper
EXTRAVERSION	Equal variances assumed	.643	-1.335	1.185
	Equal variances not assumed	.623	-1.296	1.146
NEUROTICISM	Equal variances assumed	.697	11.533	14.265
	Equal variances not assumed	.677	11.572	14.226
CONSCIENTIOUSNESS	Equal variances assumed	.835	-10.274	-6.998
	Equal variances not assumed	.788	-10.182	-7.090
OPENTOEXPERIENCE	Equal variances assumed	.694	-6.736	-4.017
	Equal variances not assumed	.633	-6.618	-4.135
AGREEABLENESS	Equal variances assumed	.933	-7.189	-3.529
	Equal variances not assumed	.836	-6.998	-3.719
SOCIALDESIRABILITY	Equal variances assumed	.298	2.403	3.573

Independent Samples Test[a]

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
SOCIALDESIRABILITY	Equal variances not assumed			9.938	2231.646	.000	2.988

Independent Samples Test[a]

		t-test for Equality of Means		
		Std. Error Difference	95% Confidence Interval of the Difference	
			Lower	Upper
SOCIALDESIRABILITY	Equal variances not assumed	.301	2.398	3.577

a. Language = Venda

Language = XHOSA

Group Statistics[a]

	English_Proficiency	N	Mean	Std. Deviation	Std. Error Mean
EXTRAVERSION	Lower Proficiency Score	4885	119.83	19.329	.277
	Higher Proficiency Score	5428	119.24	17.118	.232
NEUROTICISM	Lower Proficiency Score	4885	84.67	20.117	.288
	Higher Proficiency Score	5428	75.55	17.262	.234
CONSCIENTIOUSNESS	Lower Proficiency Score	4885	159.49	24.207	.346
	Higher Proficiency Score	5428	163.90	20.040	.272
OPENTOEXPERIENCE	Lower Proficiency Score	4885	113.68	22.080	.316
	Higher Proficiency Score	5428	116.38	15.534	.211
AGREEABLENESS	Lower Proficiency Score	4885	129.09	32.817	.470
	Higher Proficiency Score	5428	131.81	22.151	.301
SOCIALDESIRABILITY	Lower Proficiency Score	4885	43.95	8.210	.117
	Higher Proficiency Score	5428	40.78	7.708	.105

a. Language = Xhosa

Independent Samples Test[a]

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
EXTRAVERSION	Equal variances assumed	45.718	.000	1.669	10311	.095	.599
	Equal variances not assumed			1.658	9812.587	.097	.599
NEUROTICISM	Equal variances assumed	87.266	.000	24.792	10311	.000	9.128
	Equal variances not assumed			24.595	9677.128	.000	9.128
CONSCIENTIOUSNESS	Equal variances assumed	47.225	.000	-10.127	10311	.000	-4.416
	Equal variances not assumed			-10.028	9510.597	.000	-4.416
OPENTOEXPERIENCE	Equal variances assumed	172.521	.000	-7.241	10311	.000	-2.702
	Equal variances not assumed			-7.113	8658.298	.000	-2.702
AGREEABLENESS	Equal variances assumed	221.748	.000	-4.990	10311	.000	-2.728
	Equal variances not assumed			-4.893	8434.099	.000	-2.728
SOCIALDESIRABILITY	Equal variances assumed	7.306	.007	20.244	10311	.000	3.174

Independent Samples Test[a]

		t-test for Equality of Means		
		Std. Error Difference	95% Confidence Interval of the Difference	
			Lower	Upper
EXTRAVERSION	Equal variances assumed	.359	-.105	1.302
	Equal variances not assumed	.361	-.109	1.307
NEUROTICISM	Equal variances assumed	.368	8.406	9.849
	Equal variances not assumed	.371	8.400	9.855
CONSCIENTIOUSNESS	Equal variances assumed	.436	-5.271	-3.561
	Equal variances not assumed	.440	-5.279	-3.553
OPENTOEXPERIENCE	Equal variances assumed	.373	-3.433	-1.970
	Equal variances not assumed	.380	-3.446	-1.957
AGREEABLENESS	Equal variances assumed	.547	-3.799	-1.656
	Equal variances not assumed	.558	-3.821	-1.635
SOCIALDESIRABILITY	Equal variances assumed	.157	2.867	3.481

Independent Samples Test[a]

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
SOCIALDESIRABILITY	Equal variances not assumed			20.177	10027.563	.000	3.174

Independent Samples Test[a]

		t-test for Equality of Means		
		Std. Error Difference	95% Confidence Interval of the Difference	
			Lower	Upper
SOCIALDESIRABILITY	Equal variances not assumed	.157	2.866	3.482

a. Language = Xhosa

Language = ZULU

Group Statistics[a]

	English_Proficiency	N	Mean	Std. Deviation	Std. Error Mean
EXTRAVERSION	Lower Proficiency Score	6381	120.33	17.886	.224
	Higher Proficiency Score	5254	121.37	16.915	.233
NEUROTICISM	Lower Proficiency Score	6381	84.11	19.301	.242
	Higher Proficiency Score	5254	73.41	16.986	.234
CONSCIENTIOUSNESS	Lower Proficiency Score	6381	162.34	22.437	.281
	Higher Proficiency Score	5254	168.12	19.577	.270
OPENTOEXPERIENCE	Lower Proficiency Score	6381	115.60	19.287	.241
	Higher Proficiency Score	5254	118.31	14.432	.199
AGREEABLENESS	Lower Proficiency Score	6381	132.04	26.248	.329
	Higher Proficiency Score	5254	134.67	18.647	.257
SOCIALDESIRABILITY	Lower Proficiency Score	6381	44.75	7.790	.098
	Higher Proficiency Score	5254	41.44	7.775	.107

a. Language = Zulu

Independent Samples Test[a]

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
EXTRAVERSION	Equal variances assumed	4.304	.038	-3.210	11633	.001	-1.044
	Equal variances not assumed			-3.227	11413.043	.001	-1.044
NEUROTICISM	Equal variances assumed	56.578	.000	31.404	11633	.000	10.701
	Equal variances not assumed			31.793	11581.646	.000	10.701
CONSCIENTIOUSNESS	Equal variances assumed	24.373	.000	-14.648	11633	.000	-5.783
	Equal variances not assumed			-14.842	11593.968	.000	-5.783
OPENTOEXPERIENCE	Equal variances assumed	128.458	.000	-8.443	11633	.000	-2.716
	Equal variances not assumed			-8.677	11531.047	.000	-2.716
AGREEABLENESS	Equal variances assumed	133.740	.000	-6.106	11633	.000	-2.631
	Equal variances not assumed			-6.304	11397.452	.000	-2.631
SOCIALDESIRABILITY	Equal variances assumed	2.973	.085	22.875	11633	.000	3.317

Independent Samples Test[a]

		t-test for Equality of Means		
		Std. Error Difference	95% Confidence Interval of the Difference	
			Lower	Upper
EXTRAVERSION	Equal variances assumed	.325	-1.681	-.406
	Equal variances not assumed	.323	-1.678	-.410
NEUROTICISM	Equal variances assumed	.341	10.033	11.369
	Equal variances not assumed	.337	10.041	11.361
CONSCIENTIOUSNESS	Equal variances assumed	.395	-6.557	-5.010
	Equal variances not assumed	.390	-6.547	-5.020
OPENTOEXPERIENCE	Equal variances assumed	.322	-3.346	-2.085
	Equal variances not assumed	.313	-3.329	-2.102
AGREEABLENESS	Equal variances assumed	.431	-3.475	-1.786
	Equal variances not assumed	.417	-3.449	-1.813
SOCIALDESIRABILITY	Equal variances assumed	.145	3.032	3.601

Independent Samples Test[a]

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
SOCIALDESIRABILITY	Equal variances not assumed			22.879	11216.366	.000	3.317

Independent Samples Test[a]

		t-test for Equality of Means		
		Std. Error Difference	95% Confidence Interval of the Difference	
			Lower	Upper
SOCIALDESIRABILITY	Equal variances not assumed	.145	3.033	3.601

a. Language = Zulu