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The applicability of the NEO-PI-R and the CPAI-2 in a South African context.

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ABSTRACT

The trait approach to personality is one of the most influential theories in personality psychology and underlies the development of most objective personality instruments. However, considerable debate exists around the number of traits that adequately describe human personality as well as which traits adequately describe personality universally. Evidence seems to suggest that personality is adequately described by five factors, and currently the Five Factor Model (FFM) of personality is widely accepted within personality psychology. Other evidence suggests that, while applicable, the FFM is not wholly replicable in Asian and African cultures. Situated within these debates, this study explored the applicability of two personality instruments, namely the Revised NEO Personality Inventory (NEO-PI-R) and the Cross-Cultural Personality Assessment Inventory - 2 (CPAI-2), in the South African context. Thus internal consistency reliability, test-retest reliability, face validity, construct validity, and aspects of construct, method and item bias were examined for each instrument. A non-probability sample consisting of 425 university students who were in their second or subsequent year of study was used. The research took the form of a non-experimental, cross-sectional research design. A questionnaire incorporating the NEO-PI-R, the CPAI-2, and demographic information – namely age, gender, religious affiliation, population group, home language, English comprehension, and test wiseness – was used.

From the results it was evident that both instruments had adequate internal consistency reliability for the domain/factor scales but some reliability coefficients for facet/subscales were low. Test-retest reliability for both instruments was not ideal but this was conducted on a sample of 10 students. Construct validity for the NEO-PI-R was very good, with the five factor structure replicating in line with that proposed by Costa and McCrae (1992). Some differences were noted at the facet level but this did not detract unduly from the overall suitability of the FFM. Construct validity evidence for the CPAI-2 was more questionable. The four factor model proposed by Cheung et al. (2008) was not replicated. Instead support was better for a five factor model. There were also more subscales in the CPAI-2 than in the NEO-PI-R that were problematic. Evidence for construct and item bias across gender, population group and home language was found in both instruments. These for the most part mirrored findings from other African and South African studies. Some aspects of method bias were also examined in both instruments. The results suggest that response bias may have been influencing responses in both instruments but the effect sizes were too small to merit much attention. Finally, a thematic content analysis was conducted on the responses to the open-ended questions after each instrument. These results indicate that issues of

language, culture, level of education, length of questionnaire and general appropriateness were identified by almost all of the respondents in this study. All the results obtained in this study were discussed in relation to the etic-emic debate, issues of acculturation, national identity and ethos, as well as the FFM and Five Factor Theory.

DECLARATION

I declare that this dissertation is my own, unaided work. It is being submitted for the degree of Doctor of Philosophy at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other university.

_____

S. LAHER (Ms.)

_____ day of November, 2010.

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INTRODUCTION

The introduction to this study is something that perplexes me. I have been thinking about what I would write here ever since I conceptualised the current study and formally registered for this degree. I think it is always useful to start with a witty or thought-provoking quote. I have been on the search for this elusive quote for the duration of this study. In the past few weeks I have even attempted Google searches to find something that would uniquely blend with the nature of this study. However I could not find that one thought or sentence that could adequately describe what I needed. I did, however, find quotes ranging from those by Aristotle and Kahlil Gibran to Oscar Wilde. There were also a great many quotes from individuals I had never even heard of. Thus, even though I did not find my one elusive quote, I discovered something even more important. When it comes to personality, everyone has some idea of what it is or what it should be. Personality has always held a fascination for people and articles and research on personality abound in both the popular media as well as in academic fields from politics and economics to anthropology, sociology and psychology.

Aside from the quandary on what to write in the introduction, I also experienced my own existential crisis during the course of this project. My crisis centred around the value of my research. I continuously questioned whether I would be making a valuable contribution to both, psychology and humanity, with this study. I often wondered if I should not be doing something around poverty, HIV-AIDS or crime since these are the core issues that South Africans deal with on a daily basis. After much thought I realised that personality research is as important as these other core issues. Personality is at the heart of almost every human interaction. The most common response to situations where one questions someone's behaviour is, "That's just his/her personality." Increasingly I became aware of how much of our understanding of who we are as human beings and how we behave is tied into the construct of personality.

The importance of personality also came to the fore in a lecture where I discussed scales of measure (nominal, ordinal, interval, ratio) with my postgraduate students. I had as an example amongst many, "Personality scores as measured by the NEO-PI-R." Students had to identify the scale of measure in this item. In jest, we discussed the possibility of a zero score on a personality instrument and whether anyone could have zero personality or not (in relation to ratio scales). This, yet again, reinforced to me the idea that personality was something ingrained – something deeply embedded within everyone, something we all have. We also discussed the variability in personality (in relation to interval scales). However, with

this came the realisation that culture is also inextricably linked to the expression of personality.

Increasingly I became more conscientised as to the value of my study. These moments of realisation also sparked off a passion for the work I was involved in. Figuring out a rationale for this study based on my own experiences was substantially more rewarding than relying solely on academic input. I was able to engage in a more meaningful way with my work because I believed in what I was doing.

This belief was further reinforced when I reflected on the value that objective personality assessment adds to society. At my department, there are still colleagues who regard psychometric studies as mundane, standard research with little to offer. However one has only to examine how pervasive psychological assessment and specifically personality testing and assessment are. Personality tests like the NEO-PI-R and the CPAI-2 are frequently used in clinical, counselling, educational and industrial settings to make informed choices about mental and physical health, job status, person-environment fit and career counselling internationally. South Africa is no different. Personality testing is frequently utilised in all sectors in South Africa and the NEO-PI-R is amongst the most popular personality instruments employed here (see Foxcroft, Paterson, le Roux & Herbst, 2004). In July this year, the Society for Industrial and Organisational Psychology in South Africa had a session on personality assessment in South Africa. I had the opportunity to organise and present a panel discussion at this session. If I had any doubts that personality assessment was an obsolete field in psychology, they were permanently removed. The session was crammed to capacity with an audience who regarded personality assessment as a dynamic and vibrant research area in South Africa. I no longer needed to question my research or counsel myself on the value of this current study. I hope you will find the current study as engaging as I have.

In the section to follow, I provide a brief outline of each of the chapters presented herein.

OUTLINE OF CHAPTERS

This dissertation consists of eight chapters. Chapter one is an introductory chapter that locates the NEO-PI-R and the CPAI-2 within personality psychology. The chapter begins with a brief history of the development of personality psychology within the discipline of psychology. Following this, the chapter focuses on the trait approach to understanding personality but more specifically on the Five-Factor Model (FFM) of personality since this is primarily where the two instruments are located. The chapter demonstrates the link between the NEO-PI-R and the FFM and discusses briefly the limitations of the FFM in relation to this. The CPAI-2 is then introduced as a measure that developed primarily from some of the critiques levelled against the FFM and instruments, like the NEO-PI-R, which were developed using Western epistemological frameworks.

Chapter two follows on from Chapter one and deals primarily with the FFM and Five-Factor Theory (FFT) of personality. This chapter introduces the reader to the FFT of personality. Following this, critiques of the FFM and FFT are explored. This was done so as to acquaint the reader with conceptual limitations pertaining to the theoretical epistemologies that underlie the instruments used in the study. The chapter also provides South African insights to the limitations discussed.

The next two chapters, Chapters three and four, proceed to discuss the issues related to exploring the applicability of the NEO-PI-R and the CPAI-2 for a South African sample. Thus Chapter three introduces the reader briefly to the South African context and the etic-emic debate arguing that the current study supports a pseudo-etic approach. Following this, issues of reliability and validity are addressed and appropriate literature from both local and international studies is reviewed.

Examining issues of bias in the South African context is more complex and this is addressed in Chapter four. The introduction to Chapter four provides more contextual history with regards to the South African context. Following on from this, the concept of bias and the theory associated with the psychometric examination of bias is presented. The issue of equivalence is briefly addressed. The chapter then details the manner in which bias was addressed in the current study. In the South African context, issues of bias cannot be divorced from those of culture since it is necessary to define the cultural groups on whom bias will be examined. Hence, Chapter four proceeds to discuss this and provide a rationale

for examining bias across gender, population group and home language groupings. Appropriate literature from both local and international studies for each of the three variables (gender, population group and home language) is reviewed. Trends in the literature review appeared to indicate that South Africans are usually researched as two separate groups, White South Africans and Black South Africans. Given this, Chapter four concludes with a brief exploration of literature on national identity as well as literature on acculturation.

The methods used in the current study are detailed in chapter five. Thus the aims of the study are explicitly stated. This is followed by the rationale for the study. Research questions and hypotheses are presented. The sample, instruments, research design and procedure are described. Ethical considerations are discussed. The chapter concludes with a discussion of the analytical techniques employed in the current study.

Chapter six provides the results obtained in the study. Descriptive statistics for the sample in terms of the demographic characteristics pertinent to the analysis, namely, gender, population group and home language, are presented. Descriptive statistics for the NEO-PI-R and the CPAI-2 are then presented. Following this, the chapter presents the results pertaining to the reliability and validity of the NEO-PI-R and the CPAI-2. Finally, results pertaining to construct, method and item bias are reported.

The discussion of the results obtained occurs in Chapter seven. This chapter draws together the information presented in the first four chapters and discusses these in relation to the results found in the study. Thus issues of reliability, validity and bias are examined to determine the applicability of the NEO-PI-R and the CPAI-2 in South Africa. This is done in relation to the standard psychometric requirements of psychological assessment instruments as well as the debates introduced in the first four chapters, namely, the etic-emic debate, the debates around culture and acculturation and those on national identity. The chapter provides an overall concluding section and examines the implications of the findings of the current study within this.

The final chapter – Chapter eight - considers the methodological limitations inherent to the current study and concludes with recommendations based on the findings and limitations of the current study.

CHAPTER 1: CONTEXTUALISING THE NEO-PI-R AND THE CPAI-2 IN PERSONALITY PSYCHOLOGY

1.1. INTRODUCTION

Let me have men about me that are fat.
Sleek-headed men, and such as sleep a-nights.
Yond Cassius has a lean and hungry look;
He thinks too much; such men are dangerous.

(*Julius Caesar*, Act I, Scene II)

"Personality" as a term derives from the Latin word "persona" – a theatrical mask. The wearer of a particular mask could be expected to behave in a consistent manner throughout a performance. Personality was thus something imposed externally on a person (Schultz & Schultz, 2009). That there is something inside a person that we may wish to call personality is also an idea with which we are familiar. Often we ascribe an individual's behaviour to his/her personality, something within or innate to each individual. We speak of shy people, loud people or responsible people. Our art forms, our texts and even our daily interactions refer to personalities. The above quotation, spoken by Caesar in Shakespeare's play, *Julius Caesar*, highlights these lay understandings most clearly. Lay understandings of personality have been in existence as long as humans have been in existence.

More systematic and scientific understandings of personality can be traced as far back as Hippocrates and Galen and humoral theory, where individuals were classified as having either a phlegmatic, sanguine, melancholic or choleric disposition (Ellis, Abrams & Abrams, 2009; Meyer, Moore & Viljoen, 2003; Schultz & Schultz, 2009). Ayurvedic medicine in India proposed three metabolic body types (vata, pita and kapha) that provided the foundation of individual temperaments, and Japanese folklore proposed that the four blood types were responsible for differences in personality (Heine & Buchtel, 2009). The Chinese proposed that all structures in the human being including an individual's personality could be described in terms of an orientation towards five different natural elements, namely, fire, wood, air, water and earth (Ellis et al., 2009). Other pseudosciences, such as phrenology, physiognomy and graphology, attempted in the eighteenth and nineteenth centuries to classify personality characteristics but without much success (Ryckman, 2008). Slightly more promising at this time was the work of Francis Galton, Emil Kraepelin and Alfred Binet. In 1884, Galton explored good temper, optimism and other personality traits by observing people in contrived social situations. Kraepelin developed the word-association technique in

1892 and Binet devised methods for studying personality characteristics of eminent persons (Aiken, 2003). Despite this, progress in personality theory and assessment only occurred in the twentieth century (Schultz & Schultz, 2009).

This chapter provides a brief history of the development of the field of personality psychology, identifying the major theoretical positions in the field. It focuses on the trait approach in general and the Five Factor Model (FFM) specifically as this is where both instruments used in the current study – namely, the Revised NEO Personality Inventory (NEO-PI-R) and the Cross-Cultural Personality Assessment Inventory - 2 (CPAI-2) – are located. The Chinese approach within which the CPAI-2 originated is also introduced.

1.2. PERSONALITY IN PSYCHOLOGY

The birth of psychology occurred more than a century ago in Germany and was largely the work of Wilhelm Wundt, who established psychology's first laboratory in 1879 at the University of Leipzig. However, for much of psychology's history personality was not considered (Schultz & Schultz, 2009). It was only at the start of the twentieth century that Kretschmer and Sheldon, still working in the biological tradition, independently proposed theories that linked personality to physique and genetic endowment (Larsen & Buss, 2008; Ryckman, 2008). At the same time, Freud proposed his psychoanalytic understanding of personality. Following Freud, a group of personality theorists focused on the whole person as he/she functions in the real world, rather than on elements of behaviour or stimulus-response units as studied in the psychology laboratory (Larsen & Buss, 2008; Schultz & Schultz, 2009). The advent of the two world wars signalled a need for the assessment of personality and the Woodworth Personal Data Sheet was developed. However, it was not until the 1930s that the study of personality became formalised and systematised in psychology, primarily through the work of Henry Murray and Gordon Allport at Harvard University. Following their initial efforts, professional books appeared, journals were founded, universities offered courses, and research was undertaken. According to Schultz and Schultz (2009), these activities signalled a growing recognition that some areas of concern to the psychoanalysts and neopsychoanalysts could be incorporated into psychology. Personality was conceived of as a coherent whole and academic psychologists came to believe that it was possible to develop a scientific study of personality.

Disillusionment with objective personality testing procedures saw a decline in rating scales in the late 1930s and early 1940s in favour of projective personality tests (Kaplan & Sacuzzo, 2009). However, the development of factor analysis as a technique and the development of

the Minnesota Multiphasic Personality Inventory spurred a renewed interest in objective personality assessment (Ellis et al., 2009). Following this, other objective personality tests were developed, most notably, Gough's California Psychological Inventory (CPI) and Cattell's 16 Personality Factor Questionnaire (16PF). Developments in personality theory were also afoot, most notably in the humanistic and social learning traditions, with the work of Abraham Maslow, Carl Rogers and Albert Bandura. The 1970s saw a decline in personality theory and assessment, particularly those theories and assessments using the trait approach, with a subsequent upsurge evident in the 1980s (Costa & McCrae, 2008; Hofstede & McCrae, 2004).

At present, theories in psychology about personality abound. An examination of textbooks on personality theory as well as general introductory texts to psychology (see Ellis et al., 2009; Larsen & Buss, 2008; McAdams & Pals, 2006; Meyer et al., 2003; Naidoo, Townsend & Carolissen, 2008; Pervin & John, 2001; Ryckman, 2008; Schultz & Schultz, 2009; Weiten 2009) reveals that most theories of personality fall into one of eight theoretical approaches, namely, psychodynamic, the lifespan theories, cognitive, social learning, humanistic/existential, the behaviourist approach, the biological/ behavioural genetics theories, or the dispositional/trait approach. Each of these traditions of thought is described briefly hereunder.

The psychodynamic approach to personality is concerned with the emotional responses and emotional conflicts aroused by the changing events of everyday life. It emphasises unconscious forces and unavoidable conflicts in early childhood as the rulers and shapers of personality. Instincts are regarded as the primary motivators of human behaviour. The main proponents of this approach were Sigmund Freud, Carl Jung and Alfred Adler. More recently, the neopsychoanalysts, most notably Melanie Klein, Karen Horney, Heinz Kohut and Donald Winnicot, revived and developed the psychodynamic tradition (Meyer et al., 2003; Naidoo et al., 2008; Ryckman, 2008; Schultz & Schultz, 2009).

Schultz and Schultz (2009) and Naidoo et al. (2008) refer to the lifespan approach as a separate tradition of thought within personality psychology and cite Erik Erikson as being the major proponent within this school of thought. Erikson's theory attempts to explain human behaviour and growth through eight stages, from birth to death. Within this theory, all aspects of personality are explained in terms of turning points, which must be met and resolved at each stage. However Freud, Jung and Adler also proposed stages in the development of personality and hence also a lifespan approach. Usually this theory of development and personality is subsumed within the psychoanalytic tradition in personality

psychology or incorporated into developmental psychology (see Larsen & Buss, 2008; Ryckman, 2008).

The cognitive approach to personality stresses the importance of cognitions or thoughts as central to the understanding of personality. This approach to personality focuses on the ways in which people know their environment and themselves – how they perceive, evaluate, learn, think, make decisions and solve problems. Thinking, planning and problem-solving as opposed to needs, drives and emotions are the key variables in the cognitive understanding of personality. The work of Walter Mischel and of George Kelly is instrumental to this tradition of thought (Funder, 2001; Meyer et al., 2003; Schultz & Schultz, 2009). Unlike other traditions of thought – like social learning theories, which make reference to cognitive processes but do not see them as encompassing all aspects of personality – the work of Kelly attempts to describe all aspects of personality, including the emotional components, in terms of cognitive processes (Naidoo et al., 2008; Ryckman, 2008; Schultz & Schultz, 2009).

Behaviourists approach personality from the perspective that observable behaviour is the only variable that has any scientific merit in this field. Personality, according to this school of thought, refers only to what can be objectively observed and manipulated. Personality is therefore an accumulation of learned responses to stimuli, sets of overt behaviours, or habit systems. There is no reference to internal conditions, such as anxiety, drives, motives, needs or defence mechanisms in this approach. Watson's ideas laid the basis for this tradition of thought and these were later developed by B. F. Skinner. Skinner rejected as irrelevant any alleged internal forces or processes and was only concerned with external stimuli and overt behaviour (Funder, 2001; Meyer et al., 2003; Ryckman, 2008; Schultz & Schultz, 2009).

The social learning approach is often regarded as an outgrowth of the behaviourist tradition. Social learning theorists focus on overt behaviours rather than on needs, traits, drives or defence mechanisms but unlike behaviourists they allow for internal cognitive variables that mediate between stimulus and response. Albert Bandura is regarded as the pioneer of this field of thought. Quite often Bandura's work and that of other social learning theorists are classed into a cognitive-behavioural paradigm by virtue of their focus on overt behaviours as well as internal cognitive variables (Funder, 2001; Meyer et al., 2003; Naidoo et al., 2008; Ryckman, 2008; Schultz & Schultz, 2009).

The humanistic/existential approach criticised the psychodynamic school of thought for its focus on the emotionally disturbed side of human nature. They were also critical of the behaviourist school of thought, which chose to ignore conscious and unconscious forces and focused exclusively on overt behaviours. The humanistic/existential approach stresses the significance of personal meaning in one's life. Ideas such as self-actualisation, the search for meaning and personal myths all deal with the central role of meaning for understanding personality. This approach emphasises human strengths and aspirations, conscious free will, and the fulfilment of potentialities. It presents an optimistic image of human nature and describes individuals as active, creative beings concerned with growth and self-actualisation. Carl Rogers and Abraham Maslow are considered the pioneers in this field of thought, most notably in the humanistic tradition. The work of R. D. Laing and Rollo May respectively is frequently regarded as seminal within the existentialist school of thought (Funder, 2001; Larsen & Buss, 2008; Naidoo et al., 2008; Ryckman, 2008; Schultz & Schultz, 2009).

The biological approach to personality often encompasses the behavioural genetics theorists as well as trait theorists, and often it is quite difficult to separate the two. However, if one considers the humoral theory of Galen or the work of William Sheldon, one is inclined to see a more behavioural genetic stance; whereas the work of Hippocrates, and more recently Cattell and McCrae's Five Factor Theory, are examples of trait-based approaches. Thus, I have chosen to split the biological approach and the trait approach. An examination of textbooks, including the one used primarily in writing this section (*Theories of Personality* by Schultz and Schultz, 2009), are often not clear on this distinction. However theorists within the trait approach distinguish clearly between approaches that focus on temperament and genes and theories that use traits (see Boyle, Matthews & Saklofske, 2008; Larsen & Buss, 2008). In trait literature, the word 'temperament' is used specifically to denote a biological indicator of personality. Thus, the behavioural genetic approach is concerned with the extent to which the genetic inheritance from parents and environmental experiences influence the development of personality. The primary interest is therefore how heredity and environment interact with each other in forming personality. Major proponents of temperament theory include Arnold Buss and David Plomin. Hans Eysenck, by virtue of his studies on heritability, is often also included in this approach but his factor analytic work on traits also places him within the trait tradition (Schultz & Schultz, 2009; Weiten, 2009).

Trait theorists, often referred to as the "psychoarchitects" of personality, consider the structure of personality. This approach identifies certain inherent qualities or personal characteristics called traits that are present in the individual and that are the building blocks of personality. It can be argued that currently the trait theory of personality dominates the

field of personality psychology, particularly among those theorists working within a cross-cultural psychological perspective (see Cervone, 2004a; Church, 2000; Costa & McCrae, 2008; Dalton & Wilson, 2000; Heine & Buchtel, 2009; Kaplan & Sacuzzo, 2009; McAdams & Pals, 2006; McCrae & Costa, 2004; 2008a; Paunonen, Zeidner, Engvik, Oosterveld & Maliphant, 2000). Within the trait approach, there is still some debate as to the number of trait dimensions necessary to describe personality but the FFM is commonly accepted as a benchmark against which to evaluate and develop other models (see Church, 2000; Heine & Buchtel, 2009; McAdams & Pals, 2006; McCrae & Costa, 2004; 2008a; Paunonen & Jackson, 2000; Schultz & Schultz, 2009). Since both the NEO-PI-R and the CPAI-2 are located within this tradition, the remainder of this chapter will focus on conceptualising the instruments within the trait approach.

1.3. THE TRAIT APPROACH TO PERSONALITY

McCrae (2001) defines traits as "endogenous basic tendencies that, within a cultural context, give rise to habits, attitudes, skills, beliefs, and other characteristic adaptations" (p. 819). According to McCrae (2004) traits are not cognitive fictions but real psychological structures, as evident in studies of consensual validation, prediction of life outcomes, longitudinal stability and heritability. Thus, traits are relatively stable or enduring individual differences in thoughts, feelings and behaviours (Church, 2000). McCrae and Costa (2008b, p. 212) cite Tellegen (1991) that traits are not situation free; instead a trait is a disposition to exhibit reaction R under condition S.

Personality traits are different to personality types, where a personality type is defined as a "unique constellation of traits and states that is similar in pattern to one identified category of personality within a taxonomy of personalities" (Cohen & Swerdlik, 2005, p. 126). A personality trait is also different to personality states, which are generally emotional reactions that vary from one situation to another (Kaplan & Sacuzzo, 2009).

Personality research in the trait tradition originated in what is termed the "lexical" approach, where a number of adjectives used in language are subjected to factor analysis, the rationale being that the most important individual differences in human interaction tend to become encoded as single terms in some or all of the world's languages (Goldberg, 1990). Among the first studies into the structure of personality that employed the lexical approach were those conducted by two German psychologists, Klages and Baumgarten, in 1926 and 1933 respectively (John & Srivastava, 1999). Following this, in 1936 Allport and Odbert isolated all words in the English dictionary that could possibly describe personality and

compiled a list of approximately 18 000 terms, which could be used to distinguish an individual's behaviour. In an effort to impose some structure on their results, Allport and Odbert divided the list of terms into four categories of what they termed personality descriptors. The four categories were defined as follows: i) personality traits; ii) temporary states, mood and activities; iii) evaluative judgements of personal conduct; and iv) physical characteristics, capacities and talents. This list and form of categorisation formed the basis for future studies from the trait perspective most notably for the work of Cattell (John & Srivastava, 1999).

In 1943, Raymond Cattell used Allport and Odbert's list to create a reduced list of 4 500 terms that represented only the stable personality traits. Cattell then used semantic and empirical clustering techniques to reduce his original list to only 35 variables (John & Srivastava, 1999). These variables were then subjected to several oblique factor analyses from which 12 factors were extracted. These 12 factors formed the basis of Cattell's 16-Factor Personality questionnaire (16PF). Cattell's reduced list of 35 variables stimulated other research in the area. Using Cattell's list, Fiske in 1949, Norman in 1963, Borgotta in 1964 and Digman and Takemoto-Chock in 1981 found evidence for five superordinate personality traits, which became known as the "Big Five". However Norman (1967) argued that all research was based on the Allport-Odbert/Cattell lists. Therefore, he compiled an exhaustive list of personality descriptive terms, which he sorted into 75 semantic categories and subsequently factor analysed to obtain five factors. The late 1970s and early 1980s was a period of latency for research on the "Big Five" (Costa & McCrae; 2008; McCrae & Costa, 2008a).

Following this, the mid-1980s brought about a period of renewed interest in this line of investigation, most notably with the work of Goldberg (1981; 1982; 1990). Goldberg used the list that Norman had constructed in a series of three studies (see Goldberg, 1990; 1995) and found that the five factors (Extraversion/Surgency; Neuroticism/Emotional Stability; Openness/Culture; Agreeableness; Conscientiousness) remained invariant across a variety of different methods of factor extraction and rotation even when more than five factors were rotated. These results were subsequently replicated by Goldberg in 1996 and Saucier in 1997.

While researchers in the lexical tradition were accumulating evidence for the Big Five, the need for an integrative framework became more pressing among researchers who used questionnaire scales to study personality (John & Srivastava, 1999). The work of Costa and McCrae in the early 1980s changed this. In 1976, Costa and McCrae began their work on

the NEO-PI with cluster analyses of the 16PF. They found evidence for three factors, namely, Extraversion, Neuroticism and Openness. In 1983, Costa and McCrae found that their work on the NEO closely resembled three of the “Big Five” factors but did not encompass the Agreeableness and Conscientiousness factors (Costa & McCrae, 2008; John & Srivastava, 1999;). They extended their model and work began on the NEO-PI-R. McCrae and Costa utilised self-reports and peer ratings and subjected these to analysis (Costa & McCrae, 1992; 2008). Q-sort techniques, examination of 16PF data, and assessment of frequencies with which people engage in particular types of action (by self-reports and observer reports) were also used. All of these methods produced evidence for the existence of five overarching personality factors, which converged with the Big Five factors. However, subtle differences exist between the Big Five as defined by the lexical tradition and the five factors as defined by the questionnaire tradition and commonly referred to as the Five Factor Model (FFM). The current research, by virtue of its examination of the NEO-PI-R, is located within the questionnaire tradition and the FFM.

1.4. THE FIVE FACTOR MODEL OF PERSONALITY

Even though consensus exists among trait theorists around the existence of five overarching factors, there is debate as to the names of these factors, as discussed earlier. This was not only between the lexical and questionnaire traditions but also within each of the traditions. However, the creation of the NEO-Personality Inventory (NEO-PI) and subsequently the NEO-PI-R by Costa and McCrae (1992) went some way towards achieving consensus as to the labels attached to the five factors (Allik & McCrae, 2002; Church, 2000; Costa & McCrae, 2008; McCrae & Allik, 2002; Paunonen et al., 2000; Rolland, 2002).

In brief the five factors are: Neuroticism, Extraversion, Openness to Experience, Agreeableness, and Conscientiousness (Costa & McCrae, 1992). Neuroticism is defined as a general tendency to experience negative affects such as fear, sadness, embarrassment, anger, guilt, and distrust. It is the degree to which a person is calm and self-confident as opposed to anxious and insecure. Extraversion is regarded as a general tendency towards sociability, assertiveness, activeness and being talkative. Thus it is the degree to which a person is sociable, leaderlike and assertive as opposed to withdrawn, quiet and reserved. Individuals willing to entertain novel ideas and unconventional values are described by the Openness to Experience trait. Openness to Experience is defined as the degree to which a person is imaginative and curious as opposed to concrete minded and narrow thinking. Agreeableness encapsulates constructs of sympathy, co-operativeness and helpfulness towards others. It is described as the degree to which a person is good natured, warm and

co-operative as opposed to irritable, unco-operative, inflexible, unpleasant and disagreeable. The final factor, Conscientiousness, may be described as the degree to which a person is persevering, responsible and organised as opposed to lazy, irresponsible and impulsive. This dimension summarises the more specific traits that mark careful, responsible and dependable people in contrast to people who are lazy and lack self-discipline (Costa & McCrae, 1992; McCrae & Allik, 2002; McCrae, Costa, Del Pilar, Rolland & Parker, 1998).

The NEO-PI-R is at present the most commonly used operationalisation of the FFM (Cheung et al., 2001; Hofstede & McCrae, 2004; McCrae & Costa, 2008a; 2008b; McCrae, Terracciano & 79 members of the Personality Profiles of Cultures Project, 2005a; McCrae, Terracciano & 78 members of the Personality Profiles of Cultures Project, 2005b) but its applicability across cultures particularly in Asian and African cultures is questionable (see Cheung, Leung, Fan, Song, Zhang & Zhang, 1996; Cheung et al., 2001; Laher 2008; Laher & Quy, 2009; Laungani, 1999; McCrae et al., 2005a; 2005b; Nel, 2008; Okeke, Draguns Sheku & Allen, 1999; Pervin, 1999; Rossier, Dahourou & McCrae, 2005; Van Eeden & Mantsha, 2007; Vogt & Laher, 2009). Yik and Bond (1993) argue that although there is evidence for the universality of the five factors, the manifestation of these factors in different cultures might differ as different cultures “cut the social-perceptual world differently” (p. 92). Furthermore, since both the FFM and the NEO-PI-R were developed within the English lexicon, they may not be applicable in cultures where English is not the dominant language. This rationale prompted research by Fanny Cheung and colleagues into the Chinese lexicon and the development of the Chinese Personality Assessment Inventory (CPAI; Cheung et al., 1996; Cheung & Leung, 1998) and subsequently the Cross-Cultural Personality Assessment Inventory - 2 (CPAI-2; Cheung, 2004; Cheung, Cheung, Howard & Lim, 2006).

1.5. THE CHINESE APPROACH

Cheung et al. (2001) argued that while the FFM was recoverable using the NEO-PI-R in a Chinese setting, it did not provide a comprehensive description of personality. Most notably what was lacking were the interdependent aspects of Chinese culture and by extension Chinese personality. Chinese personality is viewed in the context of the cultural-ecological model and Chinese culture is characterised by collectivist orientation, other orientation, relationship orientation and authoritarian orientation (Cheung et al., 2001). Thus Cheung and colleagues began work on developing an indigenous personality inventory, the CPAI. According to Cheung et al. (2001), the intention was to construct an inventory suited to local needs by identifying unique dimensions as well as cross-cultural universals. It was developed as a collaborative project between psychologists in Hong Kong and China. The

personality constructs in the CPAI were derived from groups of personality adjectives or person descriptions reflecting daily experiences. These were obtained from reviews of contemporary Chinese novels, Chinese proverbs, psychological literature on Chinese personality, and self and other descriptions of personality obtained from informal surveys of professionals and people on the street (Cheung et al., 2001).

The CPAI revealed a clear Interpersonal Relatedness factor that did not load on any of the NEO-PI-R scales (Cheung, 2004; Cheung et al., 2001). Cheung (2004) also reports that a combination of the FFM factors could not adequately predict the variance of the Interpersonal Relatedness factor scales. Scales loading on this factor were Relationship Orientation (Ren Qing), Harmony, Traditionalism versus Modernity, Social Sensitivity, Discipline and Thrift versus Extravagance. The characteristics associated with these personality scales reflect a strong orientation towards instrumental relationships, avoidance of external, internal and interpersonal conflict, and adherence to norms and traditions (Cheung et al., 2001). The CPAI scales and factors (Social Potency, Dependability, Individualism and Interpersonal Relatedness) also converged with the Neuroticism, Extraversion and Agreeableness factors of the NEO-PI-R in a joint factor analysis but none of the CPAI scales loaded on the Openness to Experience factor (Cheung, Cheung, Leung, Ward & Leong, 2003; Cheung et al., 2001). Hence Cheung and colleagues set out to revise the CPAI including items to tap the Openness dimension.

According to Cheung, Cheung, Zhang, Leung, Leong and Yeh (2008), “although the social and historical development of Confucianism and Communism in China may restrict the expression of openness, the contemporary boom in ‘digital Asia’ with increasing intellectual investment in invention in Greater China may encourage the development of Openness characteristics” (p. 86). Thus they argued that Openness to Experience would manifest differently in Chinese culture. To identify culturally relevant dimensions, they conducted literature reviews, informal interviews and focus groups and used these to generate the items. Items were also created to express the interpersonal orientation integral to Chinese theories of personality, which are primarily collective (Cheung et al., 2008). However analysis of the new instrument including these items indicated that when the Chinese Openness items were factor analysed with the NEO-PI-R items, they loaded on the Openness dimension, but on joint factor analysis using the complete versions of both inventories the Openness dimension was not as clear-cut. Thus, Cheung et al. (2008) concluded that when the perceptual world is construed from a Chinese perspective, Openness dimensions function more in a complex context than as a distinct construct. According to them though,

> a more meaningful question to address the cultural universality or specificity of the Openness factor may be the relative coherence and salience of the factor in the cultural lexicon and taxonomic model of personality, and the relevance of the taxonomic model in explaining and predicting behaviour in the cultural context. (p. 104)

McCrae and Costa (1997) argue that part of the controversy around the Openness dimension can be linked to the confusion of Openness with intelligence or culture. McCrae (2002) also suggests that all factors might not be equally important in every culture and that individual differences in Openness to Experience might be less relevant in traditional cultures, where life's options are severely limited. Bond (1994) suggests that the Openness dimension "may be differently defined in different cultures but still exists and has a functional impact on social behaviour" (p. 116). Choi, Nisbett and Norenzayan (1998) argue that exploration of emic constructs related to folk wisdom in East Asian cultures – like holistic versus dualistic thinking, relativism versus absolutism, dialectics, contradictory thinking and probabilistic thinking – might provide an indication for the manifestation of the Openness to Experience dimension in these cultures.

Despite the debates around the Openness dimension Cheung et al. (2003) maintained the items and called the revised inventory the Chinese Personality Assessment Inventory - 2. This instrument resulted in four factors, like its predecessor, but the Individualism factor was reversed and renamed Accommodation (Cheung et al., 2006). The revised version was researched on samples from China, Hong Kong, Korea and Japan and found to be relevant (Cheung et al., 2006). It was translated into English and researched on Caucasian samples in North America and on Malay and Chinese samples in Singapore, adding further to its validity across cultures. The instrument was renamed following the evidence of its applicability in various contexts and is currently referred to as the Cross-Cultural Personality Assessment Inventory - 2 (CPAI-2; Cheung et al., 2003; Cheung et al., 2006, Cheung et al., 2008).

1.6. CONCLUSION

Like the NEO-PI-R, the CPAI-2 developed using the lexical approach as well as folk concepts. Both instruments are etic to the South African context but the NEO-PI-R was developed within a Eurocentric tradition and the CPAI-2 within an Asian context. Evidence exists that Asian and African approaches might have more in common and could contribute to Eurocentric models (see Cheung et al., 1996; Cheung et al., 2001; Laher 2008; Laher &

Quy, 2009; Laungani, 1999; McCrae et al., 2005a; Mwamwenda, 2004; Naidoo et al., 2008; Nel, 2008; Okeke et al., 1999; Pervin, 1999; Rossier et al., 2005; Van Eeden & Mantsha, 2007; Vogt & Laher, 2009). Hence the current study, which explores both the NEO-PI-R and the CPAI-2 in the South African context. Chapters 3 and 4 detail the methods and debates inherent in exploring the two instruments in the South African context. Before doing this, though, it is essential that the FFM be examined with a more critical lens.

The lexical approach has often been criticised for two main reasons. Firstly, critics argue that it is atheoretical due to its development from adjectives primarily. Secondly, it is argued that this approach is too descriptive and lacks any reference to personality development across the lifespan. These critiques are discussed in the chapter to follow and the Five Factor Theory as proposed by McCrae and Costa (1996), primarily as a response to these critiques, is presented and examined. Aside from these critiques, a number of others have also been levelled against the trait approach and the FFM, from Mischel's (1968) claim that traits are cognitive fictions to Block's (2001) ongoing diatribes on factor models (Ashton & Lee, 2005; 2007; McCrae & Costa, 2008a). These are also discussed in Chapter 2.

CHAPTER 2: A CRITICAL APPRAISAL OF THE FIVE FACTOR MODEL AND FIVE FACTOR THEORY

2.1. INTRODUCTION

Despite its widespread application and the volumes of research accumulated with regard to the Five Factor Model (FFM) of personality, there are a number of critiques levelled against this approach. In 1968, Mischel argued that traits were mere cognitive fictions. This critique, together with other developments in personality psychology at the time, set the stage for the virtual disappearance of this approach in personality research for over a decade, until the 1980s with its revival in the works of Digman, Goldberg and Costa and McCrae, among others. The focus in the 1980s was primarily on identifying the five factor structure and reaching some consensus on descriptions of what exactly constituted the five factors. By the 1990s consensus on the five factors had been reached and research on the FFM and the Big Five had gained momentum; soon after this the five factor approach had become one of the dominant approaches for research in psychology. However the approach is not without its critics.

Since its reintroduction to mainstream personality research in the 1980s, the critique of the FFM being mere "dustbowl empiricism" (McCrae, 2004, p. 4) has often been cited. The FFM was criticised both for its seemingly atheoretical basis and its lack of explanation of the developmental course of personality. In the 1990s, McCrae and Costa proposed the initial version of the Five Factor Theory (FFT) and have continued work with the FFT (see McCrae & Costa, 1996; 2003; 2008b). This chapter presents the FFT as currently conceptualised by McCrae and Costa (2008b). Following this, the FFT and FFM are examined in relation to some of the dominant critiques commonly levelled against them, most notably those of Block (1995; 2001), Borsboom, Mellenbergh and van Heerden (2003) and Cervone (2004a).

2.2. FIVE FACTOR THEORY

McCrae and Costa (2008b, p.157) describe the FFM as a "Christmas tree" on which various findings of stability, heritability, consensual validation, cross-cultural invariance and predictive validity hang like ornaments with no unifying explanatory framework. Hence the need for a theory of personality, which addresses the critique of the FFM as being atheoretical and will also serve as a unifying system. According to McCrae and Costa (2003), FFT is based on the whole body of findings associated with the FFM and began with

observations of trait stability but has evolved to become much more. This section introduces the assumptions underlying FFT, the components of the personality system as conceptualised by FFT, and the postulates that depict the relations among the components of the FFT system.

2.2.1. Assumptions of the FFT

FFT explicitly acknowledges four assumptions about human nature, namely **knowability, rationality, variability** and **proactivity** (McCrae & Costa, 1996; 2008b). **Knowability** assumes that personality is a proper object of scientific study, and FFT subscribes to this assumption, believing that there is much to be gained from the study of personality in individuals and groups. Scientific study does not have to involve experimentation or even a unification of experimental and correlational methods. Science uses many methods and works best when the methods used are dictated by the problems being researched. According to McCrae and Costa (2008b), correlational and quasi-experimental methods in natural settings can yield valuable information that cannot be accessed in a laboratory.

The second assumption of **rationality** refers to individuals having a capacity to understand themselves and others and to act in ways that are consistent with their conscious beliefs and desires (McCrae & Costa, 1996; 2008b). McCrae and Costa (2008b) suggest that the notion of rationality is an unpopular one. Psychoanalysts, contemporary social psychologists and to some extent personologists argue that individual understandings are biased. However McCrae and Costa (2008b) argue that with regard to personality traits, laypersons are the best and most sophisticated judges, who employ a trait language evolved over centuries to express important social judgements. They do point out though that this does not mean that trait psychology is merely folk psychology. Lay understandings of personality form the basis of five factor understandings, which are then used by researchers to account for the underlying structure and operation of personality (McCrae & Costa, 2008b).

The third assumption of **variability** contends that individuals differ from each other in psychologically significant ways (McCrae & Costa, 2008b). This assumption differs from traditional philosophical and psychological theories, which usually seek a single answer as to what human nature is really like. Trait theories allow for variation in human nature (McCrae & Costa, 2008b).

The final assumption is that of **proactivity**. Proactivity refers to the “assumption that the locus of causation of human action is to be sought in the person” (McCrae & Costa, 2008b,

p. 162). Hence individuals are responsible for their own actions and decisions but people do differ in the extent to which they control their lives. Personality is actively and inactively involved in shaping people's lives. According to McCrae and Costa (2008b), "proactivity of personality is not equivalent to proactivity of the person, one's proactive traits are not the same as one's conscious goals" (p.162). In other words, the enduring pattern of thoughts, feelings and behaviours that a person exhibits is due to their proactive traits, which are not necessarily reflected on and brought to conscious awareness in the same way that decision-making might be. For example, a person might need to make a decision on purchasing a vehicle, the purchase of which may represent a conscious goal of which the person is aware. However the person, by virtue of being high on Conscientiousness traits, will approach the decision to purchase meticulously, carefully weighing up the pros and cons and so on.

2.2.2. Components of the FFT personality system

Figure 2.1 represents the components of the FFT personality system. The three rectangles refer to the central components of the system, namely Basic Tendencies, Characteristic Adaptations and the Self-Concept. The three ellipses represent the peripheral components that mark the interface with systems outside of personality. Biological bases and External Influences are the inputs into the personality system that represent the interactions of personality with the physical body and with the environment. The Objective Biography is the output and represents everything that an individual does, thinks or feels across the whole lifespan. At any one point in time the Objective Biography represents the individual's actual behaviour. It is different to the life narrative, which is a subjective biography that may be inaccurate (Allik & McCrae 2004; McCrae & Costa, 2003; 2008b).

According to McCrae and Costa (2008b) at present FFT does not address the peripheral components of the personality system. Biological bases include genes and brain structures but the precise mechanisms (developmental, neuroanatomical, and/or psychophysiological) are not yet specified. FFT also does not provide details on types of External Influences or aspects of the Objective Biography. In a similar vein to other personality theories, FFT presumes that "situation" and "behaviour" are self-evident (McCrae & Costa, 2008b). In 1996, McCrae and Costa provided some examples of what constitutes Basic Tendencies, Characteristic Adaptations, Self-Concept, Objective Biography and External Influences. These are detailed in Table 2.1.

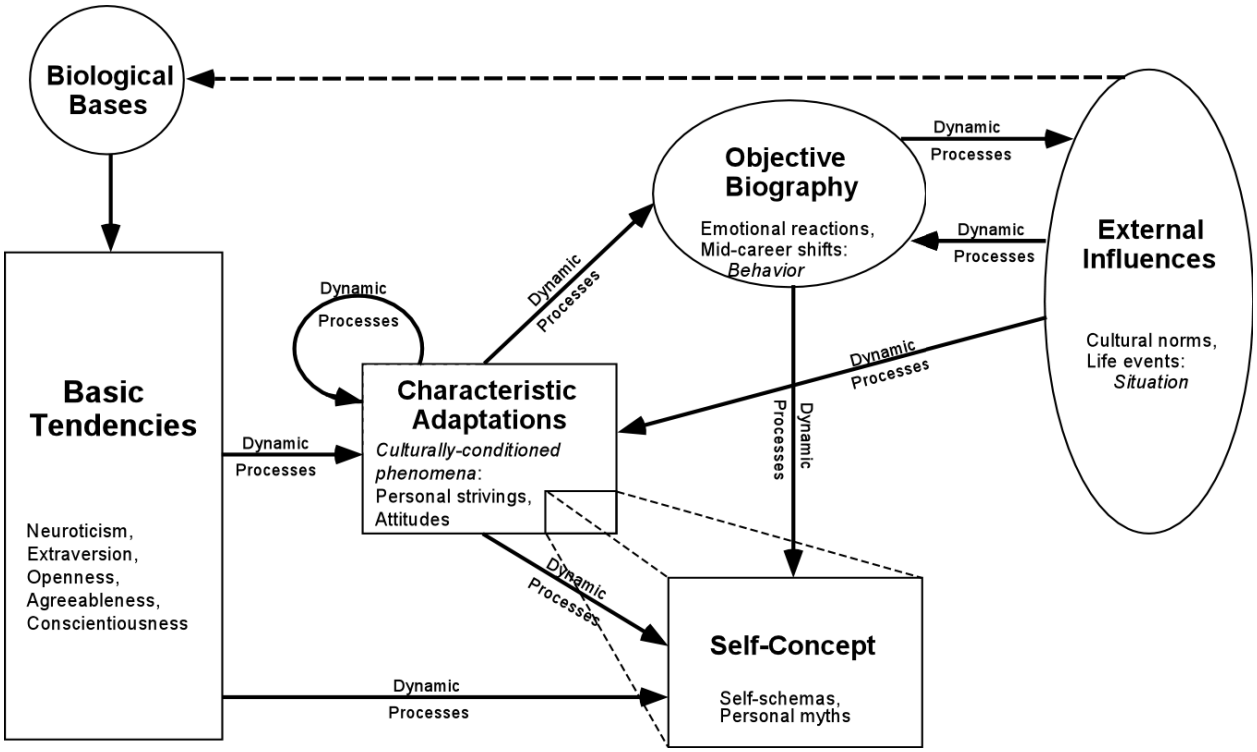


Figure 2.1: A representation of the Five Factor Theory personality system

Note. Core components are in rectangles; interfacing components are in ellipses.
Reprinted from "Empirical and Theoretical Status of the Five Factor Model of Personality Traits," by R. R. McCrae and P. Costa, Jr. 2008a, *The SAGE Handbook of Personality Theory and Assessment*, G. J. Boyle, G. Matthews & D. H. Saklofske (Eds.) (p. 278). Copyright 2008 by SAGE Publications, London. Reprinted with permission of the authors.

Central to FFT are the Basic Tendencies and Characteristic Adaptations components. Traits in FFT are not patterns of behaviour, plans or skills that lead to behaviour. Traits are regarded as Basic Tendencies. Basic Tendencies are the abstract psychological potentials of the individual, which are rooted in biology and are not directly accessible either to observation or introspection (Allik & McCrae, 2004; McCrae & Costa 1996; 2008b). Basic Tendencies are deep psychological entities that can only be inferred from behaviour and experience. Since these tendencies are deeply grounded in an individual, they are not influenced by the environment.

Characteristic Adaptations are the concrete acquired structures that develop as the individual interacts with the environment. They are called Characteristic Adaptations – "characteristic" because they reflect the individual's underlying disposition or enduring psychological core and "adaptations" because they assist the individual to fit and respond to

Table 2.1: Examples of specific content in the five components of the FFT

Basic Tendencies	**Characteristic Adaptations**
Genetics Physical characteristics - Sensory-motor capacities - Health, physical abilities - Age, race, gender - Physical appearance Cognitive capacities - Perceptual styles - Operant, respondent learning ability - General intelligence (verbal, spatial ability) - Specialised talents Physiological drives - Need for oxygen, food - Sexual drive and orientation Focal vulnerabilities - Alcohol-proneness - Manic-depressive tendencies *Personality traits* - *Neuroticism (Anxiety, Angry Hostility, Depression)* - *Extraversion (Warmth, Gregariousness, Assertiveness)* - *Openness to Experience (Fantasy, Aesthetics, Feelings)* - *Agreeableness (Trust, Straighforwardness, Altruism)* - *Conscientiousness (Competence, Order, Dutifulness)*	Acquired competencies - Language, general knowledge - Schemas and strategies - Social skills (etiquette, tactics of manipulation) - Technical skills Attitudes, beliefs and goals - Religious, moral values - Social, political attitudes - Tastes, preferences, styles - Vocational interests - Personal projects, tasks Learned behaviours - Habits - Daily routines - Hobbies Interpersonal adaptations - Social roles - Relationships - Perceptions of others
Self-Concept	**Objective Biography**
Implicit, explicit views of self Self-esteem Identity Life story, personal myth	Overt behaviour Stream of consciousness Life course - Career paths - Historical accidents
External Influences	**External Influences cont.**
Developmental influences - Parent-child relations, practices - Peer socialisation - Education - Traumatic events Macroenvironment - Culture, subculture - Historical era - Family, neighbourhood, vocational groups	Microenvironment - Situational constraints - Social cues - Motivational pressures, opportunities - Reinforcements, punishments

Note. Adapted from "Toward a New Generation of Personality Theories: Theoretical Contexts for the Five-Factor Model," by R. R. McCrae and P. T. Costa, Jr. 1996, *The Five-Factor Model of Personality: Theoretical Perspectives*, J. S. Wiggins (Ed.) (pp. 67-68). Copyright 1996 by Guilford Press, New York. Adapted with permission of the authors.

the requirements of an ever-changing social environment (Allik & McCrae, 2004; McCrae & Costa, 1996; 2008b). Thus Basic Tendencies tend to be stable while Characteristic Adaptations change.

This distinction between Basic Tendencies and Characteristic Adaptations, and the postulate that Basic Tendencies are innate structures not influenced by the environment, are among the controversial aspects of FFT. While this distinction may seem controversial, however, it is not the first time it has been identified. McCrae and Costa (2008b) identify the work of Wiggins who distinguished between genotypic and phenotypic traits and McAdams who distinguished between Level 1 and Level 2 personality variables as other approaches that adopt this distinction.

This distinction has also appeared in evolutionary psychological understandings of personality. From an evolutionary psychology perspective, personality is regarded as a complex, evolved psychological mechanism employed by human beings in order to function effectively in society. Evolutionary psychology postulates that personality could have evolved as a complex psychological mechanism in relation to human group interaction, which is vital for the survival of the species. Two of the most important features of human groups as espoused by evolutionary biology are that they are intensely hierarchical, with important reproductive resources closely linked with position in the hierarchy, and that they are characterised by elevated forms of co-operation and reciprocal alliance formation (Buss, 2003; 2009; Michalski & Shackelford, 2010) Thus in order to ensure survival in a group an individual would need to be able to co-operate with others in the group (strategic co-operation), adhere him/herself to the hierarchy (strategic facilitation) or ascend the hierarchy him/herself (strategic interference). Hence individuals developed styles of relating. Individuals with better styles of relating would have enjoyed considerable reproductive advantage over those who failed to grasp the necessary mechanisms (strategic interference) (Buss, 2009; Michalski & Shackelford, 2010). Thus certain styles of relating evolved and were passed on in the species. Therefore personality has as much a phylogenetic component as any biological mechanism and this phylogenetic development provides support for the consistent findings in psychological research recently of five universally common personality factors (Buss, 1996; 2009; MacDonald, 1998).

Personality is also influenced by the ontogenetic development of the species and the immediate environment; thus personality differences are observed in terms of the prevalence of these common factors in different contexts, cultures and individuals. Buss (2009) has

been instrumental in developing the arguments in this area and proposes in concordance with the phylogenetic, ontogenetic and immediate environment focus of evolutionary psychology that strategic individual differences in personality are a combination of "environmentally induced" and "heritably induced" adaptive problems.

Personality can thus be regarded as developing in relation to the adaptive problems within an individual's environment but not divorced from species-typical mechanisms like culture, since personality is largely the result of consistent input into species-typical mechanisms. For example, first-born children probably face different adaptive problems to later-born children and would therefore perhaps consistently across a species develop different personality styles.

Indeed there is literature supporting the fact that first-born children do exhibit characteristic styles that are different to later-born children (see Lai, 1999; Stephenson, 1997; Sulloway, 1996). Sulloway (1996) found that eldest siblings identify more with parents and authority and support the status quo more readily than younger siblings. Lai (1999) found that the eldest child is more likely to score higher on a Loss of Face questionnaire than the younger children. Given this, the point may be illustrated by saying that in South African society Indian first-born children might exhibit more Conforming personality styles and would be more concerned with Loss of Face than later-born siblings. White first-born children may also exhibit a more Conforming personality style as well as Loss of Face concerns, by virtue of being the first child. At the same time though the cultural and societal influences on elder children in the Indian community are substantially different to influences on elder children in the White community. Thus it could be argued that because of the difference in the cultures of the two groups, it is more likely that in an Indian culture – where honour is of extreme importance and the responsibility of upholding family honour lies to a greater degree with the first-born child – an Indian first-born child may be more likely to exhibit a Conforming personality style, as well as more concern with Loss of Face than a White first-born child. Hence first-born children may face specific adaptive problems according to the specific features of their context.

Strategic individual differences are also in part due to confronting different "heritably induced" adaptive problems. Genetic differences, whether they originated from selection for alternative genetically-based strategies, frequency-dependant selection, genetic noise, pathogen-driven selection for genetic uniqueness, or assortative mating, pose different adaptive problems for different individuals. Thus differences in heritable dimensions like body type, physical attractiveness, spatial ability, keenness of vision and so on influence an

individual's method of interpreting adaptive problems and developing strategic solutions to such problems. Over time these interpretations and solutions become stable, resulting in a common method of relating for a specific individual. Hence individual differences in personality arise (Buss, 2009). Thus evolutionary psychology provides a clearer way of understanding the existence and nature of basic tendencies and the differences between basic tendencies and characteristic adaptations.

The final central component of FFT is that of a Self-Concept. As indicated in Figure 2.1 the Self-Concept is a characteristic adaptation but due to its importance in psychology in general, and personality psychology in particular, it was given the status of a separate component (Allik & McCrae, 2004; McCrae & Costa 1996; 2008b). The Self-Concept is defined in Allik and McCrae (2004) as an acquired view of the self based on life experiences and social feedback. The Self-Concept can be shaped by traits. For example, an individual who is high on Neuroticism may ignore his/her talents and accomplishments and build a self image around his/her perceived faults. The Self-Concept is especially important for FFT because it is the source of information on which individuals draw when completing personality questionnaires (Allik & McCrae, 2004).

Figure 2.1 can be interpreted cross-sectionally as a diagram of how personality operates at any given time, or it can be operated longitudinally to indicate personality development (in Basic Tendencies and Characteristic Adaptations) and the evolution of the life course (Objective Biography) (McCrae & Costa 2008b). This interaction between each of the central and peripheral components is depicted via arrows and the label Dynamic Processes. The arrows indicate some of the most important paths whereby the personality components interact. The plural "processes" is used, since there are a number of quite distinct processes that may be involved in each pathway. Some examples of dynamic processes include perception, coping, role playing, reasoning, long-range planning, social comparison, selective attention, defensive denial, implicit learning and repression (McCrae & Costa, 2003; 2008b). As with the peripheral components, further detail on the dynamic processes is not given. McCrae and Costa (2008b) acknowledge this shortcoming; that, as yet, there is no adequate taxonomy of processes and that this should become a priority for personality theorists. They also argue that a complete theory of personality will need to include subtheories that elaborate on these topics. They do however provide 16 postulates, which specify how the personality system operates within the FFT approach.

2.2.3. Postulates of the FFT

The 16 postulates of the FFT appear in Table 2.2. In summary, FFT postulates that traits are biological structures that are altered by intrinsic maturation and external influences (social roles and/or expectations, changes in the environment and deliberate interventions) that affect their biological bases and cause them to manifest with different levels of intensity in the individual. Traits are organised in a hierarchical structure from narrow and specific to broad and general dispositions, with the five factors of Neuroticism, Extraversion, Openness to Experience, Agreeableness and Conscientiousness representing the highest level of the hierarchy. The social and physical environment interacts with personality dispositions to shape one's characteristic adaptations and together with the characteristic adaptations regulates behaviour. Each individual by virtue of his/her characteristic adaptations thus manifests with a unique personality. The way one behaves in any given situation is dependent on which characteristic adaptations are evoked. These will usually be congruent and consistent with one's behaviour in the past due to the information that is coherently and consistently stored in one's self-concept. Thus, individuals attend to and construe the environment in ways that are consistent with their characteristic adaptations. Individual behaviour is also partially regulated by universal cognitive affective and volitional mechanisms collectively termed dynamic processes but which as indicated previously are not specified in FFT. Some of these dynamic processes are differentially affected by the basic tendencies of the individual, which include personality traits. Individuals are therefore able to selectively influence the environment to which they respond. Maladjustment may occur at any one time when adaptations with respect to cultural values or persona goals may not be optimal (McCrae & Costa 2008b).

According to McCrae and Costa (2008b), most of the 16 postulates of the FFT are not controversial. There are only 3 statements from the postulate 1 that require discussion, given the developments in research literature of late. According to postulate 1b traits are biologically based and are not influenced by the environment. Evidence in support of this comes from genetic studies and studies on heritability (see McCrae & Costa, 2008a, McCrae et al., 2005a, Yamagata et al., 2006). However McCrae and Costa (2008b) also cite a developing body of research that demonstrates the environmental impact on basic tendencies. They concede that "the environment may under certain conditions directly affect traits but that has not yet been reliably or pervasively demonstrated" (p. 169). They cite the case of Phineas Gage, where a metal rod through the brain created dramatic changes in his personality. They also argue that psychotropic medications and psychotherapy can lead to

Table 2.2: Five Factor Theory postulates

1. Basic Tendencies

1a. Individuality. All adults can be characterized by their differential standing on a series of personality traits that influence patterns of thoughts, feelings, and actions.

1b. Origin. Personality traits are endogenous Basic Tendencies that can be altered by exogenous interventions, processes, or events that affect their Biological Bases.

1c. *Development.* The development of personality traits occurs through intrinsic maturation, mostly in the first third of life but continuing across the lifespan; and through other biological processes that alter the basis of traits.

1d. Structure. Traits are organized hierarchically from narrow and specific to broad and general dispositions; Neuroticism, Extraversion, Openness to Experience, Agreeableness, and Conscientiousness constitute the highest level of the hierarchy.

2. Characteristic Adaptations

2a. Adaptation. Over time, individuals react to their environments by evolving patterns of thoughts, feelings, and behaviors that are consistent with their personality traits and earlier adaptations.

2b. Maladjustment. At any one time, adaptations may not be optimal with respect to cultural values or personal goals.

2c. Plasticity. Characteristic Adaptations change over time in response to biological maturation, social roles and/or expectations, changes in the environment, or deliberate interventions.

3. Objective Biography

3a. Multiple determination. Action and experience at any given moment are complex functions of all those Characteristic Adaptations that are evoked by the situation.

3b. Life course. Individuals have plans, schedules, and goals that allow action to be organized over long time intervals in ways that are consistent with their personality traits.

4. Self-Concept

4a. Self-schema. Individuals maintain a cognitive-affective view of themselves that is accessible to consciousness.

4b. Selective perception. Information is selectively represented in the Self-Concept in ways that (i) are consistent with personality traits; and (ii) give a sense of coherence to the individual.

5. External Influences

5a. Interaction. The social and physical environment interacts with personality dispositions to shape Characteristic Adaptations and with Characteristic Adaptations to regulate the flow of behavior.

5b. Apperception. Individuals attend to and construe the environment in ways that are consistent with their personality traits.

5c. Reciprocity. Individuals selectively influence the environment to which they respond.

6. Dynamic Processes

6a. Universal dynamics. The ongoing functioning of the individual in creating adaptations and expressing them in thoughts, feelings, and behaviors is regulated in part by universal cognitive, affective, and volitional mechanisms.

6b. Differential dynamics. Some dynamic processes are differentially affected by Basic Tendencies of the individual, including personality traits.

Note: Reprinted from “The Five Factor Theory of Personality,” by R. R. McCrae and P. Costa, Jr. 2008b, *Handbook of Personality: Theory and Research,* O. P. John, R. W. Robins & L. A. Pervin (Eds.) (p. 166). Copyright 2008 by Guilford Press, New York. Reprinted with permission of the authors.

changes in personality trait levels. Thus postulate 1b may require rephrasing in the near future but at present McCrae and Costa (2008b) have introduced a dashed arrow in Figure 2.1 to indicate the possible influence of external factors on basic tendencies.

I would argue that currently one could make the argument that, as proposed by evolutionary psychologists and theorists like Wiggins and McAdams, we all have the genetic code for basic tendencies that is transmitted from generation to generation but the expression of these traits in each individual is unique and shaped by heritability, context and culture, resulting in what McCrae and Costa (1996; 2003; 2008b) have called Characteristic Adaptations. According to them it is these Characteristic Adaptations and not the Basic Tendencies that change. I would agree with this and emphasise that the Basic Tendencies do not change. They are the blueprint with which all human beings are born. What changes is the level of the basic tendency that is expressed over time in a specific culture as well as the level of the basic tendency expressed over time in the individual. Studies in neurology and neuropsychology are increasingly implicating brain structures and neurotransmitter functioning in personality development (see Burke, Van de Wiessen & De Win, 2010; DeYoung, 2006; Gallinat, Kunz, Lang & Neu, 2007; Gardini, Cloninger & Venneri, 2009; Luo et al., 2007). Changes in structure or neurotransmitter functioning, as in the Phineas Gage example, can alter the actual inner personality but in my opinion only by activating what is already there. Hence the initial personality potentials should be present in the genetic code of all human beings. We should all have these basic tendencies but we might differ in terms of which ones are expressed, how they are expressed and with what intensity. This expression of individual personality is influenced by cultural and evolutionary adaptation and therefore differs at the level of culture and at the level of the individual.

McCrae and Costa (2008b) also altered their initial position on postulate 1c where they asserted that traits reach mature form in adulthood and remain stable thereafter. Following this initial assertion, new empirical evidence emerged that demonstrated that there are continuing mean level changes in personality after age 30. Thus McCrae and Costa (2008b) revised their position and postulated that personality development occurs through intrinsic maturation, mostly in the first third of life but continuing across the lifespan.

The final controversial point identified by McCrae and Costa (2008b) pertains to postulate 1d and the claim that the five factors form the highest level of the personality hierarchy. In 1997, Digman found evidence for two factors of personality, namely, a Socialisation factor α and a Personal Growth factor β, based on a meta-analysis of interscale correlations in the Big Five

across 14 studies. However McCrae and Costa (2008b) argue that as yet there is insufficient empirical evidence to support this claim. This is debatable though as Rushton and Irwing (2008) argue in favour of Digman. They also go one step further to argue for a single General Factor of Personality (GFP) that forms the topmost level of personality, with Digman's two factors forming the second level in the hierarchy and the five factors the third level in the hierarchy. They provide evidence for this using the data provided in Digman's (1997) study as well as in another meta-analysis conducted by Mount, Barrick, Scullen and Rounds (2005).

Wiggins and Trapnell (1996) also make reference to a two factor model – what they term a dyadic-interactional perspective on the FFM. They argue that conceptual priority be given to the factors of Dominance (Surgency/Extraversion) and Nurturance (Agreeableness) since these two factors correspond most closely to the concepts of Agency (the existence of an organism as an individual) and Communion (the participation of the individual in some larger organism of which the individual is a part), which pervade the humanities and social sciences from classical and contemporary theories of personality to evolutionary, anthropological, sociological, cross-cultural and narrative life history perspectives.

Cheung and colleagues (Cheung et al., 2003; Cheung et al., 2008) describe a four factor model of personality, which when factor analysed with the NEO-FFI reveals a six factor solution, with the sixth factor representing Interpersonal Relatedness. However McCrae and Costa (2008a) argue that the Interpersonal Relatedness scales were subsumed with the five factor domains in a joint factor analysis of the CPAI-2 and the NEO-FFI, suggesting that this was not an independent factor.

Another approach, by Ashton and Lee (2005; 2007), provides evidence for six factors. The HEXACO model argues that a sixth factor, Honesty-Humility, exists beyond the five factors. McCrae and Costa (2008b) argue that honesty and humility correspond conceptually and empirically to the Straightforwardness and Modesty facets of Agreeableness. Therefore McCrae and Costa (2008b) argue that postulate 1d holds.

2.3. CRITIQUES OF THE FFM AND THE FFT

FFT was a bold attempt at addressing the atheoretical critique levelled against trait psychology in general and the FFM in particular. Despite the development of FFT and McCrae and Costa's (2008b) discussion of some of the limitations inherent in the theory there are still several critiques relating to the FFM and/or the FFT that need to be examined.

2.3.1. Five or more?

Block (1995; 2001) addresses the point that was also debated by McCrae and Costa (2008b) around the number of factors. He questions why five factors are regarded as representative of personality in its entirety, particularly when other studies have argued for other factors. He presents the history of the development of the FFM to demonstrate why the notion that personality consists of five factors might be flawed. Block (1995; 2001) argues that the primary data on which the lexical approach was founded were flawed. According to Block (1995; 2001), Cattell and later Tupes and Cristal and then Norman all used their own, subjective rules for choosing adjectives from the English language datasets. Block (1995; 2001) also discusses the samples used in each case and points out that the initial lists of adjectives were obtained from two specific English dictionaries.

Thus the FFM is located within a very specific English lexicon covering aspects that White males deemed important to include in the model. McCrae and Costa (2008b) reviewed some of the more dominant approaches that explore factors other than the five factors postulated in the FFM and the FFT, but there are specific non-Western personality conceptualisations that were not addressed at all by the other approaches. In support of this, Yang and Bond (1990) argue that the five factors, by virtue of their development in Western cultures, may not be comprehensive in that other factors may exist that manifest more clearly in non-Western cultures. Markus and Kitayama (1998) provide further support for this argument by arguing that

> European American models of personality have not been adopted after being compared empirically to other models of persons and found to be the best available descriptions. Most other ontologies and ideologies of personhood have yet to be reflected in the literature on personality and analysing personality in a cultural context will bring some of these alternative views to light. (p. 67)

Specific to the African context, Swanson (2007) argues that African ways of knowing tend to be conceptualised as circular, organic and collectivist rather than linear, materialistic and individualistic as is the case in Western models.

Individualism and Collectivism is commonly cited in the literature as a possible contender for a sixth factor of personality (see Laungani, 1999; Okeke et al., 1999; Rossier et al., 2005; Vogt & Laher, 2009). So too is spirituality (see Laher & Quy, 2009; MacDonald, 2000; Ozer

& Benet-Martinez, 2006; Piedmont, 1999). These constructs are particularly valid in the South African context.

2.3.1.1. Individualism/Collectivism

Broadly, constructs such as individualism and collectivism have been defined in terms of the attributes possessed by the people within a given culture reflecting either position (Triandis, McCusker & Hui, 1990). Within an individualistic society, people are viewed as independent from the group. Consequently, priority is given to personal goals over those of the group and behaviour tends to be based on personal attitudes rather than group norms (Green, Deschamps & Páez, 2005; Triandis, 2001). Conversely, collectivist societies emphasise people's interdependence within the group, group goals are given priority and people's behaviour is largely regulated by group norms rather than personal attitudes. Therefore, people in a collectivist society are mainly interested in maintaining relationships with others and avoiding conflict (Green et al., 2005; Triandis, 2001).

From the discussion above it is clear that Individualism/Collectivism can be viewed at both the societal and individual levels. At the societal level, it may be argued that Individualism/Collectivism is a cultural phenomenon and not necessarily a personality trait. However it is clear from the research by Cheung and colleagues (Cheung et al., 2003; Cheung et al., 2008) that these cultural manifestations have an individual basis and individuals demonstrate characteristics that can be associated with either individualistic or collectivist dimensions. Triandis, Leung, Villareal and Clack (1985) made this distinction by referring to Individualism/Collectivism at the cultural level and Idiocentrism/Allocentrism at the individual level. However the terms idiocentrism and allocentrism do not appear frequently in the literature even when reference is being made to the individual level. Hence I refer to Individualism/Collectivism throughout this study and, unless otherwise indicated, I am referring to the level of the individual and individual differences in personality.

Markus and Kitayama (1998) contrast the interdependent view of the person in collectivist cultures with the independent, self-contained, autonomous being in individualistic cultures and refer to the collective construction of personality in Asia that fosters relationality. In a similar vein, Ellemers, Spears and Doosje (2002) argue that the individualistic culture of Western societies might have led to the dominant adoption of personal self and personal identity as the explanatory framework to explain group processes and intergroup relations, although substantial empirical findings also support the importance of social identity in understanding group dynamics.

Furthermore, Cross and Markus (1999, cited in McCrae et al., 2004) argue that “personality traits, as distinctive and enduring aspects of individuals are essentially a Western phenomenon; in non-Western, collectivist societies, personality characteristics are fluid, determined more by transient interpersonal situations than by enduring traits” (p. 180). This is supported by research. For example, Shweder and Bourne (1984, cited in Pervin, 1994) asked respondents in India and the United States to describe the personality of a close acquaintance. Americans were more likely to use trait terms while Indians were more likely to describe people in terms of their actions. Additionally, Indians were much more context dependant in their person descriptions, leading Shweder and Bourne (1984, cited in Pervin, 1994) to conclude that the Indian view of the person is much more embedded in a social matrix, whereas the individualistic American culture treats the person as separate from group contexts and social norms. This contention has been supported in more recent research as well. Based on work undertaken with Indian and British samples, Laungani (1999) argues that there are four interrelated core factors that distinguish Western and Eastern cultures. These are Individualism/Collectivism, Cognitivism/Emotionalism, Free Will/Determinism and Materialism/Spiritualism. The Indian persona is characterised as corresponding more to the collectivism, emotionalism, determinism and spiritualism ends of the continuum (Laungani, 1999). Lodhi, Deo and Belhekar (2002) also provide evidence for a collectivist dimension to the Indian persona.

Cheung et al. (2008) argue for a collectivist dimension to be included in personality and do this via the inclusion of an Interpersonal Relatedness factor in the CPAI-2. According to Cheung et al. (2008), this factor was derived indigenously from a collectivist cultural context and can be conceptualised in terms of Confucian philosophy. According to Cheung et al. (2008) the qualities of humanity and social propriety may be manifested as “inner sageliness and outer kingliness” (nei-sheng-wai-wang) (p. 92), where equilibrium is achieved through personal cultivation and self-discipline (sageliness within), and loving people by behaving according to propriety (kingliness without).

Mazrui and Levine (1986) argue for a distinct African personality, stating that

> [t]he great genius of Africa lay not in the European concepts of rationality, but in indigenous capacities for intuition; not in the principle of scientific method and objectivity, but in the wisdom of custom and instinct; not in cold analytical reason but in warm responsive emotion. (pp. 73-74)

He cites Senghor as having described the African personality as, “Emotion is Black. Reason is Greek” (p. 74). In keeping with this, Mwamwenda (2004) argues that the African

personality has a distinct tendency towards dependence rather than independence. Africans tend to live and think in the context of the community. Mpofu (2001) also argues in favour of the existence of a collectivist dimension and discusses this in relation to the Shona culture in Zimbabwe. Ma and Schoeneman (1997) examined the self-concepts of a sample of people in Nairobi as well as a sample of students in America. They found that the urban, formally educated Kenyans showed self-concepts with some individualistic tendencies, while the more traditional Kenyans had more collectivist tendencies. The Americans demonstrated the most individualistic tendencies.

In a South African context, Eaton and Louw (2002) investigated the impact of Individualism/ Collectivism on constructions of self in English and African-language speakers at universities in South Africa. They found that compared to English speakers, African-language speakers tended to use more interdependent and concrete descriptions characteristic of the collectivist dimension. It can be argued that this collectivist dimension in South Africa is best captured by the indigenous term “Ubuntu” (humanness). Ubuntu originates from an African aphorism, “umuntu ngumuntu ngabantu” (isiZulu version) or “motho ke motho ka batho” (Sesotho version), which translates as, “a person is a person through persons”. Ubuntu as it is concerned with relationships towards others is defined by reverence, respect, sympathy, tolerance, loyalty, courtesy, patience, generosity, hospitality and co-operativeness (Louw, 2001; Naidoo et al., 2008; Shutte, 2001).

Louw (2001) argues that Ubuntu is not an absolute collectivist dimension that subsumes the individual and subjects everyone to a communal identity. Rather it incorporates dialogue and promotes the functioning of the individual in the community, giving precedence to the community. Hence the African preference for co-operation and groupwork (shosholoza) or as a Sepedi (Northern Sesotho) saying dictates: “Feta kgomo o tshware motho” (if one is faced with a decisive choice between wealth and the preservation of life, then one should opt for the preservation of life [Louw, 2001, p. 6]). According to Swanson (2007), “Ubuntu” focuses on human relations, attending to the moral and spiritual consciousness of what it means to be human and to be in relationship with an-Other (p. 55)”. Ubuntu stems from the philosophy that community strength grows from community support and that dignity and identity are achieved through mutualism, empathy, generosity and community commitment.

The essence of Ubuntu is best captured by Archbishop Tutu (1999):

> Ubuntu is very difficult to render into a Western language. It speaks of the very essence of being human. When we want to give high praise to someone we say, ‘Yu, u nobuntu;’ ‘Hey, so-and-so has ubuntu.’ Then you are generous, you are hospitable,

> you are friendly, caring and compassionate. You share what you have. It is to say, 'My humanity is caught up, is inextricably bound up, in yours.' We belong in a bundle of life. We say, 'A person is a person through other persons.' It is not, 'I think therefore I am.' It says rather, 'I am human because I belong. I participate. I share.' A person with Ubuntu is open and available to others, affirming of others, does not feel threatened that others are able and good, for he or she belongs in a greater whole and is diminished when others are humiliated or diminished, when others are tortured or oppressed, or treated as if they were less than who they are. (p. 31)

This exposition of Ubuntu is important for a number of reasons. Firstly, it clearly brings across the collectivist understanding of the individual in community. Secondly, the fact that Bishop Tutu indicates that Ubuntu is difficult to translate into Western language suggests that it is more than likely that this description was bypassed by the FFM, which originated in the English lexicon. Thirdly, the description of traits associated with Ubuntu (generous, hospitable, friendly, caring, compassionate, open and available to others, affirming of others, does not feel threatened that others are able and good) are traits that are linked to Extraversion and Agreeableness in the FFM. Hence it may be argued that these are subsumed in the FFM. I would like to argue though that the flavour of these traits as operationalised in the FFM is of a more individualistic nature. Furthermore Tutu (1999) describes an openness and availability to others that is not captured in the FFM, not even in the Openness to Experience domain. All of the domains measure personality as an expression of individual traits and behaviours. Items on the NEO-PI-R are also phrased at that level. The CPAI-2, on the other hand, acknowledges this collectivist dimension and takes account of the relatedness and connections between people. This is evident from the nomenclature of the factors in the model proposed by Cheung et al. (2008). Social Potency, Accommodation, Dependability and Interpersonal Relatedness all have a communal flavour to them. The Social Potency factor in the CPAI-2 is purported to have been created to represent the Openness to Experience dimension as it may be expressed with Chinese individuals. While Cheung et al. (2008) debate the utility of the Openness dimension in the Chinese culture, even after adding Social Potency and its subscales, the fact that it was evident that a more social and communal expression of the Openness factor was needed suggests the current limitation of the FFM in this regard. The inclusion of scales like Face, Family Orientation, Defensiveness, Traditionalism versus Modernity, Harmony and Relationship Orientation in the CPAI-2 also attests to individual differences not wholly covered in the FFM. The similarities of this to evolutionary psychology, individualism versus collectivism and Wiggins and Trapnell's (1996) Agency and Communion should be noted.

This understanding of “Ubuntu” collectivism concurs with research on the horizontal and vertical aspects of individualism and collectivism, which has demonstrated that both concepts have subdimensions and are not merely bipolar constructs and that variation on dimensions of individualism and collectivism can occur across and within cultures (see Green et al., 2005).

According to Triandis (2001), although Individualism and Collectivism are useful in terms of analysis, it would be gross stereotyping to assume that every individual within a certain culture would have all the characteristics of that culture. As a result, a distinction can be drawn between different types of individualistic and collectivist societies. This difference is due to the degree of emphasis placed on what have been termed horizontal and vertical social relationships. The former (horizontal) describes equality among individuals and the latter (vertical) a hierarchical structure where individuals differ in status. Using these two dimensions, four distinct patterns within cultures have been identified, namely, horizontal Individualism, vertical Individualism, horizontal Collectivism and vertical Collectivism (Triandis & Gelfand, 1998). Horizontal Individualism describes a society with people who want to be distinct from the group, and are highly self-reliant but not interested in the acquisition of status. With vertical Individualism, people are competitive with others for the purpose of acquiring status. In societies operating from the horizontal Collectivist position, equality, interdependence, sociability and common goals are emphasised, while people may not necessarily submit to authority. Lastly, vertical Collectivism is typified by people who will subjugate their goals for that of the group, especially if it is for the sake of the group’s integrity, and ultimately these individuals will submit to authority (Triandis, 2001; Triandis & Gelfand, 1998).

Critics have argued though that the concept of Ubuntu is overstated, that it does not exist as has been purported in the literature. Rather, according to Marx (2002), it has been appropriated in a post-apartheid context to sustain a “nationalist ideology” that glorifies an imagined past; it has been promoted to foster conformist nation-building by a new political elite. However Swanson (2007) distinguishes between two views on Ubuntu. There is the Ubuntu of cultural nationalism as interpreted by the political leadership in South Africa and then there is the Ubuntu that serves as a guiding principle for the ethics of personal relationships. It is the latter that I have been espousing in this discussion.

Ritts (2001) highlights another important point about collectivist cultures, in that they tend not to attend to the needs of all others, but rather to those whom they deem to be part of the in-group, such as immediate and extended family members and long-term work and interest

groups. Thus even when Ubuntu is about personal relationships, it is quite self-serving in a communal way. This can also explain why nepotism is frequently accepted in non-Western cultures but not in Western cultures.

To conclude, there is sufficient evidence to suggest that an Individualism/Collectivism distinction in personality, particularly in the FFM and the FFT, is necessary. Tutu's (1999) exposition of Ubuntu being the "very essence of being human" suggests something that is innate and, in the language of FFT, most likely a basic tendency. The constructs of Agency and Communion, as proposed by Wiggins and Trapnell (1996), also suggest that this forms the very basis from which all other traits originate. However, the arguments presented above indicate that aspects of this collectivist dimension are tapped in the domains of Agreeableness, Extraversion and Openness to Experience but in an individualistic way. It is unclear both from the literature presented and in my current conceptualisation whether the Individualism/Collectivism dimension should be a separate factor measured across individuals or whether it is an underlying cultural mechanism that needs to be incorporated in the flavour of items, scales and factors in the FFM. Further research is warranted.

In her definition of Ubuntu, Swanson (2007) refers to a "moral and spiritual consciousness of what it means to be human" (p. 55). This highlights another aspect that is central to African personality and something that is not covered by the FFM in particular and that is the spiritual dimension.

2.3.1.2. Spirituality and personality

Kirkpatrick (1999) proposes that personality psychology is a natural home for studies on spirituality. Efficace and Marrone (2002) believe that personality is a combination of mind, body and spirit, and by considering only one of these three domains, the psychologist has a narrow view of human nature.

Personality is defined within a South African context as "the constantly changing but nevertheless relatively stable organisation of all physical, psychological and spiritual characteristics of the individual which determines his or her behaviour in interaction within the context in which individuals find themselves" (Meyer et al., 2003, p. 11). Sow (1980) proposes an African model of personality where the individual is shaped by four principles, with the first representing the body, the second a vitality principle linked to physiological functioning, the third another vitality principle akin to psychological functioning and the final, inner layer being that of the spiritual principle. According to Sow (1980), these concentric layers of the personality are in constant relationship with the environment (ancestors, family

and community). Ajani-ya-Azibo (1991) postulates the requisites for a metatheory of the African personality that is not too different to Sow's – an African personality metatheory that among other things would seek to explain the nature of the spiritual essence underlying human personality. Thus, research is needed on the interplay between the spiritual, mental and physical dimensions of the human being and how this interplay influences personality and psychological functioning. In 1994, Ogbonnaya addressed this to some extent, citing many examples where the spiritual realm influences both the development of the person and his/her functioning in the environment. More recently, Mkhize (2004) presented an African metaphysical ontology that also emphasises the role of the spiritual dimension in shaping the individual.

Paranjpe (1998; 2010) cites a similar model of the person in Indian culture. Five concentric layers are identified, namely, the body, the "breath of life" or physiological processes, the "mind" or sensory function co-ordinator, the intellect and cognitive aspects of an individual including self-image, and the "jiva" or the seat of experience of bliss. Allik et al. (2009) also argue that the spirituality dimension is absent in Western culture and, by implication, Western research. Allik et al. (2009) argue that the concepts of dusha (soul), sud'ba (fate) and toska (melancholy) are characteristic of the Russian mentality and in Russian discourse a high proportion of themes are linked to dusha. Islamic cultures also emphasise the importance of a spiritual dimension in shaping all aspects of the individual. A person in Islam is conceptualised as being the combination of four interacting parts, namely, mind (Aql), body (Jism), self (nafs) and soul/spirit (Ruh). All four parts interact continuously with each other to maintain a harmonious balance in the body (Ashy, 1999; Al-Zeera, 2001; Carter & Rashidi, 2003). Thus the concept of spirituality is not unique to African cultures. It plays an important part in a number of non-Western cultures but is as yet not recognised in contemporary Western models.

It is possible, as argued earlier, that Western models like the FFM see spirituality as subsumed in the Openness to Experience factor, but research by MacDonald (2000) and Piedmont (1999) suggests otherwise. MacDonald (2000) explored the links between basic personality composition and spiritual concerns and behaviours using the Expression of Spirituality Inventory and found five distinct components of personality related to spirituality that are differentially related to the Big Five personality constructs but are not subsumed by them. The five components described by MacDonald (2000) that constitute spiritual concerns are Cognitive Orientation towards Spirituality (perceptions and attitudes regarding spirituality), Paranormal Beliefs (including extrasensory perception and other paranormal phenomena), Existential Well-Being (a sense of meaning, purpose and resilience regarding

one's existence), Experiential/Phenomenological (mystical, transcendental and transpersonal experiences) and Religiousness (religious practices). Cognitive Orientation towards Spirituality and Religiousness were related to Agreeableness and Conscientiousness followed by Extraversion. Openness to Experience was most related to Experiential/Phenomenological and Paranormal dimensions, weakly related to Cognitive Orientation towards Spirituality and unrelated to Religiousness. Existential Well-Being was strongly and inversely related to Neuroticism. MacDonald (2000) concludes that despite the conceptual relatedness between spirituality and the FFM, four of the five dimensions of spirituality are conceptually unique relative to the FFM of personality. Only Existential Well-Being seems to reflect the positive pole of Neuroticism. Thus he argues that the FFM is incomplete and lacks a domain that addresses personality (p. 192).

Piedmont (1999) found similar results using the Spiritual Transcendence Scale (STS). Piedmont (1999) refers to spiritual transcendence as "a fundamental capacity of the individual, a source of intrinsic motivation that drives, directs and selects behaviours" (p. 988). He developed a measure of spiritual transcendence, the STS, with universality, connectedness and prayer fulfilment subscales that constitute an approximation of what he conceptualised as spiritual transcendence. He found that the STS had similarities to the FFM in the domains of Extraversion, Openness to Experience and Agreeableness but that there was no FFM profile for someone with a high score on spirituality as it cut across all of the domains. This made spirituality a construct that could be regarded as being included within the existing domains of the FFM but not sufficiently subsumed by them (Piedmont, 1999).

Core to this body of research is the distinction between spirituality and religiosity. According to Piedmont (1999), spirituality emphasises a personal search for a connection with sacredness, while religion is more concerned with the social emphasis on encountering the divine. Spirituality is an individual, experiential and more affective process, whereas religiosity is a more socially/collectively shared systematic belief system in which cultural and cognitive factors play a part (Pargament, 1997). Spirituality is therefore a larger, umbrella term that incorporates both religious and secular aspects associated with transcendence and is concomitant with concepts such as one's ascribed meaning in life, hope, and self-esteem.

According to McCrae (1999), research into the FFM and religious phenomena is lacking. He argues further that given the role religion plays in the lives of most people, it is essential that the personality-religion association be explored. In terms of the FFM he cites research that supports associations between Agreeableness, Conscientiousness and religiosity but suggests that the relationship between Openness to Experience and religious phenomena

provides the most interesting result, with high Openness being associated with spirituality and Closedness with religion.

Saroglou (2002), in his meta-analysis of 12 studies exploring the FFM and aspects of religiosity, found in general that religiosity correlated positively with Agreeableness and Conscientiousness and to a lesser degree with Extraversion. Openness to Experience was negatively related to religious fundamentalism but positively and negatively related to intrinsic religious orientation, depending on how intrinsic religious orientation was defined. Extrinsic religious orientation was associated with high Neuroticism, and intrinsic religious orientation (again depending on definition) was positively associated with Emotional Stability. Overall effect sizes in Saroglou's (2002) study were small.

A closer examination of three studies included in the meta-analysis yield somewhat differing results. Taylor and MacDonald (1999) found negative correlations between Neuroticism and Openness to Experience and intrinsic religious orientation and positive correlations between Agreeableness and Conscientiousness and intrinsic religious orientation. Kosek (1999) found that Agreeableness and Conscientiousness were positively related to an intrinsic religious orientation and Extraversion was positively related to an extrinsic religious orientation. MacDonald (2000) explored the relationship between spirituality and the FFM, but within his Expressions of Spirituality Inventory he included a subscale called Religiousness, which he describes as being akin to an intrinsic religious orientation. According to MacDonald (2000) religiousness relates most with Agreeableness and Conscientiousness, followed by Extraversion to a lesser extent. Religiousness was not found to be related to Openness to Experience. As with spirituality, religiosity does not seem to be subsumed in the FFM of personality. However, McCrae (1999) argues as to whether religiosity has enough depth as a construct to stand alone as a factor of personality or whether it is an attitude or ideology, a learned set of beliefs and practices. He therefore suggests that measures of religiosity be regularly included in personality studies particularly in behaviour genetic studies.

The lack of spirituality in Western models of research may also be attributed to the rejection of religious ideals and principles in favour of science and empirical evidence, a shift that occurred in the late nineteenth century. Increasingly a number of beliefs promoted by the Christian church (not necessarily congruent with the teachings of Christianity or the Bible) were proved to be false particularly as they pertained to mental illness and the treatment of those with mental illnesses (Cartwright, 2008). This scepticism and disillusionment with religion together with the difficulty of subjecting religious and spiritual thought to empirical

observation is possibly another reason why researchers and theorists at the time failed to incorporate spirituality into Western theories. This has perpetuated to the point where current theory still has little recognition of these dimensions despite their widespread acceptance and use in other cultures.

2.3.1.3. South African Personality Inventory Project

Most recently Rothmann and colleagues (Laher, 2010; Meiring 2006) launched the South African Personality Inventory Project (SAPI). The project aims at developing a single, unified personality inventory for South Africa that incorporates both universal (etic) and unique (emic) personality factors found across the diversity of cultures in this country. The first stage of this project explored indigenous perceptions of personality primarily through the work of Nel (2008). He explored personality structure in each of the 11 language groups in South Africa. Structured interviews were conducted in the native languages of 1 308 South Africans to gather information about personality-descriptive terms. This resulted in 50 000 personality-descriptive terms, which were reduced to 190 personality dimensions via the use of cluster analysis. The 190 dimensions were further clustered and finally resulted in 9 clusters, namely, Extraversion, Soft-Heartedness, Conscientiousness, Emotional Stability, Intellect, Openness, Integrity, Relationship Harmony, and Facilitating, with the first 6 labels being more closely related to the FFM and the last 3 being more indigenous personality constructs (Nel, 2008). The quantitative phase of this project is currently under way and involves administering 2 500 items on 4 language groupings in South Africa. Results have not as yet been published for this (Meiring, 2010).

From the above discussion it is clear that both the FFM and the FFT might be erroneous in the assumption that only five factors form the highest level in the hierarchy. Digman (1997) and Wiggins (1996) suggest only two factors, while a number of studies – particularly those from Asian or African contexts – suggest the need to include at least two more factors, namely Individualism/Collectivism and Spirituality. Debates do exist in terms of whether Individualism/Collectivism operates at the level of the individual or only at the cultural level but the evidence presented in this section in terms of Interpersonal Relatedness, Ubuntu and the scales of the SAPI suggests an individual expression of this dimension. Furthermore, the fact that Wiggins and Trapnell (1996) suggest Agency and Communion as the two most important personality factors in their dyadic interactional model also speaks to the importance of this distinction.

The arguments made for Spirituality as another factor are also valid but it can be argued that the Openness to Experience dimension explores aspects related to this dimension. However

an examination of the facets and items of the Openness to Experience factor suggests views that are not congruent with a more spiritual or religious outlook. Hence it may be argued that the current operationalisation of Openness to Experience may be biased against spiritual or religious persons and does not wholly represent the construct of spirituality that is core to personality in a number of non-Western cultures. This brings to the fore arguments on the facets that best represent the five factors.

2.3.2. Specifics of facets

According to McCrae and Costa (2008a) the FFM does not provide adequate evidence for the facets to be included in a comprehensive assessment of personality. Yet, facet scales offer incremental validity over the five factors in predicting a variety of criteria, and facets within a domain may show different developmental trajectories (McCrae & Costa, 2008a). Despite this, there is no consensus on which specific traits should be included in the system or even how one would go about identifying facets (McCrae & Costa, 2008a). I would go a step further and say that the current group of facet scales available in the FFM are limited. If the arguments made in the previous section hold, more facet scales would need to be developed. Furthermore work that McCrae and Costa (2008b) claim is subsumed in the FFM with regard to the CPAI-2 and the HEXACO model would need to be more explicitly incorporated into the FFM and ultimately into FFT.

In the South African context, the development of the SAPI (Laher, 2010; Meiring, 2006; Nel, 2008) suggests new facets as well as slightly different facets to express traditional domains. For example, the scale of Relationship Harmony is seen as one of the dimensions indigenous to South Africa and consists of the subscales of Approachability, Conflict-Seeking, Interpersonal Relatedness (also a factor on the CPAI-2) and Meddlesome. These scales, particularly those of Interpersonal Relatedness and Meddlesome, are not covered by the FFM. Extraversion is a universal scale but in the South African context with the SAPI it has subscales of Dominance, Expressiveness, Positive Emotionality and Sociability (Nel, 2008). Expressiveness is defined as the inclination to share one's feelings or problems with others and can be seen as a combination of Warmth (E) and Feelings (O) on the NEO-PI-R. Positive Emotionality can be seen as a combination of the Extraversion Positive Emotions facet as well as the Extraversion facet of Gregariousness. The finding with regard to Sociability is similar. However the facets of Excitement-Seeking and Activity do not appear in

the SAPI operationalisation of Extraversion, indicating the different flavour of some of the domains in other cultures.

The situation with the Basic Traits Inventory (BTI) is similar. The BTI is a personality inventory developed in the South African context in accordance with the FFM (Taylor, 2004; Taylor & De Bruin, 2005). It measures the five factors of Neuroticism, Extraversion, Openness to Experience, Agreeableness and Conscientiousness but, unlike the NEO-PI-R, the BTI has five facets within each factor. The nomenclature and flavour of some of the facets are similar to those of the NEO-PI-R but others have a slightly different focus. For example, Extraversion on the BTI consists of Gregariousness, Positive Affectivity, Ascendance, Excitement-Seeking and Liveliness (Taylor, 2004; Taylor & De Bruin, 2005). Although not as clearly evident as with the SAPI example, it is possible to note the differences in the construct meanings and operationalisations across cultures.

2.3.3. FFT critiques

As I indicated in the previous section I do think FFT has a lot to offer personality psychology particularly towards the trait approach within personality psychology. However while writing up the FFT components and postulates for this chapter, I did find that the FFT was limited in terms of its descriptions and explanations for most parts of the system. Understandably there are parts of the theory that are dependent on research that has yet to be conducted and are therefore not fully understood but I am inclined to say that Block (2001) has a point when he concludes that “no specific theoretical consequences are entailed by the five factor postulates; no sense is provided of the specific dynamics of personality” (p.105). However, unlike Block (2001) I would not go as far as to conclude that, “It is not a theory in the sense of ‘an interpreted deductive system”’ (2001, p. 105). Having read the work of Mayer (1998; 2005), Higgins (2008) and McAdams (McAdams, 1996; McAdams & Pals, 2006; McAdams & Walden, 2010), I see value in considering their approaches with FFT to develop an integrative framework for personality theory. From the inception of personality psychology as a separate field of study, Allport (1937) and Murray (1938) believed that it had the potential to contribute to the rest of psychology by suggesting ways in which findings from a variety of subfields – ranging from biopsychology to clinical practice – might be integrated to create an understanding of the individual person.

McAdams proposes five principles for integrating the Big Five model of personality traits with the self-defining features of psychological individuality that develop in relation to situated

social tasks and the human need to make meaning in culture (McAdams & Pals, 2006; McAdams & Walden, 2010). Personality is thus conceived of as,

> (a) an individual's unique variation on the general evolutionary design for human nature, expressed as a developing pattern of, (b) dispositional traits, (c) characteristic adaptations, and (d) self defining life narratives, compexly and differentially situated (e) in culture and social context. (McAdams & Pals, 2006, p. 204)

This model is not too different to FFT as proposed by McCrae and Costa (2008b) but it does provide more detail on the peripheral aspects that are not so well defined in FFT. McAdams and Walden (2010) agree with McCrae and Costa (2008b) in that traits form the first and basic level of personality but they also argue for a second level, that of individual goals, and finally a third level of personality that encompasses an individual's internalised life story or what they call "narrative identity" (p. 54). Thus, according to McAdams and Walden (2010), "personality is no longer only about consistent individual differences in actors' social performances. It is now also about consequential variation in how motivated agents understand and pursue their own particular goals and values, situated in time and social context" (p. 54). McCrae and Costa (2008b) do argue for the development of subtheories to address some of the points, and the work of McAdams (McAdams & Pals, 2006; McAdams & Walden, 2010) can feed into this, particularly at the level of the peripheral components, namely Objective Biography, Self-Concept and External Influences.

Higgins (2008) discusses the relationship between personality and culture with a focus on using motivation as the link between the two. Higgins (2008) argues that in order to address the link between personality and culture, five criteria need to be fulfilled. Firstly, the universal principles of human functioning that underlie both culture and personality need to be identified. Higgins (2008) makes an argument that the same psychological states are involved and thus the same general principles can be applied when considering personality and culture. However he argues that because the same general principles apply, one cannot assume that the level of analysis for both areas is the same. Hence he identifies and discusses the second criterion – the necessity of handling the principles for both areas at different levels of analysis. Following this it becomes important to define culture and personality in terms of the universal principles identified but also to maintain the integrity of the concepts (third criterion). Higgins (2008) does this using motivational principles, particularly the human motive to share inner states, regulatory focus orientations (promotion and prevention) and regulatory mode orientations (locomotion and assessment). He proposes for the fourth criterion the selection of specific psychological factors that, because of their survival value, are present in every culture and every individual although to varying

degrees. For the final criterion he discusses how different cultures and personalities emerge from the variability in the predominance of those specific psychological factors. Higgins (2008) discusses these criteria with a developmental focus particularly on the 3- to 6-year period of child development. He concludes his arguments by providing initial support for his proposed model using the Regulatory Focus Questionnaire and the Regulatory Mode Questionnaire with student samples in Australia, India, Israel, Italy, Japan and the U.S.A., suggesting that motivation has a role to play in the link between culture and personality (Higgins, 2008).

By virtue of its developmental focus as well as the incorporation of both cognitive and psychodynamic principles, Higgins's (2008) approach adds value to personality psychology. It provides a basis for an integrative approach to understanding personality and culture and within the FFT has the potential to explain some of the dynamic processes that underlie this relationship. Although McAdams (McAdams & Pals, 2006; McAdams & Walden, 2010) also addresses the role of individual motivation as the second layer of personality, and even though he also addresses personality within a developmental framework, his arguments appear to fit best with describing the peripheral components, while the work of Higgins (2008) appears to fit in more with what is expected from the dynamic processes in FFT.

McCrae (2009) argues that Higgins's understanding of the relationship between culture and personality operates at the level of characteristic adaptations not basic tendencies. From my reading of Higgins's work, it appears that he regards psychological mechanisms and states involved in personality and culture as well as the human motive to share inner states as basic tendencies. These interact with the environment in five steps, which I see as contributing to the dynamic processes that shape characteristic adaptations resulting in an individual's personality. There are also some similarities in Higgins's (2008) understanding of personality and culture and McCrae's (2009) concept of ethos. McCrae (2009) argues that personality traits form a well studied taxonomy, which could provide a framework for the systematic description of many aspects of culture via the concept of ethos, that is, traitlike characteristics that can be used to describe the institutions and customs of culture. Hence McCrae (2009) proposes the identification of institutional equivalents of the 240 NEO-PI-R items, which will allow for the exploration of ethos.

Unlike McAdams and Higgins, Mayer (2005) does not present a theory for understanding personality. Instead, he proposes a broader systems framework for integrating the current disparate and fragmented field of personality psychology. Hence Mayer (2005) proposes a systems framework focusing on four topics, namely identifying personality, personality's

parts, its organisations and its development. He then illustrates how these can be used to classify information from the various theories and then perhaps to form an integrative theory. Mayer's (2005) systems framework is not novel. Most personality theories set out to address all four aspects. However it is common for a theory to identify and define personality and then provide more detail on one or two of the other topics while neglecting the remainder as in the case of FFT. FFT addresses structure and to some extent organisation and development but the *level of detail* in organisation and development still needs to be addressed. Thus, Mayer's (2005) proposal is a seductive one but it poses a huge challenge to anyone willing to implement it. Integrating the disparate approaches in personality psychology will no doubt be of value but it is a task of difficult proportions.

2.3.4. Traits are cognitive fictions

Mischel (1968) argues that traits are cognitive fictions. He defines them as beliefs held by laypersons about themselves and others that have no basis in fact. As such, traits should not exist. McCrae and Costa (2008b) address this critique by presenting evidence from consensual studies, studies of heritability, cross-cultural studies and studies of trait stability. This evidence, accumulated over 40 years, indicates that traits are valid indicators of personality.

Stemming from the work of Mischel (1968) and located largely within the cognitive behavioural paradigm, a new generation of criticisms against the FFM and the FFT have emerged in the work of Cervone (2004a; 2004b). Cervone (2004a) is sceptical of the five factor approach primarily because of its focus on "between-person factor-analytic constructs" (p. 35). He argues that the five factor approach is not tenable at the level of the individual since it cannot explain the dynamic nature of personality as it occurs in a particular person. Hence he proposes an approach that highlights "within-person cognitive and affective dynamics rather than mere individual differences; self-regulatory and agentic processes rather than merely persons' dispositional tendencies and the dynamic transactions between persons and sociocultural environments that contribute to personality development across the lifespan" (p. 115). Cervone (2004a) conceptualised the Knowledge and Appraisal Personality Architecture (KAPA) theory located within a social-cognitive structure as a potential way to overcome the limitations of between-subject approaches like the FFM and the FFT. KAPA emphasises two cross-cutting principles – directions of fit and knowledge/appraisal and these are used to yield a system of six classes of personality variables as indicated in Figure 2.2.

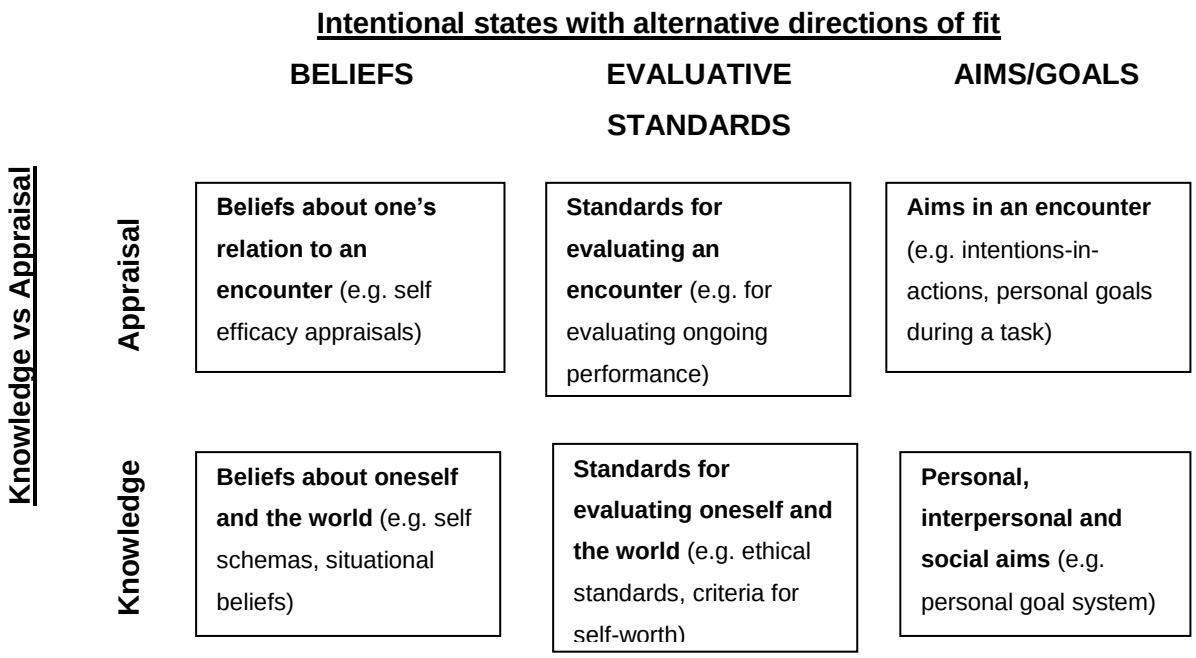


Figure 2.2: The KAPA system of social-cognitive personality variables

Note. Reprinted from "Personality Assessment: Tapping the Social-Cognitive Architecture of Personality," by D. Cervone, 2004a, *Behavior Therapy, 35,* 122. Copyright 2004 by Elsevier. Reprinted with permission of the author.

If one considers the FFT approach presented in Figure 2.1 and the KAPA approach presented in Figure 2.2 the differences are apparent. The FFT appears to be more of a structural approach to personality while the KAPA theory is more of a process approach. Perhaps I may be naïve to contend that these two approaches can be viewed as complementing each other rather than as two separate entities. I agreed with the critics cited earlier (Block, 2001; Cervone, 2004a; 2004b) that FFT is thin in its explanation of the peripheral components and the dynamic processes linking the central and peripheral components in the model. McCrae and Costa (2008b) acknowledge this to an extent, calling for subtheories to be developed that would explain these components. KAPA theory might be one of those theories that could be incorporated with FFT to explain dynamic processes. The focus on self-regulatory and agentic processes and the dynamic transactions between persons and sociocultural environments is resonant with the arguments proposed by McAdams (McAdams & Pals, 2006; McAdams & Walden, 2010) and Higgins (2008). Understandably the approaches are located within different paradigms and subscribe to different assumptions about human nature but, as indicated in McCrae and Costa (2008b),

advances in research methods – particularly as they pertain to psychophysiological research and genetic studies – might very well provide common ground for these two approaches.

2.3.5. Causality and latent variables

Cervone (2004a) repeatedly refers to the five factor approach as being a between-subjects factor-analytic system. He argues that when psychological tendencies are studied one person at a time the FFM only emerges in about 10% of the cases. Furthermore when exploring the factor model for each individual, a unique model emerges with different factors or different numbers of factors; and when these are pooled, Cervone (2004a) argues that the resultant between-person population-level factor structure is not an adequate representation of the individual. Thus, he concludes that the five factor approach fails to identify psychological features with causal force.

Cervone (2004a) uses the arguments by Borsboom et al. (2003) to support his argument. Borsboom et al. (2003) argue that latent variables appear in two distinct ways – as a formal theoretical concept and as an operational-empirical concept – but that these two concepts need to be connected. They propose a third ontological concept, that of realism, to do this. Realism is based on the assumption that there is something real in the world that gives rise to individual differences in observed variables. This realist view requires an account of the relation between the latent variable and its indicators. Thus, for the FFM the assumption would be that there is something real in the world that gives rise to individual differences in observed variables (McCrae & Costa, 2008a). McCrae and Costa (2008a) argue that this requirement is met by the FFT, which postulates real basic tendencies underlying personality development and expression but Cervone (2004a) and Borsboom et al. (2003) are not fully convinced of this. According to Borsboom et al., variation across traits can only be observed across individuals and not within an individual on any given occasion. Hence the individual does not covary, and without covariation there can be no causation.

McCrae and Costa (2008a) argue that this claim is not useful for personality and the FFM, since this implies that there would be no individual differences among individuals in a particular area. They argue further that if it were the case that the FFM and, by implication, the NEO-PI-R, was not useful at the individual level, clinicians would not have been using it. Finally, they agree with Cervone (2004a) and Borsboom et al. (2003) that the FFM is not an adequate explanation of personality and personality functioning and they propose that the FFT is an attempt to address these issues. Despite this, Cervone (2004a) and Borsboom et al. (2003) conclude that “FFT cannot in principle be a useful framework for explaining

behavior because the whole category of basic tendencies offer mere descriptions rather than causal explanations, and so cannot be a legitimate link in a causal chain" (cited in McCrae & Costa, 2008a, p. 289). In response to this, McCrae and Costa (2008a) argue that the distinction between description and explanation identified by these critics is better viewed as the distinction between proximal and distal causes or mechanistic and trait explanations. Both parties have valid arguments and the debate is an ongoing one for the moment.

Also linked to causality, trait explanations are criticised as being circular. For example, a researcher observes social behaviour. From this observation, the researcher makes inferences about the trait of sociability. Following this, the behaviour is then explained by the trait. McCrae and Costa (2008a) demonstrate why this argument does not hold by arguing that trait research is more than mere observation and inference. Usually several incidences of sociability will be observed and these will be used to make predictions about an individual's cheerfulness a year from now or the sociability of that individual's twin, for example. These non-trivial and non-circular predictions suggest that traits may have real causal status (McCrae & Costa, 2008a).

From the critique cited at the start of this section, it is evident that Cervone (2004a) is not only critical about the between-subjects nature of the data and the implications for causality but also of the technique used to generate the latent variables, namely that of factor analysis.

2.3.6. Factor analysis: A circular technique?

Cervone (2004a) expresses reservation at the consistent use of factor analysis in research on the five factors. Block (1995; 2001) concurs with this and points out at length the limitations of using factor analysis as the primary technique upon which to base arguments for five factors. The main concerns centre around the fact that observed scores are put into a system to produce latent variables. Essentially then, the technique is circular in that the inputs determine what is produced in the end. Furthermore, many of the procedures and criteria that are conventionally used at various steps in the factor analytic procedure involve decisions based on subjective criteria. As I will indicate in the methods chapter (Chapter 5), the decision around the number of factors to extract is not always the most objective. Other critics have also pointed out this limitation on numerous occasions (see Heine & Buchtel, 2009; Meehl, 1992; Millon, 1990; Pervin, 1994). However in recent years a number of techniques have been developed as indicated in my discussion and as employed in this and

other studies to ensure a more precise and objective manner in which the number of factors may be determined.

The choice of rotation is also identified as problematic (Block, 1995; 2001). Block (2001) argues that the orthagonality of the five factors has not been adequately demonstrated so as to justify the choice of orthagonal varimax rotation. In his arguments for the five factors not being orthogonal, Block (2001) makes reference to the facet of Impulsivity, which in some cases loads with Extraversion and in others with Neuroticism. Costa and McCrae (1992) make a sensible explanation for cross-loadings that applies to most cases. According to them, cross-loadings will occur since aspects of personality are related but the higher loading will always be seen on the factor on which the facet should load theoretically. I am not sure if this argument invalidates the claim of orthagonality or not, and my statistical knowledge is not of the level where I am able to comment regarding at what point orthagonality is compromised or how robust varimax rotations are in relation to this claim; but I do trust the findings of colleagues in this area, and both locally and internationally varimax rotation has been accepted as the standard method for studies in this area.

McAdams and Walden (2010) argue that over the years researchers have built up an impressive nomological network of findings regarding the five factors. According to them an impressive body of research exists that supports the construct validity of the five factors. Thus these constructs have been shown to predict robust trends in behaviour and critical life outcomes such as marital well-being and divorce, job success and longevity, among others. All of this renders the critique of the five factors being simply an empirical truth null and void (see McAdams & Walden, 2010).

2.3.7. Clinical utility of traits

Given arguments posited in the previous two sections that the FFM and the FFT focus on between-subject differences at the expense of individual differences, critics like Cervone (2004a) and Block (2001) have questioned the clinical utility of the FFM. Cervone (2004a) argues that little evidence exists to demonstrate the use of standard self-report personality tests in enhancing treatment outcomes. Block (2001) cites research that demonstrated the limited discriminatory value of the FFM in the clinical field. It is argued that more than five factors are needed for describing psychiatric symptoms. Also the five factors are accredited equal weight in terms of their clinical utility but it is only Neuroticism and Extraversion that contribute the most to understanding personality disorders (Block, 2001).

McCrae and Costa (2008a) respond to these critiques by citing research by Miller (1991) and Singer (2005), who demonstrated the utility of the NEO-PI-R in clinical practice. A number of other studies have also supported the utility of the NEO-PI-R in characterising personality disorders (see Costa & Widiger, 2002; Lowe & Widiger, 2009; McCrae & Costa, 2008a; Morasco, Gfeller & Elder, 2007; Quirk, Christiansen, Wagner & McNutty, 2003; Widiger, Costa & McCrae, 2002; Schroeder, Wormworth & Livesley, 1992; Trull, Useda, Costa & McCrae, 1995; Verheul, 2005). Finally, NEO-PI-R software is capable of comparing a client's personality profile to personality disorder prototypes and formulating hypotheses about which disorders might characterise a client (McCrae & Costa, 2008a). As with the causality debate, the clinical utility of the FFM remains an issue of contention.

2.4. CONCLUSION

This chapter has introduced the FFT as a possible framework for the FFM of personality. The development of the FFT went some way towards addressing some of the critiques levelled against the FFM but a number of criticisms still hold true for both the FFM and the FFT. These were presented and discussed in this chapter and responses to these criticisms were also explored. Based on the discussion in Chapter 1 and those in this chapter it is my opinion that the FFM is still of value despite its limitations. Located within the debates presented in Chapters 1 and 2, the current study seeks to explore the applicability of the NEO-PI-R and the CPAI-2 in the South African context. As such it will not only comment on the utility of the actual instruments but will also explore the implications for the FFM of personality and the FFT in the South African context.

CHAPTER 3: EXPLORING THE RELIABILITY AND VALIDITY OF THE NEO-PI-R AND THE CPAI-2 IN THE SOUTH AFRICAN CONTEXT

3.1. INTRODUCTION

South Africa has, since 1994, experienced and still is experiencing rapid transformation in all spheres of functioning – social, political and economic. It has become vital in this climate that past inequalities be redressed and that a way forward be found that will subscribe to the country's newfound democratic identity. Psychology, particularly psychometrics and assessment, had a controversial role in the previous political dispensation of the country and there is pressing need currently for research in the field to redress these issues.

According to Claassen (1997), psychological testing came to South Africa through Britain, and the development of psychological tests in South Africa followed a similar pattern to that of the tests in the United States. The difference is that tests in South Africa were developed in a context with unequal distribution of resources due to apartheid. According to Nzimande (1995), assessment practices in South Africa were used to justify the exploitation of Black labour and to deny Black people access to education as well as economic resources. Sehlapelo and Terre Blanche (1996) argue further that tests were used on a large scale in South Africa to determine who would gain access to economic and educational opportunities, which is why the reformation of tests is important.

Psychologists in South Africa are now more than ever aware of creating instruments or utilising already developed instruments in a fair and unbiased manner (Abrahams & Mauer, 1999a; 1999b; Foxcroft, Paterson, Le Roux & Herbst, 2004; Franklin-Ross, 2009; Laher, 2007; 2008; Laher & Cockcroft, in press; Meiring, 2008; Nel, 2008; Sehlapelo & Terre Blanche, 1996; Taylor & De Bruin, 2005; Van Eeden & Mantsha, 2007). This increase in consciousness is strongly linked to legislation promulgated in Section 8 of the Employment Equity Act (No. 55 of 1998), which stipulates:

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

Unlike other countries, where issues of bias and fairness are addressed by codes of professional organisations of psychologists and enforceable on their members, South Africa

stresses the importance of fair and unbiased testing and assessment by incorporating it into national law (Van de Vijver & Rothmann, 2004). Therefore psychometric research of the type undertaken in this study addresses an issue of national importance and should be on the primary agenda of psychological research in South Africa.

An important debate among researchers in the field of psychological assessment, particularly in the light of the stipulations of the Employment Equity Act, are the merits of employing instruments from foreign countries in South Africa (etic approach to assessment) versus the creation of local instruments (emic approach to assessment). Consequently, this chapter introduces the etic-emic debate. Following this, the chapter details the manner in which reliability and validity of the NEO-PI-R and the CPAI-2 were explored in this study together with relevant literature pertaining to the exploration of these psychometric constructs.

3.2. THE ETIC-EMIC DEBATE

Etic, or universal, constructs are necessary if comparisons are to be made between cultures, but are not always appropriate in a given culture and leave emic, or culture-specific, constructs untapped. England (1991) argues, from an interpretive viewpoint, that if individuals within a culture cannot be relied on to have shared meanings that can be tapped, then surely this will be exacerbated between members of different cultures. However measuring emic constructs is difficult, particularly across a language barrier with an investigator's ascription to a personal interpretive framework and the resulting loss of meaningful information through the reduction of data, which are frequently analysed statistically. Therefore the end result is frequently the application of tests developed in one culture to a new culture, in what has been termed an "imposed etic" (Berry, 1969) or "pseudo-etic" (Triandis, 1972) approach. It can be argued that although pseudo-etic measurement provides a convenient basis for making cross-cultural comparisons, it does so at the possible cost of the validity of the test and does not necessarily say anything meaningful about an individual in his/her world (Bhana, 1987; Cheung et al., 1996; Church & Lonner, 1998). Thus Yang and Bond (1990) point out that

> construct validation of the imported and indigenous instruments is likely to yield somewhat different theories about the local reality (often construed as reality) even if they are both true (i.e. useful). And it is this broader area of indigenous theory development that the use of imported instruments may especially compromise. (p. 1094)

Despite this, there are many who still see the search for universals as a legitimate endeavour (see Berry, Poortinga, Segall & Dasen, 2004; Segall, Dasen, Berry & Poortinga, 1999). It has been suggested (Berry et al., 2004; Segall et al., 1999) that research should begin with an etic system, with modifications being made until an acceptable emic description is achieved.

Cheung et al. (1996) adopt this approach and argue that

> if the purpose of a personality inventory is to provide a reliable and valid assessment instrument within a particular culture rather than to investigate cultural universals, then the construction of an inventory that includes the major culture-specific personality domains in addition to the culture comparable (etic) personality constructs may be called for. (p. 182)

In accordance with this, but also acknowledging the limitations inherent within such a stance, this study adopted a pseudo-etic approach in that two foreign instruments, the NEO-PI-R and the CPAI-2, were employed in the South African context. However, as indicated in Chapter 1, the CPAI-2 was developed in response to the need for an emic instrument in an Asian context. Despite being etic in a South African context, the CPAI-2 still offers a different cultural alternative to the NEO-PI-R. The examination of these two instruments in a South African context should therefore be regarded as the first step among many to establish the utility of the two instruments in the South African context. More importantly, however, it is the first step towards establishing both instruments that have a more emic focus and indigenous approaches towards the understanding of personality and personality development.

3.3. THE PSEUDO-ETIC APPROACH

Paunonen and Ashton (1998) argue that the cross-cultural applicability of an instrument can be established by considering the psychometric properties of the instrument in the original culture and comparing them to the psychometric properties obtained in the foreign culture. They identify scale means and variances, reliability (both internal consistency and test-retest), criterion validity and factor structure as the psychometric properties necessary to establish cross-cultural applicability. Other researchers are in agreement with Paunonen and Ashton (1998) but suggest that in addition to considering reliabilities, validities and factor structures, issues of test bias need to be considered (Murphy & Davidshofer, 2005; Van de Vijver & Leung, 1997; Van de Vijver & Rothmann, 2004; Van de Vijver & Tanzer, 1997). Thus in establishing the applicability of the two instruments this study will examine the reliability and validity of the NEO-PI-R and CPAI-2 as well as issues of bias. This chapter

discusses the examination of reliability and validity of the two instruments, and Chapter 4 focuses on the examination of issues of bias.

More recently, McCrae (2004) introduced an alternative way of thinking about research in this area that requires mention. He distinguishes between *transcultural, intracultural* and *intercultural research.* Transcultural research focuses on identifying human universals such as trait structure and development, while intracultural studies focus on the unique expression of traits in specific cultures; and, finally, intercultural research characterises cultures and their sub-groups in terms of mean levels of personality traits and seeks association between cultural variables and aggregate personality traits (McCrae, 2004). By virtue of exploring the NEO-PI-R and the CPAI-2 in the South African context, the current research can be described as intracultural. However this research employs etic instruments and, aside from commenting on the instruments in the South African context, it intends to provide commentary on the FFM and its universal applicability within the South African context. Hence there is a transcultural element to the study.

Furthermore it can be argued that South Africa is a land of cultural diversity. According to the most recent mid-year population estimates (Statistics South Africa, 2009), the population of South Africa is 49.32 million. Of the population, 52% are female; 79.3% are African; 9% are Coloured; 2.6% are Indian; and 9.1% are White. From the most recent census data (Statistics South Africa, 2001), 79.8% of the population subscribe to Christianity, .3% to traditional African religions, .2% to Judaism, 1.2% to Hinduism, 1.5% to Islam, and 3.7% to other religions, with 16.5% not religiously affiliated. In terms of language, 91.2% of the population do not speak English as a first language. Of the 11 official languages, isiZulu is the most commonly spoken language (23.8%), followed by isiXhosa (17.6%), Afrikaans (13.3%), Sepedi (9.4%), Setswana and English (8.2%), Sesotho (7.9%), Xitsonga (4.4%), Siswati (2.7%), Tshivenda (2.3%), isiNdebele (1.6%) and other languages (.5%) (Statistics South Africa, 2001). Thus, many cultures operate within the country's borders and exploration of these groups might also constitute transcultural analysis.

3.4. EXAMINING THE RELIABILITY OF THE NEO-PI-R AND THE CPAI-2

Moerdyk (2009) defines reliability as the consistency of test scores and/or the degree to which scores are free from random error. Anastasi and Urbina (2007) define reliability as "the consistency of scores obtained by the same persons when they are re-examined with the same test on different occasions, or with different sets of equivalent items, or under other variable examining conditions" (p. 84). Based on this definition it is possible to note that

there can be more than one type of reliability. The four most common techniques for assessing reliability are test-retest reliability, parallel/alternate forms reliability, split-half reliability and inter-rater reliability (Anastasi & Urbina, 2007; Moerdyk, 2009; Murphy & Davidshofer, 2005).

3.4.1. Parallel forms reliability and inter-rater reliability

Parallel forms reliability involves the administration of two equivalent tests, with an interval of at least two weeks between the administration of the first and second test, and then correlating the two test scores (Anastasi & Urbina, 2007; Moerdyk, 2009). This reduces any practice or carryover effects that may occur with test-retest reliability. There are no parallel forms of the CPAI-2. Thus parallel forms reliability could not be determined for the CPAI-2.

The NEO-PI-R is available in a parallel version (Form R) but it requires an “observer rating”, that is, someone else rates one on the items. Given the difficulties found in getting respondents to fill in one self-report version of the questionnaire, it was logistically beyond the scope of this study to consider parallel forms reliability for the NEO-PI-R.

In the current study, but also more generally, it would also not be feasible to consider the inter-rater reliability for both instruments, the NEO-PI-R and the CPAI-2. Inter-rater reliability refers to tests in which scoring is not objective and different raters may arrive at different scores (Anastasi & Urbina, 2007). This is not applicable to the two instruments in this study as they are objectively scored and there should be no difference in scores even if scored by different individuals. Thus inter-rater reliability was not considered.

3.4.2. Internal consistency reliability

Split-half reliability involves the splitting of a test into two equivalent halves and correlating the scores obtained on each half. Various methods for splitting tests have been espoused in the texts but better statistical techniques have been developed that consider all possible splittings of test items or the internal consistency reliability (Murphy & Davidshofer, 2005). Thus internal consistency reliability can be considered as the mean of all possible split halves (Moerdyk, 2009). The most common methods of establishing this inter-item consistency are the Kuder-Richardson and coefficient alpha reliability coefficients (Murphy & Davidshofer, 2005; Moerdyk, 2009). In keeping with both Costa and McCrae (1992) and Cheung et al. (2008), this study examined the inter-item consistency of both instruments using the Cronbach alpha reliability coefficient.

3.4.2.1. Internal consistency reliability of the NEO-PI-R

Costa and McCrae (1992) report internal consistency reliabilities for the domain scales as follows: Neuroticism .92; Extraversion .89; Openness to Experience .87; Agreeableness .86; and Conscientiousness .90. Internal consistency reliability coefficients for the facet scales range between .56 and .81 (see Table 3.1). According to Costa and McCrae (1992), these values are acceptable for scales with only 8 items. The 48-item domain scales do demonstrate larger coefficient alphas. Since the development of the NEO-PI-R in 1992, the instrument has been used in various settings and across various contexts yielding alpha coefficients in a similar range to those obtained in the original standardisation sample (Allik & McCrae, 2004).

Table 3.1: Internal consistency reliability coefficients for the NEO-PI-R

NEO-PI-R	α	NEO-PI-R	α
Neuroticism	.92	**Agreeableness**	.86
Anxiety	.78	Trust	.79
Angry Hostility	.75	Straightforwardness	.71
Depression	.81	Altruism	.75
Self-Consciousness	.68	Compliance	.59
Impulsiveness	.70	Modesty	.67
Vulnerability	.77	Tender-Mindedness	.56
Extraversion	.89	**Conscientiousness**	.90
Warmth	.73	Competence	.67
Gregariousness	.72	Order	.66
Assertiveness	.77	Dutifulness	.62
Activity	.63	Achievement Striving	.67
Excitement-Seeking	.65	Self-Discipline	.75
Positive Emotions	.73	Deliberation	.71
Openness to Experience	.87		
Fantasy	.76		
Aesthetics	.76		
Feelings	.66		
Actions	.58		
Ideas	.80		
Values	.67		

Note. Reprinted from “Revised Neo Personality Inventory (NEO-PI-R) and Neo Five-Factor Inventory (NEO-FFI) Professional Manual,” by P. T. Costa, Jr. and R. R. McCrae, 1992 (p. 44). Copyright by Psychological Assessment Resources, Odessa, FL. Reprinted with permission of the authors.

More recently McCrae et al. (2005a) conducted a study across 50 cultures representing 6 continents using translations into Indo-European, Hamito-Semitic, Sino-Tibetan, Daic, Uralic, Malayo-Polynesian, Dravidian and Altaic languages. Median internal consistency reliability coefficients of .90, .90, .88, .92 and .94 for Neuroticism, Extraversion, Openness to Experience, Agreeableness and Conscientiousness domains, respectively, were found in that study, suggesting that the NEO-PI-R has high reliability across cultures. However closer examination of these coefficients indicates that the reliability for Asian and African cultures is slightly lower than the American standard, as evident in Table 3.2.

The United States had reliability coefficients of .91 for Neuroticism, .91 for Extraversion, .88 for Openness to Experience, .93 for Agreeableness and .94 for Conscientiousness (McCrae et al., 2005a). Reliability coefficients of .87 for Neuroticism, .85 for Extraversion, .83 for Openness to Experience, .87 for Agreeableness and .90 for Conscientiousness were found in the Chinese group. While Japanese, South Korean and Hong Kong samples exhibited internal consistency reliability coefficients that were on a par with those of the U.S.A. sample or slightly below the U.S.A. values but higher than the Chinese values, other Asian countries like Thailand, Indonesia, Malaysia and India exhibited reliability coefficients that were less than the U.S.A. values but more in line with the Chinese values. South American countries (e.g. Peru) and Middle Eastern countries (e.g. Kuwait) also had reliability coefficients that were more congruent with their Chinese rather than their American counterparts (McCrae et al., 2005a).

The lowest reliability coefficients though were from African countries. Burkina Faso and Botswana exhibited coefficients closely resembling those found in Asian cultures but Nigeria, Ethiopia, Uganda and Morocco were visibly lower (McCrae et al., 2005a). Morocco had the lowest coefficients, with .54 for Neuroticism, .57 for Extraversion, .58 for Openness to Experience, .66 for Agreeableness and .82 for Conscientiousness. Apart from Conscientiousness, it is evident that these coefficients were substantially lower than both the United States and Chinese coefficients. Conscientiousness appears to have the best internal consistency reliability across the 50 cultures. McCrae et al. (2005a) attribute these results in part due to poorer data quality from the Asian and African countries. Data quality was measured in the study using six indicators, namely number of missing responses, number of acquiescent responses, number of substituted responses, language in which the test was completed, published or unpublished version of the test and researchers' reports of problems experienced during administration. McCrae et al. (2005a) do suggest though that these results may indicate actual differences in personality in these cultures as well as

Table 3.2: Internal consistency reliability and factor replicability across 50 cultures

	Internal consistency					Congruence coefficients[a]					
Culture	**N**	**E**	**O**	**A**	**C**	**N**	**E**	**O**	**A**	**C**	**Total**
Germany	.91	.89	.88	.91	.93	.98	.96	.96	.97	.97	.97
Spain	.92	.93	.93	.93	.95	.97	.93	.94	.95	.93	.94
French Switzerland	.94	.92	.91	.92	.92	.95	.94	.95	.96	.96	.95
Denmark	.93	.91	.92	.94	.95	.95	.92	.96	.94	.96	.94
France	.93	.90	.91	.93	.93	.97	.96	.96	.95	.95	.96
German Switzerland	.93	.89	.91	.93	.94	.97	.97	.96	.95	.96	.96
Chile	.92	.91	.93	.92	.94	.96	.95	.97	.95	.94	.95
New Zealand	.92	.91	.90	.94	.95	.97	.93	.95	.95	.93	.94
Belgium	.92	.91	.90	.94	.94	.97	.93	.95	.95	.96	.95
Portugal	.90	.89	.89	.93	.94	.96	.97	.93	.95	.93	.94
Turkey	.90	.93	.90	.92	.95	.95	.96	.94	.96	.95	.95
Poland	.89	.90	.91	.92	.94	.97	.94	.93	.95	.93	.94
Serbia	.90	.90	.90	.94	.95	.97	.94	.97	.94	.94	.95
Malta	.91	.90	.90	.94	.94	.98	.95	.93	.97	.94	.95
Czech Republic	.90	.90	.92	.93	.94	.95	.96	.96	.95	.96	.95
Estonia	.92	.95	.91	.94	.96	.96	.97	.94	.92	.97	.95
UK: N. Ireland	.92	.90	.90	.95	.96	.95	.94	.90	.97	.94	.94
Slovakia	.90	.84	.87	.93	.94	.96	.94	.95	.94	.95	.94
Iceland	.90	.91	.88	.92	.95	.97	.94	.96	.96	.97	.95
Austria	.93	.90	.92	.93	.94	.95	.92	.93	.96	.95	.94
UK: England	.92	.91	.90	.95	.94	.97	.92	.97	.95	.94	.95
Canada	.85	.90	.87	.92	.94	.97	.93	.93	.95	.95	.94
Australia	.92	.90	.88	.94	.95	.97	.95	.96	.95	.96	.95
Japan	.90	.91	.87	.93	.92	.96	.96	.91	.93	.95	.94
S. Korea	.86	.90	.89	.92	.95	.97	.94	.89	.93	.95	.93
Hong Kong	.92	.87	.88	.93	.93	.96	.93	.92	.96	.95	.94
Brazil	.90	.90	.88	.91	.94	.97	.96	.94	.95	.96	.96
Italy	.89	.87	.91	.90	.94	.95	.94	.96	.96	.95	.95

United States	.91	.91	.88	.93	.94	.97	.96	.96	.96	.97	.96
Thailand	.88	.87	.75	.89	.93	.94	.92	**.83**	.95	.93	.92
Indonesia	.88	.83	.71	.85	.91	.94	.94	**.84**	.94	.96	.93
Argentina	.84	.89	.85	.91	.92	.96	.96	.93	.93	.94	.94
Burkina Faso	.84	.85	.73	.91	.94	.96	.92	.85	.94	.91	.92
Kuwait	.87	.84	.75	.88	.92	.97	.95	.86	.95	.95	.94
Mexico	.87	.87	.80	.85	.92	.96	.95	.89	.95	.95	.94
Philippines	.81	.84	.77	.89	.93	.97	.92	.89	.94	.93	.93
Croatia	.90	.90	.88	.92	.95	.96	.96	.95	.95	.96	.95
Russia	.88	.90	.85	.89	.93	.94	.94	.94	.95	.95	.94
China	.87	.85	.83	.87	.90	.93	.93	.90	.95	.94	.93
India	.77	.80	**.59**	.83	.88	.93	.87	**.80**	.91	.92	.89
Peru	.86	.87	.75	.85	.91	.96	.92	.88	.97	.92	.93
Slovenia	.90	.89	.90	.91	.93	.98	.97	.96	.95	.96	.96
Malaysia	.80	.78	**.59**	.85	.91	.92	**.80**	**.82**	.94	.93	.90
Botswana	.75	.82	**.61**	.89	.92	.88	**.82**	**.53**	.90	.89	.82
Nigeria	**.61**	.73	**.25**	**.63**	.78	**.76**	**.66**	**.56**	.88	**.65**	.71
Puerto Rico	.89	.86	.81	.86	.90	.95	.94	.93	.94	.96	.95
Ethiopia	.71	.70	**.60**	.76	.87	.89	.85	**.82**	.93	.96	.90
Lebanon	.84	.85	.85	.91	.94	.96	.95	.88	.95	.95	.93
Uganda	.73	.77	**.68**	.81	.89	.93	.88	**.84**	.91	.95	.90
Morocco	**.54**	**.57**	**.58**	**.66**	.82	.91	.85	**.66**	.89	.90	.85

Note. Alphas less than .70 and congruence coefficients less than .85 are given in bold. N = Neuroticism; E = Extraversion; O = Openness; A = Agreeableness; C = Conscientiousness.

[a]These are factor and total congruence coefficients comparing five Procrustes-rotated principal components in each sample with the American normative self-report structure as reported in Costa and McCrae (1992).

Note: Reprinted from “Universal Features of Personality Traits from the Observer's Perspective: Data from 50 Cultures,” by R. R. McCrae, A. Terracciano and 79 members of the Personality Profiles of Cultures Project (2005a), *Journal of Personality and Social Psychology, 88*, 547. Copyright 2008 by APA. Reprinted with permission of the authors.

possible emic constructs that are untapped.

In an African context, Piedmont, Bain, McCrae and Costa (2002) reported alpha coefficients of .87 for Neuroticism, .92 for Extraversion, .77 for Openness to Experience, .80 for Agreeableness and .81 for Conscientiousness using a Shona translation of the NEO-PI-R in a sample of 314 Zimbabweans. Only 14 of the 30 facet scales exhibited alpha coefficients between .50 and .65. The remainder of the facet scales exhibited coefficients below .50. Seven of the remaining 16 scales exhibited particularly low alpha coefficients. Values had the lowest alpha coefficient of .13 followed by Activity .21, Ideas .22, Feelings .24, Self-Consciousness .27, Modesty .30, Excitement-Seeking .36 and Tender-Mindedness .38 (Piedmont et al., 2002).

Teferi (2004) reported alpha coefficients of .79 for Neuroticism, .50 for Extraversion, .45 for Openness to Experience, .73 for Agreeableness and .82 for Conscientiousness using a Tigrignan translation of the NEO-PI-R in a sample of 410 Eritrean individuals. Only 5 scales (Depression, Positive Emotions, Aesthetics, Dutifulness and Deliberation) exhibited alpha coefficients in the range of .51 to .61. All of the Neuroticism facets with the exception of Depression had alpha coefficients between .45 and .49. Extraversion facets with the exception of Positive Emotions ranged between .24 and .44. Excitement-Seeking had the worst coefficient of .24, followed by Activity with a coefficient of .29. Alpha coefficients on the Openness to Experience domain with the exception of Aesthetics were particularly poor. Actions had a coefficient of .02, Values .10, Feelings .22, Fantasy .32 and Ideas .45. Agreeableness facets were also poor with Trust having an alpha coefficient of .30, Straightforwardness .32, and Compliance .37. The remaining facets (Altruism, Modesty, Tender-Mindedness) had coefficients in the range of .46 to .49. With the exception of Dutifulness and Deliberation, Conscientiousness facets (Competence, Order, Achievement Striving, Self-Discipline) had alpha coefficients ranging between .30 and .40 (Teferi, 2004).

Rossier, Dahourou and McCrae (2005) reported alpha coefficients for the five domains of between .71 and .85, with a median alpha coefficient of .79, in a sample of 470 French-speaking individuals in Burkina Faso. Facet scale coefficients ranged from .16 to .68, with a median alpha coefficient of .52. Impulsiveness (α = .33), Actions (α = .31) and Values (α = .16) exhibited the lowest internal consistency reliability coefficients (Rossier et al., 2005).

In the South African context, Quy (2007) reported reliability coefficients ranging from .89 to .92 for the domain scales and coefficients ranging from .52 to .82 for the facet scales, using a sample of 94 psychology undergraduate students at a university in Johannesburg.

However, the facet scales of Activity (.45), Actions (.49), and Tender-Mindedness (.48) had alpha coefficients less than .5 (Quy, 2007).

Rothman and Coetzer (2003) reported Cronbach's alpha coefficients of .86 for Neuroticism, .83 for Extraversion, .77 for Openness to Experience, .76 for Agreeableness, and .78 for Conscientiousness, in a sample of 159 South African employees in a pharmaceutical organisation. Facet scales ranged between .55 and .83 for all facets with the exception of Values (.48) and Tender-Mindedness (.34) (Rothman & Coetzer, 2003). Similarly, Storm and Rothman (2003), using a sample of 131 South African employees in a corporate pharmaceutical group, reported Cronbach's alpha coefficients of .86 for Neuroticism, .84 for Extraversion, .78 for Openness to Experience, .74 for Agreeableness and .76 for Conscientiousness but no information was given on the facet scales in that study.

Zhang and Akande (2002) explored the reliability of the NEO-FFI in a sample of 368 students from four universities in South Africa. Coefficients below .5 were found for the Neuroticism and Openness to Experience domains. Seventeen items with poor item-total correlations were deleted as follows: four from Neuroticism, three from Extraversion, five from Openness to Experience, three from Agreeableness and two from Conscientiousness. These are detailed in Table 3.3. Following item deletion, a .78 alpha coefficient was found for Neuroticism, .75 for Extraversion, .56 for Openness to Experience, .63 for Agreeableness and .79 for Conscientiousness (Zhang & Akande, 2002).

Horn (2000) explored the internal consistency reliability of the domain scales in an isiXhosa translation of the NEO-PI-R using two samples. The first sample consisted of 65 undergraduate student volunteers at the University of Port Elizabeth who had English as their home language and who completed the original NEO-PI-R. The second sample consisted of 75 undergraduate student volunteers at the same institution who had isiXhosa as their home language and who completed the isiXhosa translation of the NEO-PI-R. The isiXhosa-speaking group was bilingual in English and isiXhosa. Internal consistency reliability coefficients of .86 for Neuroticism, .98 for Extraversion, .96 for Openness to Experience, .98 for Agreeableness and .97 for Conscientiousness were obtained for the sample of English-speaking students. Facet scale consistency coefficients exceeded .60 for all of the facets with the exception of Activity (.51), Excitement-Seeking (.58), Actions (.59), Tender-Mindedness (.40), Competence (.54), Dutifulness (.59) and Self-Discipline (.42) in the English sample. Internal consistency reliability coefficients of .83 for Neuroticism, .68 for Extraversion, .57 for Openness to Experience, .72 for Agreeableness and .77 for Conscientiousness were obtained for the sample of isiXhosa-speaking students. Facet scale

consistency coefficients were particularly poor, with only three facets at or exceeding .60. Angry Hostility had a coefficient of .68, Depression .64 and Altruism .60. Based on these results, Horn (2000) concluded that the isiXhosa translation of the NEO-PI-R was not viable in the South African context.

Table 3.3: Items deleted from the original NEO-FFI

Domain	Facet	Description
Neuroticism	Anxiety	I am not a worrier
Neuroticism	Depression	I rarely feel lonely or blue
Neuroticism	Anxiety	I rarely feel fearful or anxious
Neuroticism	Depression	I am seldom sad or depressed
Extraversion	Positive Emotions	I don't consider myself especially "lighthearted"
Extraversion	Gregariousness	I usually prefer to do things alone
Extraversion	Positive Emotions	I am not a cheerful optimist
Openness	Actions	Once I find the right way to do something, I stick to it
Openness	Actions	I often try new and foreign foods
Openness	Aesthetics	Sometimes when I am reading poetry or looking at a work of art, I feel a chill or wave of excitement
Openness	Ideas	I have a lot of intellectual curiousity
Openness	Ideas	I often enjoy playing with theories or abstract ideas
Agreeableness	Altruism	I try to be courteous to everyone I meet
Agreeableness	Compliance	I would rather co-operate with others than compete with them
Agreeableness	Trust	I believe that most people will take advantage of you if you let them
Conscientiousness	Order	I am not a very methodical person
Conscientiousness	Self-Discipline	I waste a lot of time before settling down to work.

Note. From "What Relates to the Big Five among South African University Students?," by L. F. Zhang and A. Akande. (2002). *IFE PsychologIA: An International Journal, 10,* 74. Copyright by IFE PsychologIA.

A final study considered internal consistency reliability in a sample of 50 Japanese students as well as 50 Egyptian students. However Mohammed, Unher and Sugawara (2009) used the NEO-FFI, not the NEO-PI-R. Students completed the English version of the NEO-FFI. Cronbach alpha coefficients for the domains in the Japanese sample were .87 for Neuroticism, .89 for Extraversion, .86 for Openness to Experience, .81 for Agreeableness

and .83 for Conscientiousness. In the Egyptian sample, Neuroticism had an alpha coefficient of .63, Extraversion had a coefficient of .76, Openness to Experience .75, Agreeableness .70 and Conscientiousness .73 (Mohammed et al., 2009).

From the literature presented above it is evident that internal consistency reliability is poorer in African countries. Reliability coefficients were found to be particularly poor in African countries that used translated versions, adding weight to the argument around the poorer data quality of translated versions (see McCrae et al., 2005a). Reliability coefficients were found to be better with studies using the English version of the NEO-PI-R, particularly in the South African context but, with the exception of Quy's (2007) study, were still lower than the coefficients for other countries reported in McCrae et al. (2005a). Overall the Openness domain appeared to exhibit the lowest reliability coefficient among the domain scales; and in the facet scales, Values, Activity, Excitement-Seeking, Actions and Tender-Mindedness appear to have the poorest internal consistency reliability in the African and South African contexts. Actions (.58) and Tender-Mindedness (.56) also had the lowest internal consistency reliability coefficients in Costa and McCrae's (1992) normative sample. It is perhaps worth revisiting the composition of items that tap these facets as well as their inherent nature to determine if this needs some adaptation. For Values, Activity and Excitement-Seeking, the possibility exists that these may not be entirely valid scales and constructs for non-Western, collectivist cultures, which tend to be more conservative and oriented towards the group and maintaining harmonious relationships (as discussed in Chapter 2). The same could be said to apply in the case of the Openness to Experience domain. In Chapters 1 and 2 I made reference to the exploration by Cheung et al. (2008) of Openness in a Chinese culture, and their arguments that non-Western individuals tend to cut the social perceptual world differently than Western individuals. This may hold true here as well. Lodhi et al. (2002) reported low reliability coefficients for the Values facet in Indian, Russian and Korean samples.

3.4.2.2. Internal consistency reliability of the CPAI-2

Cheung et al. (2003) report median Cronbach alpha coefficients for the English version of the CPAI-2 of .67 in a Singaporean ethnic Chinese sample and .62 (ranging from .33 to .78) in a sample of college students in a Midwestern university in the United States. In a more recent publication, Cheung et al. (2008) report alpha coefficients of .86, .86, .76 and .70 for the factor scales of Social Potency, Dependability, Accommodation and Interpersonal Relatedness respectively. Subscale coefficients ranged from .51 to .80 as evident in Table 3.4. No other internal consistency reliability information has been reported in the literature.

3.4.3. Test-retest reliability

Test-retest reliability involves administering the test twice to the same group of respondents, with an interval between administrations of at least two weeks, and then determining the correlation between the two administrations (Anastasi & Urbina, 2007; Murphy & Davidshofer, 2005). According to Moerdyk (2009):

> Under the assumptions of equal true scores and uncorrelated errors, the correlation between two administrations of a test given to the same individual at two different times is an estimate of the test's reliability and yields a coefficient of stability. (p. 273)

Costa and McCrae (1992) argue that good test-retest reliability is essential to measures of personality traits, which are expected to show little change over short intervals of time.

3.4.3.1. Test-retest reliability of the NEO-PI-R

Costa and McCrae (1992) report in the NEO-PI-R manual that short-term test-retest reliability, while necessary, has not been well studied on the NEO-PI-R. They cite a single study with the NEO inventory conducted in 1983 on a sample of 31 men and women, which had facet scale test-retest reliabilities ranging between .66 and .92 and domain reliabilities for Neuroticism of .87, Extraversion of .91 and Openness to Experience of .86. Long-term stability of the NEO-PI is also reported on. Costa and McCrae (1992) cite a 6-year longitudinal study, which showed stability coefficients ranging between .68 and .83 in both self-report and spouse ratings. A 7-year longitudinal study using peer ratings found stability coefficients ranging from .51 to .82 for the facet scales and .63 to .81 for the 5 domain scales. However these studies were conducted on a preliminary version of the NEO-PI-R.

Following the publication of the present version of the NEO-PI-R, short-term test-retest reliability studies have not been conducted. The focus in research has rather been on the stability of personality development from adolescence to adulthood, and longitudinal studies conducted over intervals ranging from 3 to 42 years are examined in the literature (Terracciano, Costa & McCrae, 2006). Trends to emerge in these studies is that personality starts consolidating during adolescence (see De Fruyt, Bolle, McCrae, Terracciano & Costa, 2009; Terracciano et al., 2006), with a firm personality profile developing in early adulthood around the 20- to 30-year age range and finally with personality remaining stable from 30 years onwards with marked changes only occurring in the advent of physical injury, psychological distress and/or other significant life events (see McCrae & Costa, 2003).

Table 3.4: Internal consistency reliability coefficients for the CPAI-2

CPAI-2	No. of items	α
Social Potency	80	.86
Novelty	10	.69
Diversity	10	.68
Divergent Thinking	10	.62
Leadership	10	.72
Logical vs Affective Orientation	10	.58
Aesthetics	10	.65
Extraversion vs Introversion	10	.70
Enterprise	10	.60
Dependability	101	.86
Responsibility	10	.70
Emotionality	10	.64
Inferiority vs Self-Acceptance	18	.80
Practical Mindedness	12	.51
Optimism vs Pessimism	10	.62
Meticulousness	10	.60
Face	11	.59
Internal vs External LOC	10	.62
Family Orientation	10	.66
Accommodation	50	.76
Defensiveness	10	.69
Graciousness vs Meanness	10	.66
Interpersonal Tolerance	10	.66
Self vs Social Orientation	10	.60
Veraciousness vs Slickness	10	.69
Interpersonal Relatedness	67	.70
Traditionalism vs Modernity	15	.65
Relationship Orientation	12	.52
Social Sensitivity	10	.62
Discipline	10	.59
Harmony	12	.51
Thrift vs Extravagance	8	.57

Note: Adapted from “Relevance of Openness as a Personality Dimension in Chinese Culture: Aspects of its Cultural Relevance,” by F. Cheung, S. Cheung, J. Zhang, K. Leung, F. Leong and K. H. Yeh (2008). *Journal of Cross-Cultural Psychology, 39*, 90. Copyright by SAGE Publications, London. Adapted with permission of the authors.

In making these claims it should be noted that I am only commenting on studies that primarily used the NEO-PI-R as the instrument to measure the stability of personality and, on other occasions, studies that utilised instruments located within the five factor framework. These studies were conducted to examine the developmental path of personality across the lifespan, primarily to explore the efficacy of the FFM and in the case of McCrae, the FFT, as a comprehensive approach within which to understand personality (De Fruyt et al., 2009; McCrae, 2004; McCrae & Allik, 2002; McCrae & Costa, 2003; Terracciano et al., 2006). However in utilising the NEO-PI-R, the assumption that would need to be made is that the NEO-PI-R has sufficient test-retest reliability to be able to conclude that the long-term stability coefficients are indeed indicative of trends across the lifespan. For the post-30-year age group the evidence indicates little change across the lifespan when using the NEO-PI-R and therefore we cannot question the reliability of the instrument. However in groups under age 30, there has been evidence of difference.

De Fruyt et al. (2009) indicate the possibility that the NEO-PI-R as a measuring instrument is problematic in that it was designed for use on adults, and some words or phrases may not be properly understood by adolescents or young adults specifically college students. Hence 37 items were changed on the NEO-PI-R, resulting in the NEO-PI-3, and this was used with adolescents ranging from 12 to 17 years of age from 24 cultures and speaking 18 different languages. Although the NEO-PI-3 showed slight improvements over the NEO-PI-R the results were not conclusive. The authors called for more research on both instruments in younger cohorts and they specifically mention further research in terms of test-retest reliability, cross-observer agreement, and convergent and predictive validity (De Fruyt et al., 2009). Given the rationale for the study by De Fruyt et al. (2009), as well as the results and the conclusions, it can be deduced that evidence relating to personality change and consolidation up to age 30 may not be valid. This may be due to test-taking artifacts, and one of the ways to establish this would be via the examination of short-term test-retest reliability studies. Hence an attempt was made to explore test-retest reliability in the current study.

In the South African context, Horn (2000) identified the necessity of establishing test-retest reliability and considered this in her study on an isiXhosa translation of the NEO-PI-R. Test-retest reliability coefficients of .90 for Neuroticism, .93 for Extraversion, .89 for Openness to Experience, .91 for Agreeableness and .86 for Conscientiousness were obtained for the sample of 65 English-speaking undergraduate students who completed the NEO-PI-R over a 3-week interval. Test-retest reliability coefficients of .31 for Neuroticism, .53 for Extraversion, .54 for Openness to Experience, .30 for Agreeableness and .48 for Conscientiousness were

obtained for the sample of 75 bilingual undergraduate students who completed the NEO-PI-R and the isiXhosa NEO-PI-R over a 3-week interval. Test-retest values for facets were not reported. Horn (2000) attributes this discrepancy in results to a number of factors. However, the most important issue to highlight is that the English-speaking group completed the original NEO-PI-R on both occasions while the isiXhosa-speaking group completed the original NEO-PI-R and the isiXhosa NEO-PI-R. Thus the values reported for the test-retest reliability for the isiXhosa-speaking group cannot be described as test-retest reliability coefficients; rather, they are correlation coefficients describing the relationship between the original English NEO-PI-R and the isiXhosa version. As such the correlations should speak to the validity of the isiXhosa translation, which in this case appears to be very poor. The test-retest reliability coefficients found on the original NEO-PI-R with the English-speaking sample indicate good evidence for the test-retest reliability of the instrument in a South African context. No other information on test-retest reliability in the African and South African contexts could be located.

3.4.3.2. Test-retest reliability of the CPAI-2

At present there is no information available in the literature on the test-retest reliability of the CPAI-2. These studies have yet to be conducted (Cheung, personal communication, January 5, 2010).

3.5. EXAMINING THE VALIDITY OF THE NEO-PI-R AND THE CPAI-2

According to Anastasi and Urbina (2007), the validity of a test concerns what the test measures and how well it does so. Just as there are different forms of reliability, there are different forms of validity. There are several categorisation systems used but the major groupings include face validity, criterion validity, content validity and construct validity (Anastasi & Urbina, 2007; Moerdyk, 2009; Murphy & Davidshofer, 2005).

3.5.1. Face validity

Face validity pertains to whether the test “looks valid” to the examinees who take it, the administrative personnel who decide on its use, and other technically untrained observers (Anastasi & Urbina, 2007). Face validity was established in the current study by determining the respondents’ responses to a question assessing their thoughts on whether the NEO-PI-R and the CPAI-2 appeared to be assessing their personality.

3.5.2. Criterion validity

Criterion validation procedures indicate the effectiveness of a test in predicting whatever it purports to predict (Anastasi & Urbina, 2007) – in this case, the effectiveness of the two instruments in accurately predicting or describing personality. Costa and McCrae (2008) cite numerous criterion validation studies for the NEO-PI-R, most of which were conducted on American samples, but evidence does exist for the criterion validity of the NEO-PI-R in other cultures. Unlike the NEO-PI-R, the CPAI-2 is a fairly new instrument, hence validational studies are still in their infancy. Thus far the clinical validity of the CPAI personality and clinical scales has been established in Cheung, Kwong and Zhang (2003) and its application in personnel management in Kwong and Cheung (2003). While there is clearly a need to examine the criterion validity of both instruments in the South African context, this was beyond the scope of the current study but should be a consideration for future research in the area.

3.5.3. Content validity

The content validity of a test examines the extent to which the test specification under which the test was constructed reflects the particular purpose for which the test is being developed. It has to be judged qualitatively more often than quantitatively, as the form of any deviation from content validity is usually more important than the degree (Moerdyk, 2009). Thus content validity could not be formally addressed in the current study. However given the rigorous approaches followed in the development of each instrument (see Cheung, 2004; Cheung et al., 2003; Cheung et al. 2008; Costa & McCrae, 1992; 2008), this should not be in dispute.

3.5.4. Construct validity

Construct validity is the primary form of validation underlying the trait-related approach to psychometrics (Kline, 1994; Larsen & Buss, 2008; Schultz & Schultz, 2009). It is defined as the extent to which the test may be said to measure a theoretical construct or trait and is therefore most appropriate for this study. Construct validity was explored via factor analysis, which was developed as a means of identifying psychological traits and is particularly relevant to construct-validational procedures (Kline, 1994; Nunnally & Bernstein, 1994; Van de Vijver & Leung, 1997). Factor analysis is defined generally as a method for simplifying complex sets of data (Kline, 1994). Specific to the case of personality psychology inventories located within the trait approach, factor analysis may be defined as a technique that

identifies the common traits underlying the huge number of items included in an inventory to assess personality.[1]

3.5.4.1. Construct validity of the NEO-PI-R

For the NEO-PI-R, evidence for the construct validity of the domain and facet scales is presented in the manual (see Costa & McCrae, 1992). The five factor structure was replicated in the American normative sample (as is evident in Table 6.8 in Chapter 6 of the current document). Following the release of the NEO-PI-R in 1992, numerous studies examining its construct validity were conducted in various settings and across a number of cultures, primarily using factor analyses and primarily to establish the utility of both the NEO-PI-R and the FFM (see McCrae et al., 2005a; Heuchert, Parker, Stumpf & Myburgh, 2000).

For example, McCrae and Costa (1997) compared the American factor structure of the NEO-PI-R with the factor structures from the German, Portuguese, Hebrew, Chinese, Korean and Japanese samples and found similar structures. They concluded that because the samples studied represented highly diverse cultures with languages from five distinct language families, the data and results obtained strongly suggest that a five factor personality trait structure is universal. McCrae, Yik, Trapnell, Bond and Paulhus (1998) also cited research in support of the fact that the five factor model is replicable not only in different languages but in languages from entirely different families, including Sino-Tibetan, Hamito-Semitic, Uralic, and Malayo-Polynesian. Similarly, Church and Lonner (1998) cite a number of studies that indicate that the structure of translated versions of the NEO-PI has been replicated well in Dutch, German, Italian, Estonian, Finnish, Spanish, Hebrew, Portuguese, Russian, Korean, Japanese, French and Filipino cultures.

More recently, McCrae and Allik (2002) brought together 14 papers representing 40 cultures, 5 continents, and Indo-European, Altaic, Uralic, Hamito-Semitic, Malayo-Polenesian, Dravidian, Austro-Asiatic, Sino-Tibetan, Japanese, Korean and Bantu languages. Evidence from these papers suggests that the five factor structure as operationalised by the NEO-PI-R does generalise well but specific variations do exist. For example, Konstabel, Realo and Kallasmaa (2002) demonstrated that even though Neuroticism as a factor was valid in a Russian culture, the Neuroticism facet of Impulsiveness did not replicate well. Gulgoz (2002) found differences on the Altruism and Fantasy facets between Turkish and American samples, while Lodhi et al. (2002) found that the facets of Values, Tender-Mindedness and Activity were problematic.

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1 For discussion on factor analysis see the data analysis section in Chapter 5, pages 158-162.

At the domain level, Rolland (2002) cites evidence in favour of the generalisability of the N, O and C dimensions after varimax rotation but not for the E and A dimensions. Most recently, McCrae et al. (2005a) examined the factor structure of the NEO-PI-R in data from 36 countries. Table 3.2 presents the factor congruence coefficients of the five domain scales of the NEO-PI-R as obtained in McCrae et al. (2005a). From these results, it is evident that the five factors are generally common to all people. However the domain of Openness does not replicate well in Asian and African countries, with Thailand, Indonesia, India, Malaysia, Botswana, Nigeria, Ethiopia, Uganda and Morocco demonstrating congruence coefficients of .84 or less. Five of the African countries (Botswana, Nigeria, Burkina Faso, Ethiopia, Uganda) do demonstrate lower factor congruence coefficients. So too do India and Malaysia. McCrae et al. (2005a) suggest that this could be due to poorer data quality from these countries but they also allude to the possibility that Africans may have certain emic dimensions of personality that set them apart from non-Africans. McCrae et al. (2005a) also argue that these results may be due to the fact that the NEO-PI-R was developed within a Western tradition, and completing it may be a more meaningful task for Westerners than for non-Westerners. The questionnaire format might also have been foreign to these cultures, resulting in artifactual results. In collectivist cultures the possibility exists that this format of the questionnaire requires decontextualised trait assessments in a culture that is used to describing people within the context of an interpretive relationship. Furthermore African cultures, according to McCrae et al. (2005a), share certain features such as close bonds within the family and a traumatic history of European colonialism that might have led to similarities in personality structure. When the African cultures were combined (N = 940), better congruence coefficients were obtained. A congruence coefficient of .96 was found for Neuroticism, .91 for Extraversion, .88 for Openness to Experience, .95 for Agreeableness and .96 for Conscientiousness (McCrae et al., 2005a).

In an African context, the construct validity of the NEO-PI-R has been variable. Piedmont et al. (2002), using a a Shona translation of the NEO-PI-R in a sample of 314 Zimbabweans, found that although the five factor structure was obtained, Extraversion and Agreeableness did not replicate as well as Neuroticism and Conscientiousness, and Openness to Experience replicated poorly.

Teferi (2004), using an Eritrean translation, found a five factor solution but it was only Conscientiousness that replicated as expected. Agreeableness replicated clearly but on two factors, with one factor consisting of the Agreeableness facets of Modesty, Tender-Mindedness and Compliance, as well as negative loadings on the Extraversion facets of

Assertiveness and Activity, and a negative loading on the Openness to Experience facet of Values. The second Agreeableness factor consisted of positive loadings on Trust, Straightforwardness and Altruism as well as the Extraversion facets of Positive Emotions and Warmth. Neuroticism replicated as expected with the exception of the facets of Impulsiveness and Vulnerability, which loaded on the Conscientiousness factor. Openness to Experience replicated poorly, with only Aesthetics, Feelings and Ideas loading as expected. Extraversion did not replicate as a factor at all, with Extraversion facets loading across all five factors (Teferi, 2004).

Other South African studies have also found variable results. While the five factors are generally retrieved, differences in factor structure can be found across population and language groupings. For example, Heaven and Pretorius (1998) found support for the five factors with an Afrikaans-speaking South African sample but found that the five factors did not replicate well for a Sesotho-speaking South African sample. However Heaven and Pretorius used adjective terms and principal components analysis with oblimin rotation.

A study by Heuchert et al. (2000) indicated support for the five factor model on a sample of 408 South African university students. Heuchert et al. (2000) used exploratory factor analysis with varimax rotation. All 30 facet scores had a loading of at least .40 on the hypothesised domain. Only 2 facet scores showed secondary loadings at or above .40 on another domain in addition to the hypothesised domain. Angry Hostility loaded negatively and Warmth loaded positively on the Agreeableness domain. Congruence coefficients between the South African group and the American normative group (Costa & McCrae, 1992) were above .95 for all the domains except for Openness to Experience, which had a congruence coefficient of .90. Heuchert et al. (2000) comment on the fact that methodological differences, particularly with regard to different factor rotation methods, may account for the differences in results found in South African research studies.

Zhang and Akande (2002) reported that a five factor structure could be obtained in a South African sample using an exploratory principal-component factor analysis with oblimin rotation but this replicability was weak and differed as a function of gender, race, educational level and socio-economic status. However in all the studies cited above, language proficiency in English is cited as playing a role in the observed differences. These studies do not however underestimate the role of true cultural differences.

Piedmont et al. (2002) cite a number of reasons for the results obtained. The first of these reasons has to do with the general quality of the translation, which may not have been

adequate. In their study, Piedmont et al. (2002) used a Shona translation of the NEO-PI-R. Alternatively Piedmont et al. (2002) suggest the possibility that the Shona language may lack equivalent terms for the English language items. This concurs with findings by Teferi (2004) with the Eritrean translation as well as an unpublished thesis that examined an isiXhosa translation of the NEO-PI-R (Horn, 2000). According to Horn (2000) certain languages lack suitable words or idioms for something from another language. For example, green and blue are given the same name in isiXhosa, and the Afrikaans language has no word for “sexy”. An isiXhosa idiom, “Wamva nonzipho” as understood by isiXhosa-speaking individuals translates as, “He put him to the test”. However, translated literally by those not familiar with isiXhosa it would read, “He felt him by the finger nail” (Horn, 2000). Horn (2000) reported, specific to the NEO-PI-R, that there were no single words in isiXhosa for “manipulation”, “morality”, “intentions”, “roller coaster” or “jittery”. Certain languages also have too many nuances of a particular construct, which cannot be explained by a wider description. According to Shillington (1988), Eskimo people use approximately 40 different adjectives for describing snow. The isiXhosa language has one word for the English terms “vision”, “dream”, “fantasy” and “imagination”, all of which appear in different items of the NEO-PI-R (Horn, 2000). Also, it is possible that the same word or concept expressed in different languages will have different positive or negative connotations (Shillington, 1988). An example that is frequently cited is that of belching, which is considered negatively in the West but is regarded as complimentary in some Arabic and Middle Eastern cultures (see Poortinga, Van de Vijver & Van Hemert, 2002). Thus a common criticism levelled against the FFM is that it is an approach developed from the analysis of adjective terms in the English language.

Piedmont et al. (2002) also allude to the possibility that differences may occur in response styles and response biases in African samples. McCrae (2002) and Allik and McCrae (2004) argue that acquiescent response biases as well as a tendency to avoid extreme responses are more prominent in collectivist cultures but this case of metric equivalence has yet to be fully explored in an African context.

Finally, Piedmont et al. (2002) posit the possibility that some of the constructs measured by the NEO-PI-R may have no counterpart in Shona culture especially at the facet level. They cite the example of Excitement-Seeking (an essentially self-centred motivation), which is foreign in collectivist cultures. Teferi (2004) also found Excitement-Seeking to be problematic in the Tigrignan translation, in terms of both translation and replication. However in Teferi’s (2004) study the five factor solution yielded no consistent Extraversion factor. Extraversion facets loaded on all other factors. The finding was similar with regard to Openness to

Experience. Positive loadings above .40 on Feelings (O), Actions (O), Ideas (O), Gregariousness (E) and Excitement-Seeking (E) and a negative loading on Values (O, -.37) constituted the Openness factor in Teferi's (2004) study. The Openness facets of Fantasy, Aesthetics and Actions were highly problematic, while Values loaded negatively (-.37) on the Openness factor and the Agreeableness factor with Modesty (A), Tender-Mindedness (A), Compliance (A), Positive Emotions (E) and Warmth (E). Thus Teferi (2004) concluded that Extraversion and Openness as measured by the NEO-PI-R were not adequate assessments of the manifestations of Extraversion and Openness to Experience in the Eritrean context.

Allik and McCrae (2004) suggest the possibility that traits like Extraversion and Openness to Experience are more valued and therefore more readily endorsed in Western cultures, whereas co-operation and tradition are more valued in non-Western cultures. Furthermore, McCrae (2002) suggests that individual differences might be muted in collectivist cultures, either because individuals avoid emphasising their personal attributes or because individual traits are less important in these cultures. Piedmont et al. (2002) also discuss the weak replicability of Openness to Experience, suggesting that this is a heritable trait but that its development may be primarily in relation to urbanisation and industrialisation and would therefore not feature in non-industrialised, agrarian cultures.

While this may be a possibility for certain parts of Africa, it is certainly not the case for a large part of the continent, particularly in South Africa, where the studies cited were conducted with relatively urbanised and industrialised individuals. Okeke et al. argued this as far back as 1999, despite the presentation of African cultures as,

> slowly changing, rural, and small cultural groups untouched by the worldwide social, political, economic, and technological transformations of the 20th century. Yet, the typical contemporary African is more likely to be resident of the urban conglomerates in and around Accra, Dakar, Johannesburg, Kinshasa, Lagos and Nairobi. (p. 140)

3.5.4.2. Construct validity of the CPAI-2

Until 2006, Cheung and colleagues were using the CPAI. It is only in publications following 2006 that the CPAI-2 was used. From 2006 onwards only three studies utilising the CPAI-2 were located. The first is the 2008 study by Cheung et al., which reported on the normative structure of the CPAI-2. The norms were obtained from the six Chinese Mainland regions and Hong Kong. Congruence coefficients ranged between .94 and .98 for the four factor solution across the seven regions. In total the four factor solution explains 48.4% of the shared variance, with Social Potency explaining 15%, Dependability 14.6%, Accommodation

10% and Interpersonal Relatedness 8.9% (Cheung et al., 2008). The matrix obtained in this study appears in Table 6.11 in the results chapter (Chapter 6).

Cheung, Fan and To (2007) report on the use of the CPAI-2 in organisational settings yet provide no information on the factor structure of the CPAI-2 in that setting. Cheung, Cheung, Howard and Lim (2006) compared the factor structure of the CPAI-2 in three ethnic Singaporean groups – a Singaporean Chinese group (*n* = 211), a Singaporean Malay group (*n* = 163) and a Singaporean Indian group (*n* = 76) – to the Chinese normative structure. According to Cheung et al. (2006) the Singaporean Chinese sample's (*n* = 450) factor structure most closely resembled the Chinese normative structure, with factor congruence coefficients from .94 to .97. Although the two structures were identical on primary loadings, the Thrift versus Extravagance loaded at .35 in the Singaporean Chinese sample. The Singaporean Malay structure was also similar to the Chinese normative structure except for Internal versus External Locus of Control (LOC), which had a loading of .36 on Dependability and .37 on Accommodation. In the Chinese normative sample the corresponding loadings were .48 and .34. The least agreement was between the Chinese normative structure and the Singaporean Indian structure. Cheung et al. (2006) report congruence coefficients above .90 for Social Potency, Dependability and Accommodation and a congruence coefficient of .85 on the Interpersonal Relatedness factor. Four Dependability scales (Family Orientation, Responsibility, Meticulousness, Practical Mindedness) loaded on the Interpersonal Relatedness factor.

In 2003, Cheung et al. explored the factor structure of the English CPAI in a sample of 531 Singaporean Chinese individuals. Factor congruence coefficients ranged between .92 and .99. The total variance explained was 57.8%, ranging between 20% and 9.5%. All CPAI scales loaded as indicated in the Chinese normative structure with the exception of Veraciousness versus Slickness, and Face. Veraciousness versus Slickness loaded on Dependability in the Chinese sample but on Accommodation in the Singaporean Chinese sample. Face loaded primarily on Dependability in the Singaporean Chinese sample but on Interpersonal Relatedness in the Chinese sample. However in both cases secondary loadings above .40 were found in the Singaporean Chinese sample that were congruent with the Chinese factor loadings.

Cheung et al. (2003) also explored the CPAI in a group of 144 Caucasian students at a Midwestern university in the United States. The Caucasian sample was compared to the normative Chinese sample using Procrustes rotation. All factor congruence coefficients were at .9 or higher for the four CPAI factors. The total variance explained was 54.6%, with

Dependability explaining 21.9%, Interpersonal Relatedness 11.5%, Social Potency 11.7% and Accommodation 9.5%. All the CPAI subscales, with the exception of Face and Defensiveness, loaded as expected. Face loaded only on Dependability in the Caucasian sample, whereas it has a primary loading on Interpersonal Relatedness and a secondary loading on Dependability in the Chinese normative sample. Defensiveness loaded primarily on Dependability in the Caucasian sample but loads primarily on Accommodation in the Chinese normative sample.

Finally, Cheung et al. (2001) also compared the factor structures of the Caucasian sample to the Singaporean sample using Procrustes rotation. All factor congruence coefficients were greater than .90. All the CPAI subscales, with the exception of Veraciousness versus Slickness, loaded on the factors as expected. Veraciousness versus Slickness loaded on Dependability in the Caucasian sample and on Accommodation in the Singaporean sample. These results informed the adaptations that led to the CPAI-2.

3.5.4.3. Joint factor analysis of the NEO-PI-R and the CPAI-2

Cheung et al. (2001) conducted a joint factor analysis of the NEO-PI-R and the CPAI and found evidence for a six factor model of personality that explained 50% of the total variance. Factor 1 explained 16.1% of the variance, Factor 2 explained 9.7%, Factor 3 explained 9.5%, Factor 4 explained 7%, Factor 5 4.2% and Factor 6 3.5%.

In the six factor solution, Factor 1 was defined by three scales from the CPAI Dependability factor, namely Inferiority versus Self-Acceptance, Internal versus External Locus of Control and Emotionality, as well as Leadership (negative) and Adventurousness (negative) from the Social Potency factor and the Neuroticism facets of Anxiety, Depression, Vulnerability and Self-Consciousness. Cheung et al. (2001) concluded that this factor fits into the Neuroticism domain of the FFM.

The second factor loaded on three Dependability scales, namely, Responsibility, Meticulousness and Practical Mindedness; Impulsiveness (negative) from the NEO-PI-R Neuroticism domain, and Self-Discipline, Deliberation, Order, Achievement Striving, Dutifulness and Competence from the Conscientiousness domain. Thus this factor fits well into the Conscientiousness domain of the FFM (Cheung et al., 2001).

Factor 3 is characterised by three scales from the CPAI Dependability domain, namely, Graciousness versus Meanness, Veraciousness versus Slickness and Family Orientation; Angry Hostility (negative) from the NEO-PI-R Neuroticism domain; and Compliance,

Straightforwardness, Trust and Altruism from the NEO-PI-R domain – making this factor similar to the Agreeableness domain in the FFM. The fourth factor consists of two CPAI scales, namely, Introversion versus Extraversion (negative) and Self versus Social Orientation (negative) and five of the NEO-PI-R Extraversion facets, namely Gregariousness, Warmth, Activity, Assertiveness and Positive Emotions. Thus Factor 4 is compatible with the Extraversion domain of the NEO-PI-R. Factor 5 is a unique CPAI factor without any loading on the NEO-PI-R facets. The CPAI scales of Optimism versus Pessimism (negative), Ren Qing (Relationship Orientation), Flexibility (negative), Ah Q Mentality (Defensiveness), Harmony, Face and Logical versus Affective Orientation loaded on this factor, which Cheung et al. (2001) initially labelled as the Chinese Tradition factor but subsequently changed to Interpersonal Relatedness. Factor 6 on the other hand is a unique NEO-PI-R factor with no loadings on the CPAI facets. The NEO-PI-R facets that loaded on this factor were Feelings, Aesthetics and Fantasy from the Openness to Experience domain, and Tender-Mindedness from the Agreeableness domain, suggesting that the sixth factor is representative of the Openness to Experience domain of the FFM (Cheung et al., 2001).

However when Cheung et al. (2001) explored a five factor solution, they found that the CPAI scales could be forced to fit the FFM, leading them to concur with Bond (1994) who argues that:

> although the indigenous dimensions may have cut the social perceptual world in different ways, they were considered to define the same space and could be “coaxed to reveal a five factor solution that bears plausible functional similarity to the Big Five”. (p. 424)

In 2003, Cheung et al. conducted a joint factor analysis of the English version of the CPAI and the NEO-FFI respectively, exploring both a six and a five factor solution. The six factor solution explained 59% of the total variance. Factor 1 explained 12.7% of the shared variance, Factor 2 explained 9.7%, Factor 3 6.3%, Factor 4 12.8%, Factor 5 8.8% and Factor 6 6.2%. The five factor solution explained 55% of the total variance (Cheung et al. 2003).

In the six factor solution, Factor 1 was characterised by positive loadings on the Conscientiousness facets as well as Meticulousness, Responsibility, Practical Mindedness and Family Orientation. Negative secondary loadings were found on Factor 1 for Flexibility, and Inferiority versus Self-Acceptance, and a positive secondary loading was found for Logical versus Affective Orientation. Factor 2 was characterised by positive loadings on the Harmony, Relationship Orientation, Thrift versus Extravagance, Logical versus Affective

Orientation, Self versus Social Orientation and Defensiveness subscales, and a negative loading on the Flexibility subscale. Face had a positive secondary loading on this factor. Since no NEO-FFI scales loaded on this factor, Cheung et al. (2003) labelled this the Interpersonal Relatedness factor. Factor 3 was characterised by loadings on the Agreeableness facets of the NEO-FFI, as well as Graciousness versus Meanness and Veraciousness versus Slickness on the CPAI-2. Defensiveness from the CPAI-2 also had a negative secondary loading on this factor. Factor 4 was characterised by loadings on the Neuroticism facets of the NEO-FFI, as well as Emotionality, Inferiority versus Self-Acceptance and Face, and negative loadings on Adventurousness and Optimism versus Pessimism on the CPAI-2. Factor 5 had positive loadings on the Extraversion facets of the NEO-FFI and the Leadership subscale of the CPAI-2 as well as a negative loading on the Introversion versus Extraversion subscale of the CPAI-2. Factor 6 had positive loadings on the Openness facets of the NEO-FFI and the Modernisation subscale of the CPAI-2 (Cheung et al., 2003).

On examination of the five factor solution for the joint factor analysis between the NEO-FFI and the CPAI-2, the five factor solution explained 55% of the total variance. Two of the Conscientiousness facets of the NEO-FFI and the Practical Mindedness and Family Orientation scales loaded on both the Conscientiousness and Neuroticism factors. Most of the scales from the Interpersonal Relatedness factor loaded on the NEO-FFI Conscientiousness factor, and Self versus Social Orientation and Defensiveness from the Interpersonal Relatedness factor loaded on the NEO-FFI Agreeableness factor (Cheung et al., 2003). Cheung et al. (2003) concluded that while the five factor structure was clearly recoverable in the six factor solution, the independence of the five factors in the FFM of personality was not so clear-cut.

A joint factor analysis of the NEO-FFI and the CPAI-2 was also conducted by Cheung et al. in 2008. Once again a five and a six factor solution were examined but a minimum average partial (MAP) analysis suggested the extraction of five factors.

The six factor solution explained 48.6% of the variance with Factor 1 accounting for 12%, Factor 2 8.9%, Factor 3 8%, Factor 4 7.7%, Factor 5 7.6% and Factor 6 4.3% of the total variance explained (Cheung et al., 2008). Factor 1 was characterised by positive loadings on the facets of NEO-FFI Neuroticism domain and the CPAI-2 Dependability subscales of Face, Emotionality and Inferiority versus Self-Acceptance. The CPAI-2 Dependability subscales of Optimism versus Pessimism and Enterprise loaded negatively on Factor 1. The CPAI-2 Dependability subscale of Practical Mindedness also had a negative secondary loading on

Factor 1. Factor 2 was defined by the same loadings in the six factor solution as it had in the five factor solution and was characterised by loadings on the NEO-FFI and CPAI-2 Openness scales. The only difference was that Leadership from the CPAI-2 Social Potency factor now had a secondary loading on Factor 2; and Enterprise from the Dependability factor, which did not load on Factor 2 in the five factor solution, now had a secondary loading on Factor 2. Factor 3 was defined by positive loadings on the NEO-FFI Extraversion facets, the CPAI-2 Social Potency Extraversion versus Introversion and Leadership subscales, and the CPAI-2 Interpersonal Relatedness subscale of Social Sensitivity. Factor 4 had positive loadings on the NEO-FFI Conscientiousness facets and the CPAI-2 Dependability subscales of Meticulousness, Responsibility and Practical Mindedness. Factor 5 was characterised by positive loadings on the Agreeableness facets of the NEO-FFI and the CPAI-2 Accommodation subscales of Graciousness versus Meanness, Veraciousness versus Slickness and Interpersonal Tolerance. The Defensiveness and Self versus Social Orientation subscales from the CPAI-2 loaded negatively on Factor 5. Factor 6 was characterised by positive loadings from the CPAI-2 Interpersonal Relatedness subscales of Relationship Orientation, Discipline, Harmony and Traditionalism versus Modernity. The Thrift versus Extravagance factor loaded primarily on Factor 6 but with a loading of .38 and the Social Sensitivity subscale loaded secondarily on Factor 6 with a loading of .39 (Cheung et al., 2008).

The five factor solution explained 46.6% of the shared variance. Factor 1 explained 15.6% of the variance, Factor 2 explained 8.9% of the variance, Factor 3 explained 7.8%, Factor 4 7.7% and Factor 5 7.6% (Cheung et al., 2008). Factor 1 in the five factor solution was characterised by positive loadings on the Neuroticism facets of the NEO-FFI and the Inferiority versus Self-Acceptance, Face and Emotionality subscales from the Dependability factor of the CPAI-2, as well as negative loadings on two of the NEO-FFI Conscientiousness facets and the Dependability subscales of Optimism versus Pessimism, Practical Mindedness, Enterprise, Responsibility, and Internal versus External Locus of Control. One NEO-FFI Extraversion facet had a secondary negative loading on Factor 1. Factor 2 was characterised by positive loadings on the NEO-FFI Openness to Experience facets, along with the CPAI-2 Social Potency subscales of Diversity, Aesthetics, Novelty, Divergent Thinking, Leadership and Logical versus Affective Orientation. Factor 3 was characterised by positive loadings on the NEO-FFI Extraversion facets, on the CPAI-2 Social Potency subscale of Extraversion versus Introversion and on the CPAI-2 Interpersonal Relatedness subscale of Social Sensitivity. The CPAI-2 Social Potency subscale of Leadership had a secondary positive loading on this factor. Factor 4 had positive loadings on the NEO-FFI Agreeableness facets, as well as on the CPAI-2 Accommodation subscales of

Defensiveness, Graciousness versus Meanness, Veraciousness versus Slickness, Self versus Social Orientation and Interpersonal Tolerance. The CPAI-2 Interpersonal Relatedness subscale Harmony had a positive secondary loading on Factor 4 while the Accommodation subscales of Defensiveness and Self versus Social Orientation had secondary negative loadings on this factor. Factor 5 consisted of positive loadings on one of the NEO-FFI Conscientiousness facets as well as the CPAI-2 Interpersonal Relatedness subscales of Discipline, Thrift versus Extravagance, Harmony and Traditionalism versus Modernity, and the CPAI-2 Dependability subscale of Meticulousness. The CPAI-2 Dependability subscale of Responsibility and one of the NEO-FFI Conscientiousness facets had secondary loadings on this factor and primary loadings on Factor 1. Two CPAI-2 scales did not have loadings greater than .4, namely Relationship Orientation from the Interpersonal Relatedness factor and Family Orientation from the Dependability factor (Cheung et al., 2008).

The five factor solution was more clearly recoverable in the six factor solution than the five factor solution examined by Cheung et al. (2008), suggesting there may be merit in the argument for six factors, which include the traditional five as well as the Chinese Interpersonal Relatedness factor. However the subscales included in the Interpersonal Relatedness factor did not load as theorised, leading one to question the operationalisation of the construct. The results discussed above also bring into question the nature of the Openness to Experience dimension and its relevance to Chinese culture. Cheung et al. (2008) conclude that although Openness-related constructs were recognisable in their study, they were more complex than in Western cultures. Further study is recommended to determine whether Openness to Experience can be subsumed under Social Potency in the four factor model in other Chinese samples as well as in other cultures. Other questions also suggest themselves for further exploration, including whether the four factor model will be supported in other cultures or whether a five or six factor solution will be more conducive to such settings.

3.6. CONCLUSION

This chapter began by situating the current study within the etic-emic debate. The argument made is that this study has adopted a pseudo-etic approach, in that the applicability of two instruments developed in cultures outside of South Africa is examined. This approach was also discussed in terms of McCrae's (2004) intracultural and transcultural levels of analyses. The examination of instruments across cultures usually involves the examination of the reliability, validity and issues relating to bias of a particular instrument in a particular culture.

Hence this study proposed to explore the internal consistency reliability, test-retest reliability, construct validity and a number of issues relating to construct, method and item bias. This chapter focused on discussing the manner in which the internal consistency reliability, test-retest reliability, and construct validity of the two instruments were explored. These constructs were defined, and local and international literature pertaining to their exploration was presented. It was evident that both internal consistency reliability and construct validity was generally better for Western than non-Western cultures. Furthermore the five factors or domains tend to have better reliability and replicability across cultures than the facet scales. However these are general trends and variations do exist, as discussed. Explanations for differences and similarities were also explored. As indicated, apart from considering the reliability and validity of the NEO-PI-R and the CPAI-2, this study also considered the appropriateness of the two instruments for use in the South African context by considering issues relating to bias. This is detailed in Chapter 4.

CHAPTER 4: EXAMINING BIAS IN THE NEO-PI-R AND THE CPAI-2

4.1. INTRODUCTION

The history of South Africa is a chequered one characterised by ethnic and racial interaction, integration and conflict (Heuchert et al., 2000). The tribal groups that occupied the area prior to the arrival of White settlers in 1650 followed patterns of merging and splitting that were similar to most other parts of the world. Some groups were formed voluntarily and others by conquest and subjugation. In 1652 the ancestors of the Afrikaans-speaking South Africans arrived. These were primarily of Dutch ancestry and later German and French ancestry. Slaves from the former Dutch colonies in the East (mainly Malaysia) were also brought to the Cape at this time. Although the slaves spoke the same language (Afrikaans) as the White settlers, after 1948 they were separated into two groups based on skin colour – White Afrikaners and Coloured/brown Afrikaners. The other main White group in South Africa consisted of the English-speaking White South Africans who arrived in the early 1800s with the aim of "settling the frontier" (Heuchert et al., 2000, p.113).

In the 1860s British settlers recruited indentured labourers from India primarily to man the sugar, tea and coffee plantations in the then Natal region. These labourers were promised good wages and the right to settle as free men after five years. The failure to implement the freedom policies for Indians led to Ghandhi forming the Natal Indian Congress, the first mass political organisation in South Africa. At the same time members of the Indian merchant class came to South Africa and were instrumental in setting up trade in the then Transvaal region of South Africa. Even though this merchant class had more freedom than the indentured Indian labourers and Malaysian slaves, they were still regarded as an inferior group by the Whites. Together with the native South African tribes, the Coloureds and Indians were classed as a Black group. Although relationships between the White Afrikaners and the White English-speaking South Africans were tense – so much so that two wars were fought between the two groups – they were united in their efforts to subjugate Black South Africans (Heuchert et al., 2000).

In 1948, the National Party, which was the dominant political party at the time, instituted a formal system of racial segregation called apartheid. Apartheid ensured the reservation of social, economic and political privilege for White South Africans while Black (non-White) South Africans were denied access to basic needs, opportunities and freedom. This divide-and-rule tactic also created further social stratification within the Black group. South African

Indians, particularly the merchant classes, held a higher socio-economic status, followed by Coloureds, and the group most discriminated against were the indigenous African tribal groups. While opportunities and freedom for Indians and Coloureds were curtailed, these groups had better access to infrastructure and basic needs like water, electricity and housing, whereas the indigenous groups were denied even this. Indigenous African groups were forced and encouraged to accept a tribal identity by separating and removing people to rural “homelands”, e.g. Bophuthatswana, Venda and Transkei. Urban people were separated by race and forced to live in separate residential areas. Urban residential areas for indigenous Africans were too small, with little or no infrastructure, resulting in even further oppression of the masses in South Africa (Heuchert et al., 2000).

Job preference was given to White individuals, and a policy of job reservation that ensured employment for all Whites was put in place. Psychometric testing and psychological assessment was misused to justify this. Tests that were developed and standardised on educated White South Africans were administered to illiterate, uneducated or poorly educated Black South Africans, and used as a basis to justify job reservation and preference. Testing was also used to indicate the superiority of the White intellect over the Black intellect and further justify apartheid. This resulted in a general mistrust of psychological assessment and more specifically psychometric testing among the Black groupings in South Africa (Foxcroft & Davies, 2008; Nzimande, 1995; Sehlapelo & Terre Blanche, 1996).

Post-1994, following a peaceful transition and the advent of democracy, the government made attempts to redress the more basic and structural inequalities that had been in place for the previous 45 years. The provision of basic services and housing has always remained a top priority. The country also developed one of the most progressive constitutions in the world (Constitution of the Republic of South Africa, 1996), which upholds human rights, promotes freedom and ensures that never again will any individual or group of individuals be subjected to a system as vile as apartheid. Laws were promulgated to support this, most notably the Employment Equity Act (Office of the President, 1998).

The Employment Equity Act (Act No. 55 of 1998) was specifically promulgated to recognise that as a result of apartheid and other discriminatory laws and practices, there are disparities in employment, occupation and income in the labour market and that these disparities create such pronounced disadvantages for certain categories of people that they cannot be addressed by simply repealing discriminatory laws. Hence the Act proposes a number of actions, most notably that of affirmative action, to address the broader inequalities that exist

in the workplace in South Africa. The Employment Equity Act also states that all psychological instruments should be reliable, valid, unbiased and fair for all groups in South Africa. It is within this context that this study to explore the utility of the NEO-PI-R and CPAI-2 was undertaken.

Chapter 3 detailed the exploration of the reliability and validity of the two instruments. However given the history of South Africa, the exploration of bias is not only fundamental but also involves more intricate arguments and therefore merits a chapter of its own. Thus this chapter starts with a theoretical discussion of bias and the types of bias as postulated in the literature (Van de Vijver & Leung, 1997; Van de Vijver & Tanzer, 1997). Thereafter, equivalence is addressed briefly. Finally the chapter focuses on the manner in which issues of bias were examined in this study. This section includes debates on culture as well as the relationship between culture and its exploration and operationalisation in the South African context. The groupings (gender, population group and home language) chosen to examine bias are discussed and relevant literature exploring differences across the various groupings is presented. The chapter concludes with some discussion on national identity followed by a brief discussion on acculturation.

4.2. BIAS DEFINED

According to Murphy and Davidshofer (2005), bias is said to exist when a test makes systematic errors in measurement or prediction. Bias is a statistical concept and can therefore be defined empirically and its existence determined scientifically. By examining test data one can determine the extent to which a test provides biased measures. Bias exists in a test if the testing procedure is unfair to a group of individuals who can be defined in some way (Moerdyk, 2009). However the most influential definitions and methods of examining bias come from the work of Poortinga (1989), Poortinga et al. (2002), Van de Vijver and Leung (1997) and Van de Vijver and Tanzer (1997). Poortinga (1989) defines bias as the presence of nuisance factors (unwanted but systematic sources of variation) in cross-cultural measurement. According to Van de Vijver and Tanzer (1997), bias occurs when score differences in indicators of a particular construct do not correspond with differences in the underlying trait or ability. It has to do with the characteristics of an instrument in a specific cross-cultural comparison rather than with its intrinsic properties (Van de Vijver & Tanzer, 1997). Van de Vijver and Leung (1997) propose a taxonomy of bias consisting of three types, namely construct bias, method bias and item bias.

Construct bias occurs when the construct measured is not identical across groups. Van de Vijver and Leung (1997), and Van de Vijver and Tanzer (1997) cite a number of sources under construct bias, as evident in Table 4.1. A partial overlap in the definitions of the construct across cultures is cited as one source of bias. An example of this can be found in Teferi's (2004) study, which focused on translating and adapting the NEO-PI-R for the Eritrean culture. He found that the manner in which Excitement-Seeking was conceptualised in the NEO-PI-R differed from how it would be conceptualised in Eritrea. Aside from living in a war torn country, Eritreans are generally quite placid people who would view a picnic on the Riviera as exciting. This is not the same degree of Excitement-Seeking as one would find in Las Vegas or riding on a roller coaster, as proposed in the NEO-PI-R.

Method bias refers to all sources of bias originating from the method and procedure of a study, including factors such as sample incomparability, instrument differences, tester and interviewer effects, and the mode of administration (Van de Vijver & Leung, 1997; Van de Vijver & Tanzer, 1997). Thus three types of method bias can be distinguished, namely, sample bias, administration bias and instrument bias. Sample bias refers to confounding sample differences that impact on the responses. For example, comparing responses of literate and illiterate people on some instrument can result in systematic differences between the groups due only to their level of literacy or education. Administration bias refers to differences in the procedures or mode employed in administering the instrument. In the previous example, using self-report questionnaires for the literate group and asking an interviewer to administer the same questionnaire to an illiterate group can create systematic differences between the groups due to the mode of test administration. Finally, instrument bias refers to general features of the instrument that give rise to unintended differences between groups. For example, systematic differences between groups may be due to ways in which specific groups treat Likert scales. Hui and Triandis (1989) found that Hispanics when compared to European Americans were more likely to endorse extreme scores on a 5-point scale but this tendency disappeared when a 10-point scale was used. Types and sources of method bias are summarised in Table 4.1

Table 4.1 also summarises the main forms of item bias. Item bias is the generic term for all disturbances at item level. An item is biased if respondents with the same standing on an underlying construct do not have the same mean score on an item. For example, a test that has an item requesting the colours of the South African flag would yield more correct responses from South African students than students of any other nationality.

Table 4.1: Sources of the three types of bias

Type of bias	Sources of bias
Construct bias	Incomplete overlap of definitions of the construct across cultures
	Differential appropriateness of (sub)test content
	Poor sampling of all relevant behaviours (e.g. short instruments)
	Incomplete coverage of all relevant aspects/facets of the construct (e.g. not all relevant domains are sampled)
Method bias	Differential response styles such as extremity scoring, social desirability or acquiescence
	Differential stimulus familiarity
	Lack of comparability of samples (e.g. differences in educational background, motivation, age, or gender composition)
	Differences in environmental administration conditions – physical (e.g. recording devices) or social (e.g. class size)
	Differential familiarity with response procedures (e.g. ambiguous instructions and/or guidelines for administrators)
	Tester/interviewer/observer effects (e.g. differential expertise of administrators)
	Communication problems between respondent and tester/interviewer in either cultural group (e.g. ambiguous instructions for respondents, interpreter problems, taboo topics)
Item bias	Poor item translation
	Ambiguous items
	Inadequate item formulation (e.g. complex wording)
	Cultural specifics (e.g. incidental differences in connotative meaning and/or appropriateness of item content)
	Incidental differences in appropriateness of item content (e.g. topic of item in educational test not in curriculum in one cultural group)
	Nuisance factors (e.g. item/s may invoke additional traits or abilities)

Note. Adapted from “Bias and Equivalence in Cross-Cultural assessment: An Overview,” by F. van de Vijver and K. Leung, 1997, *Methods and Data Analysis for Cross-Cultural Research* (p. 124). Copyright 1997 by SAGE Publications, Newbury Park, CA. Reprinted with permission of the authors.

4.3. BIAS AND EQUIVALENCE

Van de Vijver and Leung (1997) suggest that no examination of bias is complete without the mention of equivalence. Bias and equivalence may be treated as antonyms. Bias refers to non-equivalence and equivalence suggests the absence of bias (Van de Vijver & Rothmann, 2004). According to Van de Vijver and Leung (1997), equivalence refers to the implications of bias with regard to the comparability of constructs and test scores. Thus bias refers to the presence of nuisance factors that impact on scores obtained on an instrument, while equivalence describes the consequence of the nuisance factors on the comparability of scores across cultures.

Four categories of equivalence (construct, structural, metric and scalar equivalence) are proposed by Van de Vijver and Leung (1997). Construct inequivalence refers to comparisons that have no equivalent in other cultures and amounts to comparing “apples and oranges”. The example cited for this is that of culture-bound syndromes, which are unique to specific cultures and have no equivalent. Hence one finds in the literature that construct equivalence is seldom referred to when examining bias since the examination of bias suggests the presence of something that can be compared across groups. Structural equivalence refers to the extent that an instrument measures the same construct across cultures and, according to Poortinga et al. (2002), is the minimum requirement for any comparison. Metric equivalence requires not only that the construct be replicable but also that the distance between the scale points on which the construct is measured be the same across cultures. Finally, scalar equivalence requires that “a score has precisely the same meaning, even quantitatively, in terms of an interpretation, independent of the cultural background of the respondent from whom that score was obtained” (Poortinga et al., 2002, p. 292). Scalar equivalence is different to metric equivalence in that it requires a joint zero point across cultures (Poortinga et al., 2002). Structural, metric and scalar equivalence are hierarchically ordered. Thus, the third presupposes the second, which presupposes the first (Van de Vijver & Rothmann, 2004). From these definitions it is clear that at best the results of this study are contributing to the establishment of structural equivalence of each instrument in the South African context.

4.4. EXAMINING BIAS IN THIS STUDY

This study examines issues of bias using the three categories discussed above. Construct bias was examined by considering whether there were differences between the groups on each scale in each instrument. Furthermore, internal consistency reliability coefficients were

calculated for all the scales and subscales on both the instruments across gender, population group and home language. Construct bias was also examined using the degree of agreement between the factor matrices of the various groups in the study for both instruments.

Method bias was explored in the NEO-PI-R by considering to what extent groups endorsed extreme responses, and comparing this across groups. In the CPAI-2, method bias was explored using the Social Desirability Scale. More specifically, method bias in the CPAI-2 was determined by considering whether there were significant differences in socially desirable responding across groups.

Item bias was considered both quantitatively and qualitatively. Quantitative analysis involved the examination of each item across the various groups in the study for each instrument, to explore whether specific groups were responding differently to the items or not. Respondents were also asked to indicate on the questionnaire specific items that they thought were inappropriate or that they did not understand. This was done via circling or underlining items on the actual questionnaire. Two questions were included after each instrument. The first asked respondents to substantiate if they had experienced difficulties in understanding items on the instruments and the second asked respondents to substantiate if they had identified any items as inappropriate. The quantitative results were then examined in conjunction with the qualitative responses to two questions at the end of each instrument. Examination of the quantitative and qualitative data together provides some indication of item bias.

Thus far the discussion on bias has been theoretical and nonspecific. Although the terms “culture”, “cross-cultural” and “comparisons across cultures” have been referred to in this section and throughout the chapter, I have for the most part referred to “groups” and “comparisons across groups”. I did this deliberately since the terms culture, cross-cultural and comparisons across cultures are problematic. The term culture is nebulous and can mean different things in different contexts. When the term was used in these first three chapters it referred either to differences between South Africans and those of other nationalities or differences between the many groupings within South Africa.

These two distinctions are important. We conduct comparisons across groups to consider whether an instrument from one culture is valid in another. In this case the group or culture that is referred to is usually defined by nationality. The NEO-PI-R is an instrument developed in America and standardised on Americans. The CPAI-2 was developed and standardised

on Chinese. The instrument's validity – most notably its construct validity – in a South African culture is examined.

When it comes to issues of bias, the question is whether the instruments can be used for all South Africans fairly. At the start of the chapter I referred to the cultural diversity present in South Africa and the fact that in the past instruments were differentially created and utilised, based on previous policies of inequality and oppression where certain groups were given preference over others. Hence South Africa legislation insists that all instruments be unbiased against any employee or group (Section 8, Employment Equity Act, Office of the President, 1998). In order for an instrument to be unbiased in the South African context, it needs to be demonstrated that no group is being discriminated against; but the challenge is to define the groupings. In the discussion to follow, I address these two issues, namely the definition of the terms culture and cross-cultural, and how I have chosen to define the groupings to examine bias in the NEO-PI-R and the CPAI-2 in this study.

4.5. BIAS AND CULTURE

Culture is a difficult concept to define formally. It can mean different things to different people depending on individual backgrounds and individual contexts. Social anthropologists contributed the earliest definitions of culture. In 1871, Tylor defined culture as "that complex whole which includes knowledge, belief, art, morals, laws, customs, and any other capabilities and habits acquired by man as a member of society" (cited in Berry et al., 2004, p. 165). A shorter definition, widely used at the time, was proposed in 1948 by the anthropologist Herskovitz, who stated that "culture is the man-made part of the environment" (cited in Segall, Lonner & Berry, 1998, p. 1102). By the 1950s, though, definitions of culture abounded, so much so that Kroeber and Kluckhohn (1952) were able to place definitions into six major classes, that is, those definitions that were descriptive, historical, normative, psychological, structural or genetic. Based on their review, Kroeber and Kluckhohn (cited in Berry et al., 2004, p. 166)) proposed that "culture consists of patterns, explicit and implicit, of and for behaviour acquired and transmitted by symbols, constituting the distinctive achievements of human groups, including their embodiments in artifacts". In 2000, Matsumoto (cited in Matsumoto, 2007, p. 14) defined culture as "a shared system of socially transmitted behaviour that describes, defines, and guides people's ways of life, communicated from one generation to the next". More recently culture has been defined as:

> a unique meaning and information system, shared by a group and transmitted across generations, that allows the group to meet basic needs of survival, coordinate

> socially to achieve a viable existence, transmit social behaviour, pursue happiness and well-being, and derive meaning from life. (Matsumoto, 2007, p. 14)

Since the work of McCrae and Costa, and Cheung, is instrumental, it is essential that their understandings of culture be examined. McCrae and Costa's work has been elucidated in Chapter 2, with the presentation of the FFT. Basically the FFT regards culture as one of many external influences that work in conjunction with one's basic tendencies to produce characteristic adaptations, which consist of the outward or behavioural manifestations of personality, among others. The FFT asserts that traits have only a biological basis and cultures shape the expression of traits but not their levels (Hofstede & McCrae, 2004). McCrae and Costa do often emphasise that, in literature, country is equated with culture and comparisons across nationality are referred to as cross-cultural but that this is erroneous (McCrae, 2001; McCrae & Costa, 2008a; McCrae et al., 2005a). Culture cannot be equated with nationality (McCrae, 2004; McCrae & Costa, 2008a; McCrae et al., 2005a).

Despite acknowledging this, neither McCrae nor Cheung provides an explicit definition of culture. In Hofstede and McCrae (2004), Hofstede's definition of culture is cited where culture is defined as "the collective programming of the mind that distinguishes one group or category of people from another" (p. 58). Hofstede and McCrae (2004) elaborate further that culture is a collective and not an individual attribute. Culture is not directly visible but is rather manifested in behaviours, and culture is common to some but not all people.

In a more recent publication (McCrae et al., 2005b), McCrae and colleagues conceptualise personality in culture by distinguishing between ethos, aggregate personality and national character. Ethos refers to "traitlike characteristics used to describe the institutions and customs of the culture, such as the folktales, political organisations, child rearing practices and religious belief" (p. 408). For example, South African culture under the apartheid system might have been characterised as closed to experience because the government at the time censored everything from books to music to the theatre. South Africans, particularly Black South Africans, were not allowed to be exposed to anything foreign that might have caused them to rebel. Thus the ethos of South Africans at the time was closed to experience but this does not mean that individual South Africans were not highly open to experience. Despite the political stifling, South Africans, particularly Black South Africans, managed to organise effectively in all areas of functioning from politics to art. Aggregate personality as defined by McCrae et al. (2005a) refers to cultures in terms of the assessed mean personality trait levels of culture members. Thus if one were to say that South Africa has an agreeable culture, then as compared to other cultures South Africans are on average higher on

Agreeableness than the other cultures. Finally McCrae et al. (2005a) make reference to national character, where national character is defined as “personality traits that are perceived to be prototypical of members of a culture” (p. 408). For example, Indian people are regarded as being thrifty with money and good at business while South Africans are regarded as tolerant. Thus ethos may be regarded as a personality profile of a particular culture, whereas aggregate personality is the mean profile of the people belonging to a culture, and national character is the shared perceptions of the mean profile of the “typical” citizen and is akin to a national stereotype (McCrae, 2009).

In 2009 McCrae argued that both culture and the human mind are interdependent because they co-evolved. Since personality traits, according to McCrae (2009), were a pre-existing feature of the primate mind, they must have left an imprint on forms of culture. Hence he argues that whereas previous research regarded culture as the independent variable and personality as the dependent variable, the approach he proposes regards personality and culture as two independent sets of variables, both of which influence the behaviour of individuals and the development of social institutions. McCrae (2009) proposes that culture be viewed as ethos. “…Personality traits form a well-studied taxonomy which could provide a framework for the systematic description of cultures, or at least many aspects of culture” (p. 207), which should result in profiles of ethos, that is, the manners, customs and institutions that embody the characteristic spirit of culture. While this goes a long way towards explaining personality within the context of culture, it still does not explicitly define culture.

Cheung also does not explicitly define culture. Cheung and colleagues (1996; 2001; 2003) make mention of the etic, emic, imposed etic and pseudo-etic arguments in their papers and discuss the merits and demerits of using imported versus indigenous instruments in Chinese culture but do not state their understanding of the term culture. In their studies Cheung and colleagues compare the CPAI-2 factor solutions across Chinese, Singaporean Chinese and Caucasian samples (Cheung et al., 2003) as well as comparisons on Singaporean Chinese, Singaporean Malay and Singaporean Indian samples (Cheung et al., 2006) to make conclusions about the cross-cultural applicability of the instrument. Thus it is possible to deduce that Cheung and colleagues are defining culture based on nationality and ethnicity.

This assumption of equating culture with nationality or ethnicity is common. As indicated earlier, McCrae alerts one to it a number of times. Bock (2000) has called this fallacy the uniformity assumption. Fiske (2002) reports that many researchers evade defining culture, often choosing simply to equate culture with nationality. Further evidence for this comes from the number of published cross-cultural studies that claim to be exploring the cross-cultural

applicability of an instrument but which only proceed to consider whether the factor structure or some other psychometric property of the instrument can be replicated across nationality (see Cheung & Rensvold, 2000; McCrae & Costa, 2008a; McCrae et al., 2005a; Paunonen et al., 2000; Pervin, 1999). Dalton, Elias and Wanderman (2002) argue that the term culture has been applied to include nation-states, ethnic and religious groups, and even schools and corporations. Segall et al. (1998) argue that definitions of culture abound but that the most meaningful way to grasp culture is to consider how it is conceptualised in the research, that is, to grasp its operational definition. Thus,

> Culture is used as a label for a group within a set of groups (e.g., groups constituting nationalities resident in different parts of the world or ethnic groups, often of varying national origins, living within a multicultural society) being compared on some behavioural dimension. As such, the term is an overarching label for a set of contextual variables (political, social, historical, ecological, etc.) that are thought by the researcher to be theoretically linked to the development and display of a particular behaviour (Segall et al., 1998, p. 1105).

It is this approach towards culture that is adopted in the current study.

4.6. IDENTIFYING CULTURAL GROUPS FOR EXAMINING BIAS IN THE SOUTH AFRICAN CONTEXT

In the South African context, the variables of population group and home language are often used as operationalisations for the major cultural groupings in South Africa (see Abrahams, 1996; Abrahams & Mauer, 1999a; 1999b; Laher, 2010; Meiring, Van de Vijver & Rothmann, 2006; Meiring, Van de Vijver, Nel, 2006; Taylor, 2004; Van Eeden & Mantsha, 2007; Vogt & Laher, 2009). However it is debatable whether these groupings necessarily represent valid categories of classification for the cultural diversity within South Africa or whether the use of these categories perpetuates a past mindset where the previous political regime ensured that the population was divided on the basis of race, religion and language. These categories are, however, in keeping with international trends in cross-cultural research, where culture is operationalised using either religion, nationality or ethnicity, as evidenced in studies in recent editions of the *Journal of Cross-Cultural Psychology* and the *Journal of Personality*.

A more convincing argument for exploring bias in these two variable groupings comes from South African legislation. The Employment Equity Act (Office of the President, 1998, p. 1) proposed affirmative action (Chapter 3 of the Act) in order, among other things,

> to promote the constitutional right of equality and the exercise of true democracy; to eliminate unfair discrimination in employment; to ensure the implementation of employment equity to redress the effects of discrimination; and to achieve a diverse workforce broadly representative of the South African people.

According to the Employment Equity Act, “affirmative action measures are measures designed to ensure that suitably qualified people from designated groups have equal employment opportunities and are equitably represented in all occupational categories and levels in the workforce of a designated employer” (p. 9). Designated groups are defined in the Employment Equity Act as “black people, women and people with disabilities” (p. 3), where “black people” is “a generic term which means Africans, Coloureds, Indians” (p. 3). Thus from the Employment Equity Act it is evident that by law psychometric studies should be assessing issues of bias and in assessing bias one should consider bias across gender groupings as well as across population groupings.

South Africa has 11 official languages and fluency in an official language other than English is generally encouraged. Given that the majority of South Africans (91.8% of the population) speak English as a second language (Statistics South Africa, 2001), employers often ask that future employees be fluent in another South African language other than English, so as to be better able to assist clients. Furthermore, a number of job applicants from the designated groups will in all likelihood not have English as their first language. South African research has consistently demonstrated how taking a test in a language that is not one’s first language can impact on test results (see Abrahams, 1996; 2002; Abrahams & Mauer, 1999a; 1999b; Bedell, Van Eeden & Van Staden, 1999; Foxcroft, 2004; Franklin-Ross, 2009; Heaven & Pretorius, 1998; Heuchert et al., 2000; Horn, 2000; Meiring et al., 2006; Nel, 2008; Nell, 1999; Taylor, 2000; Taylor, 2004; Van de Vijver & Rothmann, 2004; Van Eeden & Mantsha, 2007; Vogt & Laher, 2009). Thus it becomes salient that bias across home language groupings also be examined.

In essence then this section has argued that in all research – whether it be conducted internationally or in the South African context – making claims about the cross-cultural utility of an instrument is difficult since the concepts of culture and what is cross-cultural are nebulous and very much context dependent. This issue is particularly salient when examining issues of bias since we need to determine across which cultural groups bias will be examined. Thus there appears to be merit in the proposal by Segall et al. (1998) that the operationalisation of culture will define what culture means in a particular study. In the current study a case is made for examining bias across gender, population groups and home

language. These variables represent the cross-cultural groupings across which the utility of the NEO-PI-R and the CPAI-2 were examined.

A further point to note is my consistent use of the term “population group” instead of “race” as the collective term for the African, Indian, Coloured and White groupings in South Africa. Commonly these are referred to as race groupings in South Africa. However, biologically race groups are more similar than different; it is the psychological and social meaning of the term in many societies that maintains its relevance, since as a socially constructed classification system, race is largely related to inequalities of status and power (Dalton et al., 2002). This is particularly salient in South Africa, where apartheid based on racial classification left a bitter legacy of what “race” means in this country. It is important that research move away from the term race and adopt a term with less negative connotation.

I adopt the term “population group” since it does not carry with it the legacy of the term race. I have chosen not to use the term “ethnicity” – despite its frequency in international research to refer to sub-groups within a nationality or as a synonym for nationality. Stevens (2008) argues that ethnicity,

> is a socially and historically determined or constructed concept that may differ from one social environment to another...ethnicity is neither primordial nor essential in nature (in other words ethnicity is not a natural set of characteristics with which we are all born), but rather that our experiences of ethnicity are dependent on and influenced by the power relations, histories, levels of social conflict and inequalities operating in any society at a given point in time (p. 325).

Thus, the term ethnicity can mean many things at any given time. In the South African context, it has both positive and negative connotations. On the negative side, at the time of apartheid ethnic groupings were defined as affiliation to a particular indigenous African tribe in South Africa, for example, Zulu, Xhosa, Sotho. These ethnic groupings were used to further divide the African people into the various homelands, for example the Xhosa people in Transkei, the Tswana people in Bophuthatswana. The term ethnicity therefore carries with it some of the legacy of apartheid. On the positive side, unlike race which stirs up bitter memories of forced removal and separation, ethnicity has been embraced to represent the diversity in South African cultures ranging from the indigenous African tribes to the various ethnic cultures present under the blanket term “Indian”.

Therefore while all three terms (race, ethnicity, population group) are valid descriptors of the four groupings (Black, Coloured, Indian, White), I have chosen to use the term “population

group" as it does not have the same intense negative connotation of the term race or the ambiguity of the term ethnicity. The four groupings are by-products of apartheid. "Population group" upholds the system of division along colour lines and as such is as inappropriate as the terms race or ethnicity; but it is essential to examine these groupings in psychometric research primarily because of the stipulations in the Employment Equity Act. I am certain that in the next 10 to 15 years, if not sooner, these groupings are going to fall away as we move towards a non-racial, more integrated society. However, at present we do need to consider these groupings in psychometric research and if we need to do this, then in my opinion population group is the most neutral and the blandest of the three terms.

Given that gender, population group and home language will be examined for incidences of bias, it is essential that literature pertaining to personality differences and gender, personality differences and population group and personality differences and home language be explored.

4.7. BIAS AND GENDER

Internationally, Feingold (1994) explored gender differences across personality traits in widely used personality inventories. The scales from all the inventories were organised according to the facets and dimensions of the FFM. Males were found to score moderately higher on Assertiveness (d = .50).[2] Females scored slightly higher on Anxiety (d = .25) and Trust (d = .28). The largest difference was found on Tender-Mindedness or Nurturance (d = .97), where females scored higher than males. According to Feingold (1994), these patterns were found to be consistent across age, educational level and culture.

Costa, Terracciano and McCrae (2001) analysed self-report data obtained from the NEO-PI-R across 26 cultures and found consistent gender differences. Where Feingold (1994) was only able to assess 9 traits, Costa et al. (2001) explored gender differences on all 30 traits and across 11 additional cultures. Costa et al. (2001) reported the results separately for U.S. adults and the other 25 cultures. Among the U.S. adults, females scored higher on Neuroticism, Agreeableness and Extraversion, with moderate effect sizes for Neuroticism (d = .51) and Agreeableness (d = .59) and a small effect size for Extraversion (d = .29). These results were replicated in the other cultures. The U.S. sample did not show any significant gender differences for Openness to Experience and Conscientiousness. In the other cultures, females scored higher than males on Openness to Experience and

2 Effect sizes for significant findings are reported using Cohen's *d*.

Conscientiousness, although the effect sizes were very small (*d* = .11 to .16) (Costa et al., 2001).

McCrae et al. (2005a) found similar results to Costa et al. (2001) when using observer, rather than self-report ratings obtained from the NEO-PI-R across 50 cultures. Females were found to score higher than males on all the domain scales, with a moderate effect size for Neuroticism (*d* = .49), a small to moderate effect size for Agreeableness (*d* = .32), and nonconsequential effect sizes for Extraversion (*d* = .15), Openness (*d* = .07) and Conscientiousness (*d* = .14).

Hyde (2005) posits that the magnitude of gender differences are often over-inflated, resulting in the misconception that males and females are vastly different to each other. Hyde (2005) argues that over-inflated claims about the differences between men and women pervade the mass media, resulting in the development of misinformed gendered stereotypes. These stereotypes have detrimental effects on relationships, parenting and the advancement of women in the workplace. Thus, Hyde (2005) argues that attention should be paid to effect sizes when interpreting research results with regard to gender differences. It is suggested that gender differences with an effect size (when calculated using Cohen's *d*) of less than *d* = .35 are too minor to warrant attention.

Feingold (1994) found effect sizes larger than *d* = .35 on the scales of Tender-Mindedness, where females scored higher than males, and Assertiveness, where males scored higher than females. Costa et al. (2001) and McCrae et al. (2005) found that females scored higher than males with an effect size greater than *d* = .35 on Neuroticism, and Costa et al. (2001) found that females scored higher than males with an effect size greater than *d* = .35 on the scale of Agreeableness. The results for the domains of Extraversion, Openness and Conscientiousness were mixed.

Studies using the FFM have found that gender differences are greater in Western cultures than in African cultures (Costa et al., 2001; McCrae et al., 2005a). In order to assess accurately the magnitude of gender differences across cultures, Costa et al. (2001) and McCrae et al. (2005) reorganised the facet scales constituting the domains of Extraversion and Openness to Experience into different domain scales. This was done because gender differences varied by facet within these domains. The new domain scales were designed to summarise consistent gender differences. The new domain scales were:

- Feminine-Extraversion/Introversion (F-Ex/In), which was calculated as (Warmth + Gregariousness - Assertiveness - Excitement-Seeking + Positive Emotions) / 5.

- Feminine-Openness/Closedness (F-Op/Cl), which was calculated as (Aesthetics + Feelings + Actions - Ideas) / 4.
- McCrae et al. (2005a) included Feminine-Conscientiousness/Unconscientiousness (F-Co/Un), which was calculated as (Dutifulness + Order + Competence) / 3.

Costa et al. (2001) found that Zimbabweans and Black South Africans reported very little evidence of gender differences on any of the scales (effect sizes were close to zero on all scales). The biggest gender differences were found in Belgium, with females scoring higher than males on all domains (Neuroticism *d* = .69, Agreeableness *d* = .55, F-Ex/In *d* = .36 and F-Op/CL *d* = .40). Gender differences reported by White South Africans were found to be mid-way in the rank ordering, with females scoring higher than males on all domains (Neuroticism *d* = .50, Agreeableness *d* = .46, F-Ex/In *d* = .19 and F-Op/Cl *d* = .27). McCrae et al. (2005a) found no significant gender differences in Nigeria, India, Botswana or Ethiopia, and the most significant gender differences were found in the United Kingdom, where females scored higher than men in all domains (Neuroticism *d* = .78, Agreeableness *d* = .84, F-Ex/In *d* = .43, F-Op/Cl *d* = .28). South Africans were not included in that study.

Costa et al. (2001) speculate that these findings may represent differences in personality traits arising from individualistic versus collectivist cultural influences. Western societies are typically individualistic while non-Western cultures are collectivist. They suggest that individual and gender differences in personality traits may be less relevant to members of collectivist societies. Subtle gender differences may therefore go unnoticed (Costa et al., 2001).

In an African context, Teferi (2004), using a Tigrignan translation of the NEO-PI-R in a convenience sample of 135 females and 265 males, found significant differences in the domains of Extraversion, Openness and Agreeableness, and the facets of Angry Hostility, Impulsiveness, Gregariousness, Assertiveness, Excitement-Seeking, Positive Emotions, Fantasy, Aesthetics, Feelings, Ideas, Straightforwardness, Compliance, Order and Dutifulness. Males scored higher than females on Extraversion and Openness and lower than females on Agreeableness. Males also scored higher on all the facets, with the exception of Positive Emotions, Straightforwardness, Compliance, Order and Dutifulness (Teferi, 2004). Mohammed et al. (2009) explored gender differences in personality using the NEO-FFI in a Japanese sample (males = 46, females = 64) and an Egyptian sample (males = 40, females = 43). They concluded for both groups that the only difference was in the

Neuroticism domain, with females scoring higher than males. They did not conduct facet level analyses.

In the South African context, the only documented study that could be located was that by Zhang and Akande (2002). They explored gender differences in a sample of 103 male students and 265 female students using the NEO-FFI. Three analyses were conducted to examine gender differences (Multivariate Analysis of Variance or MANOVAs, Analysis of Variance or ANOVAs, and multiple regression). No significant differences were found using the MANOVAs and ANOVAs. The multiple regression results indicated that females scored significantly higher on Neuroticism than males (Zhang & Akande, 2002). Thus results suggest that gender differences are stronger in Western than non-Western cultures.

4.8. BIAS AND POPULATION GROUP

As argued earlier, in South Africa, a variety of cultures are contained within a single political border. The “race” variable is a particularly sensitive but salient one for describing cultural diversity in psychometric studies in South Africa due to the country’s history of apartheid. Psychometric tests were used to justify apartheid along racial lines. Black individuals were given tests developed and standardised for White South Africans, and poor performance was argued to be a function of the inferior intellect of Black groupings who would benefit from leadership by Whites (Foxcroft & Roodt, 2008). Therefore, studies investigating the cross-cultural applicability of personality instruments in the South African context have had to take the variable of race into account but, as discussed earlier, this study uses the term population group not race.

Furthermore, as Allik and McCrae (2004) argue, “the primacy of human groups over geophysical locations is illustrated by the fact that Black and White South Africans have very different personality profiles, despite living in the same country for many generations” (p 23). It is therefore possible to conclude that, both internationally and locally, division along colour lines has always been considered in psychometric studies. Allik and McCrae’s (2004) contention of different personality profiles for White and Black groupings in South Africa needs to be explored further.

A study on the cross-cultural applicability of the 16PF in South Africa showed that the scores obtained were strongly influenced by race (Abrahams, 1996). Abrahams (1996) found significant differences in the means, reliability coefficients and factor structures for the different race groups, most notably the Black and White population groups. In addition there

were significant differences in the way that the items were answered by the different population group sub samples, and 18% of the items failed to attain significant item-total correlations. These results led Abrahams (1996) to conclude that population group had the greatest influence on the manner in which the test items were dealt with, suggesting the possible moderating influence of this variable.

A study by Allik and McCrae (2004) examined personality traits using the NEO-PI-R across 36 cultures, including a sample of Black and White South Africans. Multidimensional scaling procedures showed that Black South Africans, in line with other African and Asian cultures, were lower on Extraversion and Openness to Experience, and higher on Agreeableness, suggesting that these may not be differences in personality but rather differences in how these personality traits are expressed in individuals from individualistic and collectivist cultures respectively.

Piedmont et al. (2002) also allude to the possibility that these differences may not reflect personality differences but may occur due to differences in response styles and response biases in African samples. Allik and McCrae (2004) argue that acquiescent response biases as well as a tendency to avoid extreme responses are more prominent in collectivist cultures. Hamamura, Heine and Paulhus (2008) also argue that extreme response styles are more characteristic in those of European heritage, while moderate response styles are more characteristic in those of East Asian heritage. They also cite literature that suggests that North Americans of European heritage have higher levels of extreme responding as compared to African Americans and Latino Americans. They conclude that this may be due to a tendency towards dialectical thinking (a tolerance of contradictory beliefs) that is more prominent in East Asian cultures.

Hofstede and McCrae (2004) also discuss acquiescent responding and the tendency to endorse extreme scores in certain cultures and they argue that since the NEO-PI-R has balanced keying, acquiescence should not be a problem. Furthermore, patterns of mean levels obtained in other studies suggest that extreme responding should not be a significant concern. However given this body of research, this study considered extreme responding across gender, population group and home language to explore this aspect of method bias.

Other studies of the NEO-PI-R in South Africa have similarly found differences related to population group. Heaven, Connors and Stones (1994) used John’s list of 112 adjectives for the FFM in a sample of 230 Black South African undergraduate students. Using a principal components analysis with oblimin rotation, they found a five factor solution that was different

to that postulated by the FFM. The first factor was a combination of Agreeableness, Conscientiousness and Openness. The second factor could not be interpreted. The third and fourth factors resembled the positive and negative poles of Extraversion, and the fifth factor resembled Neuroticism. Thus Heaven et al. (1994) concluded that Neuroticism and Extraversion might be universal but Openness, Agreeableness and Conscientiousness may be culturally determined.

Matsimbi (1997), using principal components analysis with varimax rotation in a sample of 57 Black male white-collar workers, found only two of the five factors, namely, Conscientiousness and Agreeableness. Although the factor solution clearly identified five factors, the nature of the loadings on the five factors differed from the FFM. Factor 1 had most of the loadings on the Extraversion scale but some of the Conscientiousness and Agreeableness items loaded positively on this factor. Neuroticism items loaded negatively on Factor 1. Factor 2 also had similar loadings to Factor 1, with Extraversion, Conscientiousness and Agreeableness items loading positively on this factor and Neuroticism items loading negatively. Factor 3 was labelled as the Conscientiousness factor since almost all of the Conscientiousness items loaded on this factor. Factor 4 was labelled as the Agreeableness factor since almost all of the Agreeableness items loaded on this factor. The final factor, Factor 5, had positive loadings on both the Openness to Experience and Neuroticism domains. Considering Matsimbi's results one is inclined to question the utility of the NEO-PI-R and the FFM for Black males in South Africa. However one needs to bear in mind that the sample size was too small for the factor analysis. Furthermore, the factor analysis was conducted at the item level, not with the NEO-PI-R facets, and a cut-off of .30 was applied. Finally, the 57 males were from a single organisation in Johannesburg. However no information on their home language or language proficiency was given. Hence Matsimbi's (1997) results, while useful, are problematic.

Taylor (2000) investigated the construct comparability of the NEO-PI-R in a sample of 150 Black and 150 White employees at South African Breweries. Taylor (2000) explored the reliability coefficients for both groups and found minimal differences between the reliabilities on Neuroticism, Extraversion and Conscientiousness. However the Black sample had a reliability coefficient of .65 for Openness to Experience, while the White sample had a coefficient of .74. The Black sample had a reliability coefficient of .66 on Agreeableness, while the White sample had a reliability coefficient of .74. Facet scale reliabilities were also poorer in the Black sample, with 19 facet scales demonstrating reliability coefficients below .60. Of the 19, 15 were between .41 and .57. The lowest reliability coefficients in the Black sample were from Impulsiveness (.10), Activity (.37), Excitement-Seeking (.35) and Tender-

Mindedness (.29). For the White sample only 4 facet scales were below .60 as follows: Actions (.54), Tender-Mindedness (.52), Competence (.55) and Dutifulness (.56).

Using a principal components analysis with oblimin rotation, Taylor (2000) found that the five factor structure emerged better in the White sample than it did in the Black sample, with the Openness to Experience domain being most problematic in the Black sample. Using the original five factor matrix from Costa and McCrae (1992) as the target matrix, Taylor (2000) investigated congruence coefficients for both groups. Domain and facet scales in the Black sample with congruence coefficients below .90 were Openness to Experience (.78), Assertiveness (.84), Positive Emotions (.87), Ideas (.68), Values (.78), Straightforwardness (.86), Modesty (.87) and Order (.78). In the White sample all domain congruence coefficients exceeded .90. Tender-Mindedness (.89) was the only facet scale with a congruence coefficient below .90 in the White sample. The Black sample in particular also experienced a number of problems with the language used in the items. Words such as “permissiveness”, “lackadaisical”, “controversial”, “crafty”, “blue” (as in “I rarely feel lonely or blue”), ”crave”, “vigorously”, “jittery”, “fastidious”, “panhandler”, “cynical” and “prudence” were among those cited as problematic. Taylor (2000) identified low scores on the Trust facet in some Black individuals, and in post-test feedback it became apparent that this was associated with negative life events associated with political atrocities of the past. Another point of interest was that both Black and White individuals expressed a negative association with the word “fantasy”. For most of these respondents having an active fantasy life implied that one was lazy or did not have sufficient contact with reality (Taylor, 2000).

Zhang and Akande (2002) explored the validity and reliability of the FFM among a sample of 368 South African students, from 4 different South African universities. They found that Black students (n = 180) scored significantly higher on Neuroticism but significantly lower on Extraversion and Agreeableness than White students (n = 188).

Heuchert et al. (2000) administered the NEO-PI-R to 363 college students (248 White, 74 Black, 41 Indian) from 2 different universities in South Africa. Heuchert et al. (2000) employed exploratory factor analysis with varimax rotation on the Black and White sub-groups. They also employed Procrustes rotation with the White group as the target matrix and the Black group as the second matrix. Finally ANOVAs were used to compare Black, Indian and White groups on the NEO-PI-R domain and facet scales. Results for the White sub-group were congruent with the structure of the NEO-PI-R and the FFM as postulated by Costa and McCrae (1992). When rotated with the normative structure as the target matrix all congruence coefficients for the domains were above .95, except for Openness, which was

above .90. Only the Extraversion, Openness and Agreeableness factors were recovered in the Black sub-group. The first factor in the Black sub-group had positive loadings from the Conscientiousness facets and negative loadings from the Neuroticism facets. The fifth factor had only two facet loadings – Achievement Striving from the Conscientiousness domain and Actions from the Openness to Experience domain. When rotated with the normative structure as the target matrix, Neuroticism, Extraversion and Conscientiousness had coefficients in the range of .89 to .91. Extraversion had a congruence coefficient of .86 and Openness to Experience .73. Of the 30 facets, 27 loaded as hypothesised. When the Black structure was rotated with the White group as the target matrix, 29 facets loaded as expected. Congruence coefficients of between .85 and .89 were found for Neuroticism, Extraversion, Openness to Experience and Conscientiousness, while Agreeableness had a congruence coefficient well above .90 (Heuchert et al., 2000).

From the ANOVAs, Black individuals scored significantly lower in Openness to Experience than did Whites or Indians. Whites scored significantly higher in Extraversion than did Blacks or Indians and Whites scored significantly higher in Agreeableness than did Blacks. Significant differences were also found at the facet level on Impulsiveness, Warmth, Gregariousness, Activity, Excitement-Seeking, Positive Emotions, Fantasy, Aesthetics, Feelings, Actions, Values, Straightforwardness, Altruism, Compliance and Deliberation. However Heuchert et al. (2000) argue that effect sizes for these differences were too small to warrant discussion. Only Impulsiveness, Fantasy and Feelings demonstrated adequate effect sizes. Whites, Indians and Blacks were significantly different to each other on Feelings, with Whites scoring the highest and Blacks the lowest. Black scores were significantly different to White and Indian scores on Fantasy and Impulsiveness, with Whites scoring the highest and Blacks the lowest (Heuchert et al., 2000).

It is important to note that both studies (Heuchert et al., 2000; Zhang & Akande, 2002) concluded that differences found between the race groups were related to race in terms of educational level, socio-economic status and cultural differences, but were not a direct product of race itself. Heuchert et al. (2000) argue further that race is a variable of limited utility. South Africa has 11 official languages (2 European, 9 Black African) and a number of other languages (e.g. Hindi, Portuguese, Mandarin). Each of these linguistic groups has a unique culture and identity but according to Heuchert et al. (2000) it is reasonable to assume that the Black, Indian and White linguistic groups are more similar to each other culturally and politically than they are similar to the racially different groups. They cite examples of how South African White Afrikaner and South African White English cultures are different despite the fact that both cultures are White and South African. At the same time though

these two cultures are more similar to each other than White Afrikaners to Black Zulus or White English to Black Xhosa. Superimposed within and between these groups is the "historical reality of long-term differential treatment of these racial groups by the apartheid system" (Heuchert et al., 2000, p. 122). This, they conclude, makes it difficult to determine the extent to which racial differences in personality are products of specific cultural differences between the races in South Africa and how much may be attributed to general environmental factors like political oppression and poverty.

Heuchert et al. (2000) cite similarities between Black South Africans and the Nentsy people from the Russian Arctic. Both are members of historical out-groups who have experienced political oppression, poverty and reduced educational opportunities and both groups demonstrate significantly lower scores on Extraversion and Openness to Experience when compared to the traditional political in-groups (White South Africans and Russians). Out-groups are vulnerable and made to feel vulnerable; and in order to minimise these feelings members of out-groups learn to inhibit their thoughts and feelings, creating a reduced Openness to Experience.

In the current study although an attempt was made to gather equivalent amounts of data on all four population groups, this was not possible. Thus in order to create viable sample sizes for statistical analysis, samples were collapsed into a White and a non-White group. This was not done arbitrarily though. It is evident from the studies above that differences exist across population groups, most notably between Black and White South Africans. Dividing the population into two categories is not ideal. Both Black and White South Africans are by no means a homogeneous group. Sub-groupings exist among White South Africans and sub-groupings are even more evident among Black South Africans. The African, Indian and Coloured groupings that are collectively referred to as Black South Africans do have a number of differences that would merit that each group be studied individually. Within the three groupings as well there are sub-groupings that would probably also benefit from individual study. However, the Employment Equity Act (Office of the President, 1998) groups the three groups as a single category of "Black" individuals. Furthermore, there is a sufficient body of research to support the claim that African and Asian individuals differ significantly from White individuals but not necessarily from each other (see Allik & McCrae, 2004; Eaton & Louw, 2002; Cheung et al., 2001; Cheung et al., 2006; Laungani, 1999; Mpofu, 2001; McCrae, 2001; McCrae et al., 2005a; McCrae & Costa, 2008a; 2008b; Okeke et al., 1999; Van Dyk & De Kock, 2004; Vogt & Laher, 2009). Hence the decision to collapse groups into a White and a non-White grouping.

4.9. BIAS AND HOME LANGUAGE

Apart from population group, language has also been cited as a cultural variable notable for its influence as a powerful moderator of test performance (see Abrahams, 1996; 2002; Abrahams & Mauer, 1999a; 1999b; Bedell et al., 1999; Foxcroft, 2004; Franklin-Ross, 2009; Heaven & Pretorius, 1998; Heuchert et al., 2000; Meiring et al., 2006; Nel, 2008; Nell, 1999; Taylor, 2000; Van de Vijver & Rothmann, 2004; Van Eeden & Mantsha, 2007; Vogt & Laher, 2009). The dimensions of the FFM, while not explicitly located within the lexical hypotheses, are based on the work conducted within these studies (see Ashton & Lee, 2005). As such it is questionable whether factors derived from descriptive adjectives in the English language relate to the same constructs across cultures. Considerable disagreement in the literature exists between researchers whose studies continue to support the universality of the FFM and those whose studies raise questions as to its validity in cross-cultural applications particularly as it pertains to issues of language (Allik & McCrae, 2004; Ashton & Lee, 2005; McCrae et al., 2005a).

In South Africa language has a controversial history because issues of language were intertwined with politics and psychology, particularly psychological assessment, in the past dispensation (Abrahams, 1996; Abrahams & Mauer, 1999a; 1999b; Heuchert et al., 2000; Meiring et al., 2006; Nel, 2008; Van Eeden & Mantsha, 2007). Language thus becomes an important factor within South African culture; it would be vital in any study wishing to comment on the cross-cultural utility of any psychometric instrument requiring language capability.

Both home language and language proficiency impact significantly on responses in the South African context (see Bedell et al., 1999; Foxcroft, 2004; Horn, 2000; Nel, 2008; Van de Vijver & Rothmann, 2004). Since this study was conducted on a sample of university students, all of whom were in their second year or higher, it is assumed that the effects of language proficiency would be minimal. However, since both measures used in the study are etic measures, it is possible that certain items may be inappropriate for or not properly understood in the South African context. Hence respondents were asked, before the presentation of each instrument, to mark any items they thought inappropriate or that they did not understand. Following the presentation of each instrument, respondents answered another item requesting that they substantiate their identification of inappropriate items or items that they did not understand if they identified any. An examination of these responses provided an indication of the overall appropriateness of items in the South African context for both instruments. In addition to this, these responses provided information on bias by

considering whether systematic differences occurred between the various groupings (population group, home language) on items identified.

Language differences were consistently found in South African research on the 16PF. Abrahams (1996) found that participants whose home language was not English or Afrikaans had difficulty in understanding many of the words and the construction of sentences contained in the 16PF. Another study, conducted by Abrahams and Mauer (1999a), found that subjects whose home language was neither English nor Afrikaans experienced critical difficulties in understanding many of the words that would, as a rule, be regarded as rudimentary by English first-language speakers. Additionally, the manner in which the items had been constructed impeded the comprehension of subjects who did not speak English as a first language. Van Eeden and Prinsloo (1997) found that the African language group in their study tended to be more serious, less emotionally controlled and more group dependent. The tendency of the African language group regarding emotional control was reflected in the high scores they obtained on anxiety and emotional sensitivity. The Afrikaans/English group had higher scores on the compulsivity dimension (Van Eeden & Prinsloo, 1997).

Heaven and Pretorius (1998) explored the five factor personality structure using the 112 natural language descriptors suggested by John (1990), in a sample of 247 Black Sesotho-speaking students and 155 Afrikaans-speaking (mainly White) students enrolled at 2 universities in South Africa. All students completed the questionnaire in their native language, that is, Afrikaans or Sesotho. Heaven and Pretorius (1998) found that the traditional five component taxonomy was the best fit for the Afrikaans-speaking group but a different pattern of components with significant loadings emerged for the Sesotho-speaking group. A five factor solution that explained 37.7% of the variance was found for the Afrikaans group, with the first factor reflecting the Agreeableness dimension and explaining 14.1% of the variance. The second factor reflected the Extraversion dimension and explained 8.1% of the variance. The third factor reflected the Neuroticism dimension (6.5% of the variance) while the fourth factor reflected the Conscientiousness domain (5% of the variance) and the fifth factor reflected the Openness domain (4% of the variance). In the Sesotho-speaking sample 33% of the variance was explained. The first factor contained a mix of items from the five domains of the FFM and explained 16.1% of the variance. The second factor explained 7.3% of the variance and reflected the Neuroticism domain, with one item from the Conscientiousness domain. The third factor was characterised by loadings on the Agreeableness and Conscientiousness domains and explained 3.4% of the variance. The fourth factor explained 3.5% of the variance but was characterised by loadings on only two

items from the Extraversion domain. The fifth factor was a mixture of Extraversion, Agreeableness and Conscientiousness and explained 2.7% of the variance. According to Heaven and Pretorius (1998) the clearest factor to emerge in the Sesotho-speaking sample was an emotional stability factor.

As discussed in Chapter 3, Horn (2000) developed an isiXhosa translation of the NEO-PI-R but there were significant difficulties experienced by the isiXhosa-speaking students when completing the original NEO-PI-R in English. Correlations between the original NEO-PI-R and the isiXhosa version in a sample of 75 students whose home language was isiXhosa but who were bilingual (English and isiXhosa) were extremely poor, with Horn (2000) concluding that an isiXhosa translation of the NEO-PI-R was not viable.

Given the findings presented above on gender, population group and home language, there is significant evidence to suggest that South Africans are not a homogeneous group. Various differences occur across the various groupings in the country. Aside from the indications this has for bias and the utility of the NEO-PI-R and the CPAI-2 in South Africa, it is likely to have an influence on the appropriateness of the FFM, within which both instruments are located. Finally given recent trends in research that focus on national identity, I am inclined to question whether South Africans can be investigated as a group in studies of national identity, or whether South Africans would need to be split into Black and White groupings as has been the case in previous research (see McCrae, 2001; Allik & McCrae, 2004).

4.10. PERSONALITY AND NATIONAL IDENTITY

According to Terracciano, McCrae, Brant & Costa (2005a), national identity – also referred to as national character – can be defined as “beliefs about distinctive personality characteristics common to all members of a culture” (p. 96). National identity refers to “personality traits that are perceived to be prototypical of members of a culture” (McCrae et al., 2005b, p. 408). McCrae (2002, p.11) has noted that for centuries “people have characterised themselves and their neighbours in the language of personality traits (usually more flattering to themselves than others)” and that the influences of a “national character” upon the collective cultural experience of a group of people is a hugely powerful denominator in personality assessment. National character is different to national stereotypes in that stereotypes are oversimplified judgements whereas national character reflects the average emotional, interpersonal, experiential, attitudinal and motivational styles of members of a particular culture that are usually based on rigorous empirical research (Terracciano et al., 2005b). Recent advances in personality and cross-cultural research have made it possible to

compare perceived national character with aggregate personality data, that is, the means of a sample of assessments of individuals, across a number of cultures.

In 2004, Allik and McCrae and in 2005, McCrae et al. (2005b) concluded that geographically proximate cultures have similar personality profiles. European and American cultures differed significantly from Asian and African cultures, with the European and American cultures being higher in Extraversion and Openness to Experience and lower in Agreeableness. Southern European cultures tended to score higher on Neuroticism than Northern European cultures. Mean standard deviations were also systematically lower among Asian and Black African cultures (range = 3.6 to 4.33) than among European cultures (range = 4.06 to 5.59) (Allik & McCrae, 2004). However Allik and McCrae (2004) argued that if personality similarities do exist across nations in close geographical proximity – as the results of the two studies indicate – the explanations for this are still unclear. Possible explanations include shared culture, shared genes and shared physical environment but this might account for similarities between China and Korea, for example, but not necessarily China and Black South Africans. It also needs to be noted that in studies looking at national identity, reliance is on data already collected and in some cases on data collected on translated versions of the NEO-PI-R. Thus it is often argued that with translations slight shifts in phrasing can increase or decrease endorsement of items. Also individuals of different cultures may have different response styles, different self-presentational motives or different standards of comparison (Allik & McCrae, 2004; McCrae et al., 2005b; Terracciano et al., 2005a; 2005b). However Allik and McCrae (2004) also cite research that demonstrates that in the case of their study, these effects were minimal. They do also suggest the possibility that Asian and Black African cultures may be more homogeneous in personality traits than the more individualistic cultures of Europe. It is also possible that traits like Extraversion and Openness to Experience are more valued and thus more readily endorsed in Western cultures, whereas co-operation and tradition are more valued in non-Western cultures (Allik & McCrae, 2004).

McCrae et al. (2005b) found that Brazilians were rated as highest in Neuroticism, Northern Irish were highest in Extraversion, Czechs in Agreeableness and German Swiss in both Openness and Conscientiousness. McCrae et al. (2005b) also found evidence for within-nation variability. French and German Swiss samples differed significantly on all the NEO-PI-R domains except for Agreeableness. The English sample differed from the Northern Irish sample on Openness, where the English sample ranked 4th and the Northern Irish 49th. Hong Kong Chinese scored significantly higher than Mainland Chinese on Neuroticism and lower on Openness to Experience. There were no significant differences among the three sites

sampled in Brazil but significant differences were found among the four sites sampled in the United States on Neuroticism, Extraversion and Conscientiousness. In accordance with Allik and McCrae (2004), McCrae et al. (2005a) found that Asians, Africans and Russians clustered together in a geographical analysis of personality trait distributions across cultures, and Europeans and Americans clustered together. The Black African cultures in McCrae et al. (2008b) also shared the same space as the Black South Africans and Zimbabweans from Allik and McCrae's (2004) study. White South Africans shared the same space as Icelanders, Norwegians, the English, Puerto Ricans and Hispanic Americans (McCrae et al., 2005a). McCrae and Costa (2008b) argue that despite generations of life in South Africa, Blacks and Whites do not share similar personality profiles. Black South Africans resemble other Black Africans while White South Africans resemble Europeans. This suggests that White South Africans did not acculturate to the indigenous culture; instead they transported their culture with them. However McCrae stresses the need to consider that "African cultures are marked by the trauma of several centuries of European colonisation and the enforced social change that was brought about by this experience of outside domination" (Okeke et al., 1999, p. 140).

While these results are interesting and represent recent trends in research on the NEO-PI-R and the FFM, one is inclined to question the relevance of such research to this study. This line of research is important since it highlights an international trend to divide South Africans into Black South Africans and White South Africans without much explanation. While it has been demonstrated that sufficient justification may exist to do this, I question its value in the light of studies exploring national identity. By virtue of splitting South Africans, questions are raised as to whether the implication is that South Africans do not have a shared national identity. Angleitner and Ostendorf (2000, cited in Hofstede & McCrae, 2004) compared mean levels of NEO-PI-R scores from the former East and West Germany, and the only difference found was that West Germans were higher in Openness than East Germans. Why then should South Africans be any different? Perhaps it is because the same studies split Americans into Hispanic Americans and Americans, and Koreans into North and South Koreans. Given that South Africa is 16 years post-transformation and 16 years into a new democracy I am of the opinion that South Africans are well on their way to forging a South African identity.

Franklin-Ross (2009), in a study exploring language bias in the NEO-PI-R in a sample of postgraduate Psychology students (n = 25), provides some evidence for this. The focus group discussions in Franklin-Ross's (2009) study revealed that participants believed that South Africans share unique characteristics in that South Africans are accepting and tolerant

of change, adaptable under conflict, and eager to drive towards a resolution. Many of the participants felt that South Africans have a strong survival element within the expression of themselves and their personalities, both as individuals and as a collective cultural characteristic. This is best revealed in some of the quotations from the focus groups (Franklin-Ross, 2009):

> Y2 stated, "*I think this idea of a South African personality comes out of the contextual or the environmental impacts… So with us I would think that it would be the unique social factors; like what makes us specifically South African; for instance, the fact that we have braai's and not barbeques, and having jerseys and not jumpers, wearing school uniforms, having been through the apartheid and nowadays respecting each other's cultures".* (Franklin-Ross, 2009, p. 112)
>
> X3 concurs, *"…I think our South African mentality has developed out of a very integrated cultural environment, where sometimes you see more of the Western mentality and sometimes more of the ubuntu side of the nation comes out…and I think we all fit into that mould".* (Franklin-Ross, 2009, p. 112)
>
> Finally, X5 states, "*We are so open to change and adaptation in our…environment, I think, and that really reflects on the way that we have handled westernisation; like where we have come from, and where we are today. Ja, we have just kind of, gone with it, you know, and really embraced all the differences and incorporated it into our community. And I really think that these days whether you're saying 'Holy mackere', 'Jissus' or 'Eish' everyone will know what you mean...an 'elke boer maak a plan' mentality".* (Franklin-Ross, 2009, p. 120)

From Franklin-Ross's (2009) study, it is evident that a perception exists around a South African national identity based on the fact that South Africans have over the years developed cultural aspects and rituals that are uniquely South African, that South Africans are developing a national pride and a recognition of the collective culture or Ubuntu that was previously characteristic only of the African culture and that having been through apartheid, the transition and now democracy South Africans are more aware and appreciative of diversity.

As discussed in Chapter 2, the concept of Ubuntu is concerned with relationships towards others and is defined by reverence, respect, sympathy, tolerance, loyalty, courtesy, patience, generosity, hospitality and co-operativeness (Louw, 2001; Shutte, 2001). According to Louw (2001) the concept of Ubuntu defines the individual in relation to others but the individual

‘”signifies a plurality of personalities corresponding to the multiplicity of relationships in which the individual in question stands” (p. 6). An individual is self determining through other dependence. Persons depend on relationships with other persons to grow as persons (Shutte, 2001). Ubuntu as it manifests within the individual is defined by an integrity and wholeness of character that is present in one’s judgements, decisions and feelings and provides one with a sense of confidence, value and dignity (Shutte, 2001).

Vogt and Laher (2009) suggest the possibility that this may represent an emic construct in the South African context that is not covered in the NEO-PI-R. Based on the arguments and descriptions presented on the CPAI-2, it would be interesting to see if this dimension can at all be subsumed within the Interpersonal Relatedness factor that Cheung and colleagues (Cheung et al., 2003; Cheung et al., 2008) postulate.

Thus this section highlights two important issues, namely, whether the constant splitting of South Africans into Black and White groupings is justified 16 years post-transition – particularly when it comes to studies of national identity – and the possibility of an emic dimension to personality in the form of Ubuntu.

Terraccianno et al. (2005) however found that national identity does not correspond to national stereotypes, bringing into question this line of research. McCrae (2009) goes so far as to equate national identity with a national stereotype even though Terracciano et al. (2005) distinguish between the two. McCrae (2009) suggests that the study of aggregate personality traits and ethos are better directions for personality research. Either way, for South African research and research that uses South African results the question of the validity of splitting South Africans into White and Black South Africans remains.

McCrae et al. (2005b) argue that in a number of studies ancestry and culture are confounded, and therefore studies on acculturation are needed. This is more so in the African and South African contexts, where “politically liberated, Africans are now challenged by the opportunities and risks of modern technology and, above all, by the fast pace of worldwide transformation and change” (Okeke et al., 1999, 240). Heuchert et al. (2000) also identified acculturation as a potential confounding variable in their study.

4.11. ACCULTURATION

Thus a final issue for consideration – particularly in line with the arguments proposed by Okeke et al. (1999) and Heuchert et al. (2000) – is that of acculturation. Acculturation may

be defined as “those phenomena which result in individuals having different cultures come into continuous first-hand contact, with subsequent changes in the original cultural patterns of either or both groups” (Redfield, Linton and Herskovits, 1936, cited in Van de Vijver & Phalet, 2004, p. 216).

Van Dyk and De Kock (2004) argue, with regard to student samples in South Africa, that student populations tend to be more individualistic in nature, due in part to their shared exposure to similar education. In support of this view Oyserman, Coon and Kemmelmeier (2002) argue that the demands of an academic environment foster individualism, since the focus is on individual striving, competition and the realisation of one’s potential. Eaton and Louw (2002) argue that acculturation, which can be occurring at both the individual and community levels, could be influencing the extent to which cultural differences are expressed or even in fact exist. Mpofu (2001) speaks of what is referred to as the “African modernity trend”, which represents a shift towards Western individualism. This ideological shift has been greatly influenced by Africa’s participation in the global economy, where Western, free market economies emphasise individualistic values. Studies of acculturation have shown that overt behaviours become oriented to those of the dominant culture, but that the “invisible” elements of the individual’s traditional culture remain intact (Mpofu, 2001).

Table 4.2: Bidimensional model of acculturation

		CULTURAL MAINTENANCE (Do I want to establish good relations with the host culture?)	
ADAPTATION (Do I want to maintain good relationships with my culture of origin?)		**YES**	**NO**
	YES	INTEGRATION	SEPARATION/SEGREGATION
	NO	ASSIMILATION	MARGINALISATION

Note. Reprinted from “Assessment in Multicultural Groups: The Role of Acculturation,” by F. van de Vijver and K. Phalet, 2004, *Applied Psychology: An International Review, 53,* 218*.* Reprinted with permission of the authors.

Van de Vijver and Phalet (2004) argue that Mpofu’s (2001) understanding of acculturation is unidimensional, and they cite the bidimensional model proposed by Berry and Sam (1997) as a better conceptualisation of acculturation. In this model, Berry and Sam (1997) propose that individuals ask two questions: one pertaining to whether one wants to establish a good relationship with the host culture (adaptation dimension) and the other pertaining to whether

one wants to maintain a good relationships with one's native culture (cultural maintenance). The answers to these questions lead to four types of acculturation, namely, integration, separation, assimilation and marginalisation, as indicated in Table 4.2. Given the sample used in this study, it is essential that these arguments regarding acculturation be borne in mind.

4.12. CONCLUSION

This chapter presented a description and discussion of the manner in which issues of bias affect personality measures and its possible impact on the current study. The examination of bias in both instruments used in this study is strongly linked to debates within personality theory and assessment. This chapter also addressed some of the most salient debates around the definition and operationalisation of culture and the implications of cross-cultural personality assessment for research on national identity. Acculturation was briefly addressed in as much as it pertains to testing and the formation of national identity. An attempt was made to discuss these debates with special reference to the South African context and to provide a platform within which the results of this study may be interpreted. The next chapter provides a discussion of the methods used in this study.

CHAPTER 5: METHODS

5.1. AIMS OF THE STUDY

This study investigated the applicability of two personality assessment instruments, namely the Revised NEO Personality Inventory (NEO-PI-R) and the Cross-Cultural Personality Inventory - 2 (CPAI-2) in the South African context. Thus, the internal consistency and test-retest reliability of the two instruments were explored. Face validity and construct validity of the instruments were also explored, together with issues of construct, method and item bias.

5.2. RATIONALE FOR THIS STUDY

According to Sehlapelo and Terre Blanche (1996), psychometrics played an important role in the development of psychology in South Africa and continues to affect more South Africans than any other branch of psychology. Given South African psychology's intimate historical connection with psychometrics and the continued prevalence of testing in modern day South Africa, Sehlapelo and Terre Blanche (1996) argue that it should obviously be an important site of transformation. They argue that psychological tests are used on a large scale to determine who gains access to economic and educational opportunities, and if psychology as a discipline is truly interested in empowerment, the reform of testing practices should be one of its priorities.

Prior to this, Nzimande (1995) argued that psychometrics and testing was regarded as a vehicle for maintaining the apartheid status quo, since it symbolised the overt and covert racism of South African psychology, and was used to justify the exploitation of Black labour and to deny Black people access to education and economic resources alike. These debates were instrumental in informing a national response to psychological testing. In 1998 the Employment Equity Act was promulgated. Section 8 of the Employment Equity Act states that all psychological tests used in South Africa should be reliable, valid, unbiased and fair (Office of the President, 1998). Following this, much of the published literature in the field of psychological assessment has called for the exploration of issues of reliability, validity and bias in psychological instruments but to date, research on actual instruments – particularly in personality assessment – is lacking (see Bedell et al., 1999; Foxcroft, 2004; Laher, 2007; Meiring, 2008; Van de Vijver & Rothmann, 2004).

Researchers in South Africa have also debated the value of using etic (developed internationally) versus emic (developed locally) instruments, but the lack of empirical research to support the arguments again suggests that a need exists for research on psychometric issues (see Foxcroft et al., 2004; Laher, 2007; 2010; Meiring, 2008). Furthermore, psychological instruments in general, and personality tests in particular, are usually developed in relation to some theory. However, these theories are for the most part rooted in a Eurocentric culture. Recent literature on assessment in psychology calls for research not only into psychological instruments but more importantly into the theories that underlie the instruments (see Foxcroft, 2004; Laher, 2007; 2008; Van Eeden & Mantsha, 2007).

This study addresses this need in terms of its psychometric contributions as well as its contributions to the etic-emic debate within the realm of personality research. Aside from its theoretical contribution to the field of psychology and psychological assessment in South Africa, this study attempts to make a broad contribution at the ideological level to reform perceptions around psychological assessment and its uses in South Africa. It further aims to make a contribution to research beyond its local relevance. Internationally a large body of research exists on the universality of the NEO-PI-R and, by extension, the Five Factor Model of personality (see Ashton & Lee, 2005; 2007; Costa & McCrae, 2008; McCrae & Allik, 2002; McCrae & Costa, 2008a; 2008b; McCrae et al., 2005a; McCrae et al., 2005b). However African studies are lacking in this corpus of research. According to Heine and Buchtel (2009), most studies in personality have been guided by Western research. Of publications in the *Journal of Personality and Social Psychology*, 92% are from authors at North American institutions and 99% are from authors at Western schools (Heine & Buchtel, 2009). Thus the current study contributes to addressing this gap in research, while providing recognition for African research internationally.

Studies have also indicated that even though the NEO-PI-R and by extension the FFM are universally applicable, they may not be comprehensive. Other factors may exist which were not accounted for, primarily because the NEO-PI-R and the FFM originated within a Eurocentric tradition and are firmly rooted in the English lexicon. Thus factors may exist in Asian and African cultures that may warrant further research (see Ashton & Lee, 2007; Church, 2000; Cheung, 2004; Laher, 2008; Laher & Quy, 2009; McCrae et al., 2005a; Nel, 2008; Piedmont et al., 2002; Rolland, 2002; Teferi, 2004; Vogt & Laher, 2009). By virtue of exploring the utility of both the NEO-PI-R and the CPAI-2 in South Africa, this study hopes to contribute to this body of research.

Finally, as alluded to in the discussion above, a need exists for research on both personality instruments and the theories in which they are located, more so because of the need to explore indigenous approaches and develop indigenous theories. Lee, McCauley and Draguns (1999) as well as McCrae et al. (2005a) acknowledge the lack of African and South African research on personality and argue for more African research into personality. Hence this study should also pave the way for further studies into the area of personality theory and assessment in the African and South African contexts.

5.3. RESEARCH QUESTIONS

How applicable are the NEO-PI-R and the CPAI-2 to the South African (SA) context?

This question is operationalised in the following questions:

5.3.1. Reliability

Are the NEO-PI-R and CPAI-2 scales reliable in terms of internal consistency reliability in the SA context?
Are the NEO-PI-R and CPAI-2 scales reliable in terms of test-retest reliability in the SA context?

5.3.2. Validity

Do the NEO-PI-R and CPAI-2 appear to be measuring personality?
Does the NEO-PI-R factor into a five factor solution?
How does the NEO-PI-R factor solution in this study compare with that of the original sample?
Does the CPAI-2 factor into a four factor solution?
How does the CPAI-2 factor solution in this study compare with that of the original sample?

What does a joint factor analysis of the NEO-PI-R and the CPAI-2 reveal and what are the implications of this for the etic-emic debate as well as the universality of the FFM?

5.3.3. Bias

5.3.3.1. Construct bias

Does gender influence responses on the NEO-PI-R domain and facet scales?

Does gender influence responses on the CPAI-2 factors and subscales?
Does population group influence responses on the NEO-PI-R domain and facet scales?
Does population group influence responses on the CPAI-2 factors and subscales?
Does home language influence responses on the NEO-PI-R domain and facet scales?
Does home language influence responses on the CPAI-2 factors and subscales?

Will the internal consistency reliability coefficients for the NEO-PI-R domain and facet scales differ across gender?
Will the internal consistency reliability coefficients for the CPAI-2 factor and subscales differ across gender?
Will the internal consistency reliability coefficients for the NEO-PI-R domain and facet scales differ across population group?
Will the internal consistency reliability coefficients for the CPAI-2 factor and subscales differ across population group?
Will the internal consistency reliability coefficients for the NEO-PI-R domain and facet scales differ across home language?
Will the internal consistency reliability coefficients for the CPAI-2 factor and subscales differ across home language?

Will the factor structure for the NEO-PI-R domain and facet scales differ across gender?
Will the factor structure for the CPAI-2 factor and subscales differ across gender?
Will the factor structure for the NEO-PI-R domain and facet scales differ across population group?
Will the factor structure for the CPAI-2 factor and subscales differ across population group?
Will the factor structure for the NEO-PI-R domain and facet scales differ across home language?
Will the factor structure for the CPAI-2 factor and subscales differ across home language?

5.3.3.2. Method bias

Do response styles differ across gender in the NEO-PI-R?
Do response styles differ across population group in the NEO-PI-R?
Do response styles differ across home language grouping in the NEO-PI-R?

Do gender groupings differ on social desirability in the CPAI-2?
Do population groupings differ on social desirability in the CPAI-2?
Do language groupings differ on social desirability in the CPAI-2?

5.3.3.3. Item bias – Quantitative questions

Does gender influence responses on the NEO-PI-R items?
Is there an association between gender and responses on the CPAI-2 items?
Does population group influence responses on the NEO-PI-R items?
Is there an association between population group and responses on the CPAI-2 items?
Does home language influence responses on the NEO-PI-R items?
Is there an association between home language and responses on the CPAI-2 items?

Are there any items that were not understood on the NEO-PI-R and the CPAI-2?
Is there an association between gender and the understanding of items on the NEO-PI-R?
Is there an association between population group and the understanding of items on the NEO-PI-R?
Is there an association between home language and the understanding of items on the NEO-PI-R?
Is there an association between gender and the understanding of items on the CPAI-2?
Is there an association between population group and the understanding of items on the CPAI-2?
Is there an association between home language and the understanding of items on the CPAI-2?

Are there any items that were identified as inappropriate on the NEO-PI-R and the CPAI-2?
Is there an association between gender and the identification of inappropriate items on the NEO-PI-R?
Is there an association between population group and the identification of inappropriate items on the NEO-PI-R?
Is there an association between home language and the identification of inappropriate items on the NEO-PI-R?
Is there an association between gender and the identification of inappropriate items on the CPAI-2?
Is there an association between population group and the identification of inappropriate items on the CPAI-2?
Is there an association between home language and the identification of inappropriate items on the CPAI-2?

5.3.3.4. Item bias – Qualitative questions

Which items were identified as problematic on the NEO-PI-R?
What were the reasons underlying the choice of problematic items on the NEO-PI-R?

Which items were identified as problematic on the CPAI-2?
What were the reasons underlying the choice of problematic items on the CPAI-2?

5.4. HYPOTHESES

5.4.1. Validity

5.4.1.1. Face validity

The NEO-PI-R is measuring personality.
The CPAI-2 is measuring personality.

5.4.1.2. Construct validity

The NEO-PI-R does factor into a five factor solution.
The norm group factor structure for the NEO-PI-R is congruent with the study group factor structure.
The CPAI-2 does factor into a four factor solution.
The norm group factor structure for the CPAI-2 is congruent with the study group factor structure.

5.4.2. Bias

5.4.2.1. Construct bias

Gender will influence responses on the NEO-PI-R.
Gender will influence responses on the CPAI-2.
Population group will influence responses on the NEO-PI-R.
Population group will influence responses on the CPAI-2.
Home language will influence responses on the NEO-PI-R.
Home language will influence responses on the CPAI-2.

Internal consistency reliability coefficients for the NEO-PI-R domain and facet scales will differ across gender.
Internal consistency reliability coefficients for the CPAI-2 factor and subscales will differ across gender.
Internal consistency reliability coefficients for the NEO-PI-R domain and facet scales will differ across population group.
Internal consistency reliability coefficients for the CPAI-2 factor and subscales will differ across population group.

Internal consistency reliability coefficients for the NEO-PI-R domain and facet scales will differ across home language.
Internal consistency reliability coefficients for the CPAI-2 factor and subscales will differ across home language.

The factor structure for the NEO-PI-R will differ across gender groupings.
The factor structure for the CPAI-2 will differ across gender groupings.
The factor structure for the NEO-PI-R will differ across population group.
The factor structure for the CPAI-2 will differ across population group.
The factor structure for the NEO-PI-R will differ across home language.
The factor structure for the CPAI-2 will differ across home language.

5.4.2.2. Method bias

Response styles will differ across gender in the NEO-PI-R.
Response styles will differ across population group in the NEO-PI-R.
Response styles will differ across home language in the NEO-PI-R.
Social desirability differs across gender in the CPAI-2.
Social desirability differs across population group in the CPAI-2.
Social desirability differs across home language in the CPAI-2.

5.4.2.3. Item bias

Gender influences responses on the NEO-PI-R items.
There is an association between gender and responses on the CPAI-2 items.
Population group influences responses on the NEO-PI-R items.
There is an association between population group and responses on the CPAI-2 items.
Home language influences responses on the NEO-PI-R items.
There is an association between home language and responses on the CPAI-2 items.

There is an association between gender and the understanding of items on the NEO-PI-R.
There is an association between population group and the understanding of items on the NEO-PI-R.
There is an association between home language and the understanding of items on the NEO-PI-R.
There is an association between gender and the understanding of items on the CPAI-2.
There is an association between population group and the understanding of items on the CPAI-2.

There is an association between home language and the understanding of items on the CPAI-2.

There is an association between gender and the identification of inappropriate items on the NEO-PI-R.
There is an association between population group and the identification of inappropriate items on the NEO-PI-R.
There is an association between home language and the identification of inappropriate items on the NEO-PI-R.
There is an association between gender and the identification of inappropriate items on the CPAI-2.
There is an association between population group and the identification of inappropriate items on the CPAI-2.
There is an association between home language and the identification of inappropriate items on the CPAI-2.

5.5. SAMPLE

One thousand questionnaires were handed out to students over the period of one year. Attempts were made to source students from all five faculties at the University of the Witwatersrand, namely, Commerce, Law and Management; Engineering and Built Sciences; Health Sciences; Humanities and Science. However, the researcher was not given permission from the respective deans to approach students in lectures. No reasons or explanations were given. An attempt was made to contact the Head of School of each school within each faculty but again the response was poor. Hence attempts at obtaining a stratified and fairly representative sample failed. However, Psychology students at the University of the Witwatersrand are fairly well represented across four of the faculties, namely, Commerce and Law, Health Sciences, Humanities and Sciences. Although the majority of these students were registered in the Humanities faculty, the sample consisted of students from other faculties. Using elements of snowball sampling, students were also asked to give questionnaires to their friends in other faculties. Although accurate statistics on faculty and degree were not collected (since this information was only added to the questionnaire after failed attempts at the faculty and school levels), it was evident from the questionnaires returned that students from all faculties completed questionnaires.

At the end of a year, a non-probability, convenience sample[3] of 442 students at the University of the Witwatersrand voluntarily completed the questionnaire. Research has demonstrated that the personality of volunteers differs from non-volunteers (see Dollinger & Leong, 1993; Lönnqvist et al., 2007; Marcus & Schutz, 2005; Rosenthal & Rosnow, 1991). In order to minimise this possible volunteer bias, students were informed of this during the verbal briefing and students were encouraged to complete the questionnaires even if they usually did not volunteer for studies.

The 442 questionnaires represent an initial response rate of 44.2%. Students were continually reminded in lectures to complete and return the questionnaires. However feedback from the students was that the questionnaire was too long and that, in the CPAI-2 in particular, items were repetitive and students lost interest. Research on response rates indicates that the response rates found in this study are within the normal range though (see Groves & Peytcheva, 2008). Lipschultz, Hilt and Mixan (2000) cite response rates ranging from 19.6% to 55.4% on mailed surveys. Groves and Olson (2000) report a response rate of 56% on surveys with a self-addressed, stamped return envelope and 59.7% with a self-adhering return address label. Of note though is that Groves and Olson's (2000) survey consisted of a cover page and 39 items only. Wimmer and Dominick (cited in Lipschultz et al., 2000) report that presently response rates range between 10% and 40%. Dey (1997) reported response rates of 21% in student surveys.

On examination of the 442 questionnaires, 17 had to be discarded. These questionnaires were either incomplete, had too many items left out and in the case of the CPAI-2 failed to meet the validity and/or consistency checks. For the NEO-PI-R, there are no built in validity scales. Participants were asked at the end of the questionnaire to check if they had filled in all the questions, if they had filled in the responses in the correct box and if they had answered honestly. A "no" response to any of these questions invalidated the questionnaire (Costa & McCrae, 1992). On the CPAI-2, participants with a Response Consistency Index score less than 4 (out of a maximum of 8), an Infrequency Scale score greater than 4 (out of a maximum of 16), or those who had 30 or more items unanswered were classified as invalid cases (Cheung et al., 2003). Thus, a final sample of 425 students was obtained.

The students ranged in age from 17 to 50 years, with a mean of 21.3 (*SD* = 3.81) as evident in Table 5.1. Table 5.2 presents the frequencies for gender, population group, religious

3 Non-probability convenience samples may be defined as samples that consist of individuals that are easily available and willing to respond (Botha & Laher, in press; Rosenthal & Rosnow, 1991).

affiliation, home language, English reading ability, English comprehension ability, test wiseness and test familiarity.

Table 5.1: Descriptive statistics for age, English reading, English comprehension and test familiarity

	N	Mean	*SD*	Minimum	Maximum
Age	427	21.33	3.8	17	50
English reading	134	4.41	.67	2	5
English comprehension	134	4.31	.66	2	5
Test familiarity	243	3.14	1.14	1	5

From Table 5.2, it is evident that 28.71% of the sample were male (*n* = 122) and 71.29% female (*n* = 303). In terms of population grouping, 28.47% classified themselves as Black (*n* = 120), 6.35% as Coloured (*n* = 27), 17.88% as Indian (*n* = 76), 44.47% as White (*n* = 189), 2.12% (*n* = 9) as Asian (e.g. Chinese, Taiwanese) and .71% (*n* = 3) choosing the Other option but not specifying their grouping. For religious affiliation, 56.24% (*n* = 239) were Christian while 39.76% were affiliated to other religions (34 were Hindu, 43 were Muslim, 39 were Jewish, 50 were affiliated with a Traditional African Religion) and 4.68% had no religious affiliation (16 chose the No Religious Affiliation option, 1 selected the Atheist option and 3 selected the Agnostic option). Language groupings were distributed as follows: 68.47% of the sample reported English as their home language (*n* = 302), 2.35% spoke Afrikaans as their home language (*n* = 10) while 24% (*n* = 102) of the sample spoke an African language and 5% (*n* = 22) selected the Other option, specifying Chinese, Taiwanese and so on as their home language.

The use of students in psychological research is a contentious issue as students are generally not representative of the population (Rosenthal & Rosnow, 1991). However the use of students is consistent with previous research in this area, particularly when research on personality instruments is at the preliminary or exploratory stage as is the case in this

Table 5.2: Demographic information of the sample

Variable		Frequency	%	Cumulative %
GENDER	Male	122	28.71	28.71
	Female	303	71.29	100.00
POPULATION	Black	121	28.47	28.47
GROUP	Coloured	27	6.35	34.82
	Indian	76	17.88	52.71
	White	189	44.47	97.18
	Asian	9	2.12	99.29
	Other	3	0.71	100.00
RELIGIOUS	Christianity	239	56.24	56.24
AFFILIATION	Hinduism	34	7.80	64.24
	Islam	43	10.12	74.35
	Judaism	39	9.18	83.53
	Traditional African	50	11.76	95.29
	No Religious Affiliation	20	4.68	100.00
HOME	English	293	68.47	68.47
LANGUAGE	Afrikaans	10	2.35	70.82
	isiNdebele	4	0.94	71.76
	Sepedi	15	3.53	75.29
	Siswati	5	1.18	76.47
	Sesotho	10	2.35	78.82
	Xitsonga	12	2.82	81.65
	Setswana	18	4.24	85.88
	Thivenda	4	0.94	86.82
	isiXhosa	14	3.29	90.12
	isiZulu	20	4.71	94.82
	Other	22	5.18	100.00
ENGLISH	Not so good (1)	0	0.00	0.00
READING	Fairly good (2)	1	0.75	0.75
ABILITY	Satisfactory (3)	11	8.21	8.96
	Very good (4)	54	40.30	49.25
	Excellent (5)	68	50.75	100.00
ENGLISH	Not so good (1)	0	0	0.00
COMPREHENSION	Fairly good (2)	1	0.75	0.75
ABILITY	Satisfactory (3)	12	8.96	9.70
	Very good (4)	66	49.25	58.96
	Excellent (5)	55	41.04	100.00
TEST	Yes	245	57.65	100.00
WISENESS	No	180	42.35	42.39
TEST	Somewhat familiar (1)	27	11.00	11.00
FAMILIARITY	Fairly familiar (2)	35	14.22	25.22
	Satisfactory (3)	86	35.10	60.37
	Quite familiar (4)	68	27.64	87.96
	Very familiar (5)	29	11.79	100.00

study (see Costa & McCrae, 1992; Cheung et al., 2003; 2008; McCrae et al., 2005a). The use of students is also advantageous to this study as they represent a fairly homogeneous group. It can also be assumed that students meet the level of education required by the NEO-PI-R and the CPAI-2.

Furthermore language proficiency and test wiseness are constantly identified in assessment literature as factors influencing response on psychological instruments, especially in the South African context (see Abrahams & Mauer, 1999a; 1999b; Botha & Laher, in press; Foxcroft, 2004; Nel, 2008; Nell, 1999; Retief, 1992; Shuttleworth-Jordan, 1996; Taylor & Boeyens, 1991; Van Eeden & Mantsha, 2007; Van Eeden & Prinsloo, 1997). The use of students should ensure that the effects of these factors are minimal as the University of the Witwatersrand is an English-speaking university and a certain level of proficiency in English is required by all students. However in order to further reduce this effect, only students who were in their second year of study or higher were approached for the study. In order to be in a second-year course students will have to have passed at least two first-level courses in English. Furthermore, two questions were included in the questionnaire that requested students whose home language was not English to rate their English reading skills and English comprehension skills from 1 to 5, with 1 being “not so good” and 5 being “excellent”. From Table 5.2 it is evident that the majority of the sample (68.62%, *n* = 293) spoke English as their first language. The majority of the remaining 31.38% (*n* = 132) rated their English reading and comprehension skills as being very good or excellent. Of these students, 91.05% (*n* = 122) reported their reading ability to be very good or excellent, while 90.29% (*n* = 121) reported their English comprehension skills to be very good or excellent. There were no individuals who rated themselves as a “1” on the reading and the comprehension items. From Table 5.1, a mean of 4.41 with a standard deviation of .67 was obtained for the English reading item and a mean of 4.31 with a standard deviation of .66 was obtained for the English comprehension item.

Students who are at least in their second year at university should also be familiar with test-taking and test-taking procedures. However it may be argued that examinations in academic subjects are somewhat different to psychological testing processes. Hence two questions in this regard were included in the questionnaire. The first asked students whether they had ever taken a psychological test before. From Table 5.2 it is evident that the majority of the sample (57.61%, *n* = 246) had taken a psychological test before. The second question asked students to rate their familiarity with psychological testing processes from 1 to 5, with 1 being “somewhat familiar” and 5 being “very familiar”. Table 5.2 indicates that 39.43% (*n* = 97) of the students were quite familiar with psychological testing processes, while 35.37% (*n*

= 87) were in the satisfactory range and 25.22% (*n* = 62) were not very familiar with psychological testing processes. From Table 5.1, a mean of 3.14 with a standard deviation of 1.14 was obtained for the test familiarity item.

The procedures section of this chapter details the difficulties encountered with obtaining data for examining the test-retest reliability of the two instruments. After four failed attempts, the researcher obtained funding to offer an honorarium of R50 to a maximum of 50 students to complete the questionnaire twice over a 3-week interval. Fifty questionnaires were given out a year later to second-year Psychology students who volunteered to participate in the study. These students were briefed about the study with notable emphasis on the volunteer bias as well as the need to commit to completing the questionnaire twice. A week after giving out the questionnaires, 25 were returned. Three weeks later, 25 questionnaires were handed out and only 10 were returned. Thus the final response rate for the test-retest reliability phase of the study was 20%. Given the length of the questionnaire and examined in conjunction with literature on response rates, a response rate of 20% was adequate.

Table 5.3 provides the descriptive statistics (mean, standard deviation, minimum and maximum values) for age, English reading ability, English comprehension ability and test familiarity, while Table 5.4 summarises the frequencies for gender, population grouping, religious affiliation, home language, English reading ability, English comprehension ability, test wiseness and test familiarity for the test-retest reliability sample.

Table 5.3: Descriptive statistics for age, English reading, English comprehension and test familiarity of the test-retest sample

	N	**Mean**	***SD***	**Minimum**	**Maximum**
Age	10	20.50	1.65	19	24
English reading	6	4.33	.82	3	5
English comprehension	6	4.50	.55	4	5
Test familiarity	4	3.50	.58	3	4

It is evident from Tables 5.3 and 5.4 that the sample consisted of nine female students and one male student, ranging in age from 19 to 24 years (*M* = 20.65, *SD* = 1.65). In terms of population group there were no White students in this sample. There were six Black individuals, two Coloured individuals and two Indian individuals. All the students in this sample were affiliated to Christianity (*n* = 9) with the exception of one student who was affiliated to Hinduism. Four individuals identified English as their home language while the remaining six individuals

Table 5.4: Demographic information of the test-retest sample

Variable		Frequency	%	Cumulative %
GENDER	Male	1	10	10
	Female	9	90	100
POPULATION	Black	6	60	60
GROUP	Coloured	2	20	80
	Indian	2	20	100
	White	0	0	100
	Asian	0	0	100
	Other	0	0	100
RELIGIOUS	Christianity	9	90	90
AFFILIATION	Hinduism	1	10	100
	Islam	0	0	100
	Judaism	0	0	100
	Traditional African	0	0	100
	No Religious Affiliation	0	0	100
HOME	English	4	40	40
LANGUAGE	Afrikaans	0	0	40
	isiNdebele	0	0	40
	Sepedi	1	10	50
	Siswati	2	20	70
	Sesotho	1	10	80
	Xitsonga	0	0	80
	Setswana	0	0	80
	Thivenda	0	0	80
	isiXhosa	0	0	80
	isiZulu	2	20	100
	Other	0	0	100
ENGLISH	Not so good (1)	0	0	0
READING	Fairly good (2)	0	0	0
ABILITY	Satisfactory (3)	1	17	17
	Very good (4)	2	33	50
	Excellent (5)	3	50	100
ENGLISH	Not so good (1)	0	0	0
COMPREHENSION	Fairly good (2)	0	0	0
ABILITY	Satisfactory (3)	0	0	0
	Very good (4)	3	50	50
	Excellent (5)	3	50	100
TEST	Yes	4	40	40
WISENESS	No	6	60	100
TEST	Somewhat familiar (1)	0	0	0
FAMILIARITY	Fairly familiar (2)	0	0	0
	Satisfactory (3)	2	50	50
	Quite familiar (4)	2	50	100
	Very familiar (5)	0	0	0

spoke an African language at home. Of the six individuals, three reported an excellent reading ability, two a very good reading ability, and one a satisfactory reading ability, with an overall mean of 4.33 and a standard deviation of .82. In terms of reading comprehension ability, three individuals reported an excellent ability and three reported a very good ability, with an overall mean of 4.50 and a standard deviation of .55. In terms of test wiseness, four individuals reported taking a psychological test before. Of the four individuals, two reported being quite familiar with psychological tests and two reported satisfactory familiarity, with an overall mean of 3.50 and a standard deviation of .58.

5.6. INSTRUMENTS

A questionnaire incorporating a demographics section, the NEO-PI-R, and the CPAI-2 was used.[4] Before the presentation of each instrument, a statement was incorporated into the instrument instructions asking respondents to cross out items that they thought were inappropriate. Respondents were also asked to underline words or items that they did not understand. After completing the NEO-PI-R and after completing the CPAI-2, respondents were asked in an open-ended item to substantiate their marking or underlining of items if they had chosen to do this. Following this, for both instruments, there was a single question asking respondents whether the instrument they had just completed appeared to be measuring their personality. Respondents were asked to substantiate their answers. This was used to assess the face validity of the instruments.

5.6.1. Demographics section

Before the presentation of the instruments, the questionnaire requested demographic information, namely, age, gender, population group, religious affiliation and home language. Age and religious affiliation were used for descriptive purposes only, whereas gender, population group and home language were used for analysis.

5.6.2. The NEO-PI-R

The NEO-PI-R is a self-report instrument consisting of 240 items. It takes approximately 45 minutes to complete the instrument. It is available in two forms: Form S, which is an instrument for self-rating, and form R, which is used for rating someone else. The items are

4 The NEO-PI-R and CPAI-2 items do not appear in the questionnaire in Appendix A (p. 398) as the instruments are under copyright. I obtained permission from the test developers and test publishers to use the NEO-PI-R and the CPAI-2.

the same except that the subject is changed from “I” to “he” or “she”. Given the nature of the current study, Form S was utilised.

Form S measures each of the five factors postulated in the FFM, namely Neuroticism, Extraversion, Openness to Experience, Conscientiousness and Agreeableness but refers to these as domains. Each of the domains is measured by 48 items, which are subdivided into 6 sets of 8 items. These clusters of items are called facets and were designed to provide more specific information about some important concepts within each of the domains. NEO-PI-R items are answered on a 5-point scale ranging from strongly agree (4) to strongly disagree (0) and scales are balanced to control for the effects of acquiescence (Costa & McCrae, 1992). In addition to the 240 items, the NEO-PI-R has 3 items at the end of the answer sheet that serve as validity checks. These items ask respondents if they responded honestly, responded to all the items and marked the correct responses on the answer sheet (Costa & McCrae, 1992). However at the time when the study was conceptualised and the questionnaires printed, I did not have access to all the original NEO-PI-R material and had not seen the answer sheet with the questions.

5.6.2.1. Development of the NEO-PI-R

The NEO-PI-R began in 1978 as the NEO Inventory. The NEO consisted of 3 domain scales (Neuroticism, Extraversion and Openness to Experience) and 18 facet scales. In 1983, 18 item domain scales measuring Agreeableness and Conscientiousness were added and in 1985 the test was published as the NEO Personality Inventory. In 1990, the facet scales for Agreeableness and Conscientiousness were completed and 10 items in the original NEO were modified. The 30 facet scales of the NEO-PI-R were chosen to represent constructs frequently identified in the psychological literature that embody important distinctions in each of the 5 domains (Costa & McCrae, 1992).

The NEO-PI-R is based on the idea that traits are arranged in hierarchies from very broad to very narrow and that both highly general (domain) and relatively specific (facet) traits should be assessed. Thus, development began with the constructs that the instrument was required to measure. The constructs measured by the NEO-PI-R are not original discoveries and were not meant to be original. Rather the developers searched the available psychological literature to identify traits and dispositions that were important to personality theorists, that were represented as trait terms in the natural language and that appeared in personality research literature. Items were then developed to tap those constructs. Costa and McCrae (1992) employed a modified rational approach to scale construction. They considered the construct they wished to measure and then wrote items that, if answered in the keyed

direction, would suggest the presence of the trait. They clarify that they do not suppose that item responses are to be regarded as the literal truth but responses can be interpreted as evidence of the traits to which they refer. They therefore subscribe to the *self-disclosure* theory of item responding and cite research by Hase and Goldberg (1967) that suggests that rational scales work as well or better than scales that employ subtle items or use contrasted group selection methods (see Costa & McCrae, 1992).

Although item analyses began with a pool of items constructed rationally, final item selection was based on extensive item analyses using factor analytic techniques. Factor analysis was used since it identifies clusters of items that covary with each other but which are relatively independent of other item clusters; that is, items show convergent validity with respect to other items in the cluster but divergent validity with respect to other items in other clusters/domains on the scale (Costa & McCrae, 1992).

Thus, items constructed were administered to a large sample and the responses factored. Items were selected based on their factor loadings. An equivalent number of positively and negatively loaded items were selected so as to control for the effects of acquiescence, and items were keyed to one scale only so as to avoid artifactual correlations between scales (Costa & McCrae, 1992).

5.6.2.2. NEO-PI-R domain and facet scales

The NEO-PI-R consists of five domain scales, namely, Neuroticism, Extraversion, Openness to Experience, Conscientiousness and Agreeableness. Each of these domains is further broken down into six facet scales, as indicated in the discussion below.

Neuroticism

Neuroticism is defined as the general tendency to experience negative affects such as fear, sadness, embarrassment, guilt, anger and disgust. Individuals who have high scores in this domain are more likely to have irrational ideas, be less able to control their impulses and to cope more poorly with stress. Individuals who score low on this domain are more emotionally stable. They are usually calm, even-tempered and relaxed and are able to face stressful situations without becoming upset (Costa and McCrae, 1992).

Neuroticism is measured on six facet scales on the NEO-PI-R, namely, Anxiety, Angry Hostility, Depression, Self-Consciousness, Impulsiveness, and Vulnerability. *Anxiety* describes individuals who are apprehensive, fearful, prone to worry, nervous, tense and jittery. *Angry Hostility* represents the tendency to experience anger and related states such

as frustration and bitterness. *Depression* measures normal individual differences in the tendency to experience depressive affect. High scorers on this scale are prone to feelings of guilt, sadness, hopelessness and loneliness. *Self-Consciousness* is characterised by the emotions of shame and embarrassment. Self-conscious individuals are uncomfortable around others, sensitive to ridicule and prone to feelings of inferiority. *Impulsiveness* refers to the inability to control cravings and urges. Low scorers on this facet find it easier to resist temptation and have a higher tolerance for frustration. High scorers on the *Vulnerability* facet feel unable to cope with stress, becoming dependent, hopeless or panicked when facing emergency situations (Costa & McCrae, 1992).

Extraversion

Extraversion is regarded as a general tendency towards sociability, assertiveness, activeness and being talkative. Extraverts are upbeat, energetic and optimistic, like excitement and stimulation and tend to have cheerful dispositions. Introverts are reserved rather than unfriendly, independent rather than followers, and even-paced rather than sluggish. Although they do not express the exuberance of extraverts they are not unhappy or pessimistic (Costa & McCrae, 1992).

In the NEO-PI-R, Extraversion is measured on six facet scales, namely, Warmth, Gregariousness, Assertiveness, Activity, Excitement-Seeking and Positive Emotions. *Warmth* is associated with interpersonal intimacy. High scorers on this facet are generally affectionate and friendly and easily form close attachments to others. *Gregariousness* refers to the preference for other people's company. High scorers on the *Assertiveness* facet are dominant, forceful and socially ascendant. They speak without hesitation and often become group leaders. A high *Activity* score suggests a rapid tempo and vigorous movement; a need to keep busy. Active people lead fast-paced lives. *Excitement-Seeking* refers to the tendency to crave stimulation and excitement. High scorers like bright colours and noisy environments. *Positive Emotions* refers to the tendency to experience positive emotions such as joy, happiness, love and excitement. High scorers on this scale are cheerful, optimistic and laugh easily and often (Costa & McCrae, 1992).

Openness to Experience

Individuals willing to entertain novel ideas and unconventional values are described by the Openness to Experience trait. It is the degree to which a person is imaginative and curious as opposed to concrete minded and narrow thinking. Other characteristics of Openness include aesthetic sensitivity, attentiveness to inner feelings, preference for variety, and independence of judgement. Open individuals are more willing to question authority and are

more prepared to entertain new ethical, social and political ideas but are not necessarily unprincipled. Openness is related to aspects of intelligence like divergent thinking that contribute to creativity. Low scorers on Openness tend to be conventional in behaviour and conservative in outlook. They prefer familiar to novel experiences and have a narrower scope and intensity of interests. Closedness does not imply hostile intolerance or authoritarian aggression (Costa & McCrae, 1992).

In the Neo-PI-R, Openness to Experience is measured in terms of six specific facets, namely, Fantasy, Aesthetics, Feelings, Actions, Ideas and Values. Individuals who are open to *Fantasy* have a vivid imagination and an active fantasy life. High scorers on the *Aesthetics* scale have deep appreciation for art and beauty and are "moved by poetry, absorbed in music and intrigued by art" (Costa & McCrae, 1992, p. 17). Openness to *Feelings* implies receptivity to one's own inner feelings and emotions, while high scorers on the *Actions* facet suggests a willingness to try different activities, go to new places or try different foods. *Ideas* refers to the tendency to be open-minded and to consider new and sometimes unconventional ideas. Openness to *Values* means the readiness to re-examine social, political and religious values. Closed individuals tend to accept authority and honour tradition and are therefore conservative regardless of political party affiliation (Costa & McCrae, 1992).

Agreeableness

Agreeableness encapsulates constructs of sympathy, co-operation, and helpfulness towards others. It is described as the degree to which a person is good natured, warm and co-operative as opposed to irritable, unco-operative, inflexible, unpleasant and disagreeable. The agreeable person is fundamentally altruistic. In contrast, the disagreeable person is egocentric, sceptical of others' intentions, and competitive rather than co-operative (Costa & McCrae, 1992).

Agreeableness is measured by the six facets of Trust, Straightforwardness, Altruism, Compliance, Modesty and Tender-Mindedness. High scorers on the *Trust* facet have a disposition to believe that others are honest and well intentioned. *Straightforward* individuals are frank, sincere and ingenuous. *Altruism* refers to an active concern for the welfare of others as demonstrated in generosity, consideration of others and a willingness to assist others in need of help. High scorers on the *Compliance* facet tend to defer to others, inhibit aggression and forgive and forget. Compliant people are generally submissive, gentle, modest and docile. *Modesty* refers to the extent that an individual demonstrates humility. *Tender-Mindedness* measures attitudes of sympathy and concern for others. High scorers

are moved by others' needs and emphasise the human side of social policies, while low scorers are more hardheaded and make rational decisions based on cold logic (Costa & McCrae, 1992).

Conscientiousness

The final factor, Conscientiousness, may be described as the degree to which a person is persevering, responsible and organised as opposed to lazy, irresponsible and impulsive. The conscientious individual is purposeful, scrupulous, punctual, strong-willed and determined (Costa & McCrae, 1992). According to Costa and McCrae (1992) low scorers on this scale are not necessarily lacking in moral principles but are less exacting in applying them in the same way that they are more lackadaisical in working towards their goals (Costa & McCrae, 1992).

As with the other four traits, Conscientiousness is operationalised via six facet scales on the Neo-PI-R, namely, Competence, Order, Dutifulness, Achievement Striving, Self-Discipline and Deliberation. *Competence* refers to the sense that one is capable, sensible, prudent and effective. Low scorers on this scale have a lower opinion of their abilities and are often unprepared and inept. High scorers on the *Order* facet are neat, tidy and well organised, while low scorers are unable to get organised and usually describe themselves as unmethodical. *Dutifulness* is characterised by strict adherence to ethical principles and scrupulous fulfilment of moral obligations. High scorers on *Achievement Striving* tend to be diligent and purposeful and work hard to fulfil their goals, while low scorers are not as driven to succeed and often lack ambition and appear aimless. *Self-Discipline* refers to the ability to begin tasks and carry them through to completion despite boredom and other distractions. The final facet, *Deliberation,* refers to the tendency to think carefully before acting. High scorers on this scale are cautious, while low scorers are hasty in their decision-making but can at best be described as spontaneous with the ability to make snap decisions when necessary (Costa & McCrae, 1992).

5.6.2.3. Psychometric properties of the NEO-PI-R

The NEO-PI-R was standardised on over 1 000 individuals taken primarily from the Augmented Baltimore Longitudinal Study of Aging (ABLSA), the ABLSA Peer Sample, individuals in a large U.S. national organisation and several clinical samples. Internal consistency reliability coefficients range from .86 to .92 for the domain scales and from .56 to .81 for the facet scales as evident in Table 3.1. Test-retest reliability coefficients for the domain scales were between .79 and .91 while the facet scale reliabilities ranged between .66 and .92. These stability estimates remained virtually the same in various studies ranging

from 1 month to 6 years. Stability estimates were better in adult samples as compared to adolescent or young adult (21 years or under) samples (Costa & McCrae, 1992).

In terms of validity, Costa and McCrae (1992) provide a large body of evidence for construct and criterion validity. The NEO-PI-R factors loaded as expected, with the domain scales appearing clearly in all samples and the facet scales loading appropriately in the domains. Where cross-loading occurs on some facets, this is due to the inherent relationships between the facets. For example, Altruism and Extraversion might load together, since one would need to be sociable to be altruistic (Costa & McCrae, 1992). Evidence is also provided that indicates that domain and facet scores from the NEO-PI-R have been shown to relate in predictable ways to personality trait scores from a variety of personality measures, most notably the Personality Research Form (PRF), the Myers-Briggs Type Indicator (MBTI), the California Personality Inventory (CPI), peer reports, adjective checklists, sentence completion tests and the Twenty Statements Test (Costa & McCrae, 1992).

Following these initial studies, research on the NEO-PI-R continued at a rapid rate across different contexts and in different cultures. A summary of these findings is beyond the scope of the current study but McCrae et al. (2005a) undertook an examination of studies using the NEO-PI-R in 50 cultures and found evidence for the reliability and validity across most of the studies examined. However McCrae et al. (2005a) do point out that studies from only a few African were examined. No pre-literate cultures were examined and most studies used college student samples whose members were relatively Westernised. Also evident from McCrae et al. (2005a) was the differential replicability of the Openness to Experience domain. Cheung et al. (2008) elaborate further on this by providing evidence of the low validity of the Actions, Values and to a lesser extent Feelings in Asian cultures. Cheung et al. (2008) also argue that Fantasy is an inappropriate facet in Chinese culture and could not be located in Chinese folk concepts. Furthermore, Cheung et al. (2001) found Modesty and Straightforwardness in the Agreeableness domain to be problematic, while McCrae et al. (1998) found Tender-Mindedness from the Agreeableness domain to be problematic.

5.6.3. The CPAI-2

The CPAI-2 Form B is a self-report instrument consisting of 341 items, which are answered in a dichotomous (true/false) response format (Cheung et al., 2008). Form B was chosen for the current study as the researcher does not require the clinical scales, hence Form A (all 541 items, personality, clinical and validity scales) and Form C (200 items, clinical and

validity scales) were inappropriate. The CPAI-2 is available in four languages, namely Chinese, Korean, Japanese and English (Cheung et al., 2003; Cheung et al., 2006). The English version was utilised in this study. The CPAI-2 takes approximately 60 to 90 minutes to complete. It is suitable for individuals in the age range of 18 to 70 with at least a Grade 6 level of education (Cheung et al., 2003).

5.6.3.1. Development of the English version of the CPAI-2

The English version of the CPAI-2 was based on the preliminary English version developed as part of the doctoral dissertation of Gan (1998) using the back translation technique outlined by Brislin (1970, cited in Cheung et al., 2003). The 22 personality scales and 3 validity scales of the original Chinese CPAI were translated into English by 3 bilingual research assistants specialising in translation (including a native English speaker). Special attention was paid to idiomatic items and equivalent meaning was ascertained in the English version. The initial English items were then back translated into Chinese, and the original and back translated items were compared for distortion in meaning. The process was repeated to ensure conceptual equivalence between the Chinese and English items. Following this, a partial list of the English CPAI scales was administered to a multi-ethnic Hawaiian undergraduate sample in Gan's (1998) study. The results were used to refine the items for the English version of the CPAI (Cheung et al., 2003). The CPAI was then used in two separate studies to determine its applicability. The first study was conducted on 675 Singaporean Chinese and the second on 144 Caucasian American students at a Midwestern university. Cheung et al. (2003) reported that both the Singaporean and American samples had similar factor structures to the Chinese normative sample when Procrustes rotation technique was applied, but the American sample was less similar to the Chinese normative sample solution than the Singaporean sample when the varimax rotated solutions were explored. The CPAI was also jointly administered with the NEO-FFI, and a joint factor analysis revealed that the Interpersonal Relatedness factor of the CPAI was not covered by the NEO-FFI, and the Openness factor of the NEO-FFI was not covered by the CPAI (Cheung et al., 2003). This prompted work on the CPAI-2.

Following a similar method to that used in development of the CPAI, Cheung et al. (2008) examined literature, held informal interviews and conducted focus groups to get a sense of the nature of the Openness dimension in Chinese culture. Preliminary scales were derived using the folk concepts obtained from the literature, interviews and focus groups. These were grouped into loose categories, namely, Action, Aesthetics and Imagination, Boundaries, Communication Style, Creativity, Empathy and Sensitivity, Deviance, Diversity, Family Life, Human Heartedness, Ideas, Intellectual Capacity, Interpersonal Tolerance,

Novelty, Other-Orientation, Soul Searching, Thinking Styles, Ambiguity and Values. Fantasy, a facet of Openness on the NEO-PI-R, was not included for the CPAI-2 since it did not feature prominently in the data gathered. Items were written to cover these constructs based on the behavioural descriptions obtained in the informal interviews and focus groups. A questionnaire consisting of 295 items grouped into 22 personality scales and using a true/false response format was piloted on a convenience sample of 756 Chinese individuals. Using the data obtained from the pilot study, further refinements were made to the CPAI, resulting in the CPAI-2. Six scales were found to contribute to an Openness dimension on the new version, namely, Novelty, Diversity, Divergent Thinking, Aesthetics, Interpersonal Tolerance and Social Sensitivity; however, no separate Openness factor emerged. Novelty, Diversity, Divergent Thinking and Aesthetics loaded on the Social Potency factor, while Interpersonal Tolerance loaded on Accommodation and had a secondary loading on Social Potency. Social Sensitivity loaded on the Interpersonal Relatedness dimension. Hence the CPAI-2 incorporated the new items and the new scales and consisted of 28 scales. Since the majority of the Openness scales loaded on Social Potency, this factor was renamed the Social Potency/Expansiveness[5] factor (Cheung et al., 2008).

5.6.3.2. CPAI-2 factors and scales

The CPAI-2 has 28 personality scales, which factor into 4 factors, namely Social Potency/Expansiveness (8 scales), Dependability (9 scales), Accommodation (5 scales) and Interpersonal Relatedness (6 scales) (Cheung, 2004). The CPAI-2 also has 3 validity scales, namely, the Infrequency Scale, the Response Consistency Index, and the Good Impression Scale. The Infrequency Scale consists of 16 items that have a low endorsement rate in a normative sample. The Response Consistency Index consists of 3 pairs of repeated items and 5 pairs of reversed items. A low score on the Response Consistency Index suggests that the respondent answered in an inconsistent way. The Good Impression Scale consists of 12 items used to identify respondents who tend to fake well (Cheung et al., 2003). Respondents who have an Infrequency score greater than 4 out of a maximum of 16, who score less than 4 out of a maximum of 8 on the Response Consistency Index, and who have 30 or more items unanswered are classified as invalid cases (Cheung et al., 2003; Cheung et al., 2008).

5 Social Potency/Expansiveness is referred to as Social Potency throughout this dissertation.

Social Potency

Social Potency is defined by eight personality scales, namely, Novelty, Diversity, Divergent Thinking, Leadership, Logical versus Affective Orientation, Aesthetics, Extraversion versus Introversion and Enterprise (Cheung, 2005; 2006; Cheung et al., 2008).

Novelty measures the extent to which individuals like trying new things and facing new challenges. High scorers on this scale tend to be innovative, exploratory, creative and willing to accept change and meet challenges (Cheung, 2006; Cheung et al., 2008).

Diversity refers to the degree to which individuals are willing to try out new ways of handling tasks. Individuals who have high scores on diversity tend to have a broad range of interests, are energetic, co-operative, and versatile, and are more likely to take risks (Cheung, 2006; Cheung et al., 2008).

Divergent thinking is characterised by intellectual curiosity and lateral thinking. It measures the extent to which individuals can deal with issues and problems from various perspectives, with high scores indicating more intellectual curiosity and greater flexibility in thinking (Cheung, 2006; Cheung et al., 2008).

Leadership measures the degree to which people possess the ability to influence others and make decisions. High scores on leadership are characterised by independence, organisational ability, willingness to assume leadership positions where one's advantages over others can be used and actively seeking opportunities to show one's innovative power (Cheung, 2006).

Logical versus Affective Orientation refers to the degree to which individuals are objective or subjective in their thinking or behaviour. High scores correspond to the logical dimension, representing individuals who are better at controlling their emotions, determined, good at thinking through problems, and who tend to be unaffected by personal feelings. Low scores correspond to the affective dimension and represent people who are expressive, more likely to be influenced by emotions when judging people, and become easily agitated or nervous (Cheung, 2006).

Aesthetics measures the extent to which individuals value and enjoy the arts, with high scores indicating more cultured, refined and artistic individuals and low scores indicating

individuals who emphasise practicality in living standards and tend to neglect aesthetic interests (Cheung, 2006; Cheung et al., 2008).

Extraversion versus Introversion measures the social orientation of an individual, with high scores representing extraverted, sociable individuals who tend to have more friends, and enjoy social gatherings and talking to others. Low scores represent introversion, where this is defined as calm, self-reflective and reclusive individuals who are more likely to be shy, unwilling to interact with others, lacking in social finesse and poor at expressing themselves (Cheung, 2006).

Enterprise measures the extent to which individuals are prepared to take risks, and be innovative and adventurous. Low scorers tend to be careful individuals who are satisfied with stability and do things in a proper and controlled manner. They may be hesitant and prone to over worrying (Cheung, 2006).

Dependability

Dependability consists of nine personality scales, namely, Responsibility, Emotionality, Inferiority versus Self-Acceptance, Practical Mindedness, Optimism versus Pessimism, Meticulousness, Face, Internal versus External Locus of Control and Family Orientation (Cheung, 2006; Cheung et al., 2008).

Responsibility measures the degree to which a person can be relied on to carry out tasks and achieve aims. High scores on this scale suggest that individuals are reliable, persistent, serious about their work and have good planning skills (Cheung, 2006).

Emotionality measures to what extent individuals are able to control their emotions, with high scores indicating emotional instability, irritability, impulsiveness, greater anxiety and low levels of frustration tolerance (Cheung, 2006).

Inferiority versus Self-Acceptance considers the degree of self assurance. High scores are indicative of the inferiority dimension and indicate low self-confidence and low self-esteem, indecisiveness and inability to take criticism. Low scores correspond to the self-acceptance dimension and describe individuals who are confident about their abilities, decisive, and comfortable with tasks and challenges, and can accept criticism and confront others if necessary (Cheung, 2006).

Practical Mindedness measures the extent to which people focus on substance rather than form. High scorers on this scale tend to be pragmatic, pay little attention to appearances and target concrete goals and rewards. Low scorers tend to love imagination and fantasy, set plans without implementation, generally have more style than substance and pursue vanity (Cheung, 2006).

The degree to which an individual has a positive or negative viewpoint, worries, holds grievances, and/or has the tendency to be self-sceptical is measured by the *Optimism versus Pessimism* scale. High scores align with the optimism dimension and describe individuals who are full of ideals and confidence towards life, who are energetic and find life full of fun and who give others a lively and active impression. Low scores are indicative of individuals with a negative and grumbling attitude who cannot forget unhappy experiences and generally feel disheartened about the past and the future (Cheung, 2006).

Meticulousness measures the extent to which people take care and pay attention to detail, with high scores indicating individuals who tend to be careful in public speech and behaviour, give prudent consideration to matters at hand, do not boast or act prematurely, are careful in implementation and work and live in a planned way adhering to rigorous and painstaking detail (Cheung, 2006).

Face measures the concern for maintaining face and social behaviours that enhance one's own face and that avoid losing one's face. According to Cheung (2006; Cheung, Fan & To, 2007), Face is a dominant concept in interpreting and regulating social behaviour in the Chinese culture. Individuals who score high on this scale tend to be self-defensive, have a strong ego, and generally want to look good in public, do not admit to an inability to understand something, pretend to know things even if they do not, and put face-saving considerations first (Cheung et al., 1996; Cheung, 2006).

Internal versus External Locus of Control refers to the extent to which a person attributes the causal relationships of his/her actions. High scorers stress the importance of one's ability and are active doers who believe that the success of an event depends on internal factors and that "humans can conquer over nature" (Cheung, 2006, p. 12). Low scorers stress the importance of external conditions, are resigned to destiny and believe in chance, fate or luck, subscribing to the belief that the success or failure of an event depends on external factors (Cheung, 2006).

Family Orientation measures the extent to which individuals have a strong sense of family solidarity, with high scores indicating greater emphasis on maintaining a harmonious atmosphere within the family, more loving relationship/s with parent/s and/or children, greater respect, trust and understanding towards family members and effective communication of thoughts and feelings. Individuals who obtain low scores on this scale tend not to be reliant on family ties for economic and social support, tend to have distant relationships with family members, and have frequent disputes and conflicts at home (Cheung et al., 1996; Cheung, 2006).

Accommodation

Accommodation is made up of five scales, namely, Defensiveness, Graciousness versus Meanness, Interpersonal Tolerance, Self versus Social Orientation and Veraciousness versus Slickness (Cheung, 2006; Cheung et al., 2008).

Defensiveness – also known as *Ah-Q Mentality* – measures defence mechanisms such as self-protective rationalisation, externalisation of blame, self-enhancement and belittling others' achievements. High scores on this scale are indicative of individuals who tend to imagine superiority over others, have a negative way of mental balancing, boast of personal history, console themselves through imagination, cover up a sense of inferiority, are jealous of others' accomplishments and generally lack the courage to face failure (Cheung, 2006; Cheung et al., 2001; Cheung et al., 1996).

Graciousness versus Meanness measures how tolerant and broad-minded people are in their dealings with others. High scores are indicative of the graciousness dimension and indicate big-hearted, tolerant individuals who have a concern for the well-being of others and are generally magnanimous and forgiving. Low scores correspond to the meanness dimension and indicate demanding, sarcastic, suspicious and narrow-minded individuals who tend to take joy from the misery of others, tend to find opportunities for revenge, are willing to gain at the expense of others and generally doubt and distrust the opinions of others and society (Cheung, 2006; Cheung et al., 2001; Cheung et al., 1996).

Interpersonal Tolerance refers to the extent to which individuals are accepting of others, with high scores indicating more co-operative, easy-going and open-minded people and low scores indicating prejudiced and discriminatory individuals who find it difficult to accept others with different opinions (Cheung, 2006; Cheung, 2007; Cheung et al., 2008).

Self versus Social Orientation measures the degree of enthusiasm for social interaction. High scores correspond to the self orientation dimension and indicate individuals who are confident, maverick, carefree and independent, who do not need help from others and are not influenced by others but who are also not willing to associate with others. Low scores are in line with the social orientation dimension and are indicative of individuals who feel comfortable in communal life, are willing to co-operate with others in activities, are sensitive to the opinions of others and are generally teamplayers (Cheung, 2006).

Veraciousness versus Slickness measures the trustworthiness and reliability of an individual. High scores are indicative of the veraciousness dimension and suggest that these individuals are faithful to facts, uphold principles, speak truthfully and act honestly, put group interest over self interest and can be stiff and dull. Low scores correspond to the slickness dimension and are indicative of individuals who are flexible, sociable and smooth, tend to understand others well and are good at achieving their objectives through various means (Cheung, 2006; Cheung et al., 1996).

Interpersonal Relatedness

Interpersonal Relatedness measures various aspects of "interdependence and reciprocity in traditional social relationships such as a strong orientation towards instrumental relationships; emphasis on occupying one's proper place and engaging in appropriate action; avoidance of internal, external and interpersonal conflict; and adherence to norms and traditions" (Cheung et al., 2001, p. 425). This factor was derived indigenously from a collectivist cultural context and can be conceptualised in terms of Confucian philosophy. According to Cheung et al. (2008), the qualities of humanity and social propriety may be manifested as "inner sageliness and outer kingliness" (nei-sheng-wai-wang) (p. 92), where equilibrium is achieved through personal cultivation and self-discipline (sageliness within) and loving people by behaving according to propriety (kingliness without). Interpersonal Relatedness is defined by six scales, namely, Traditionalism versus Modernity, Relationship Orientation, Social Sensitivity, Discipline, Harmony and Thrift versus Extravagance (Cheung, 2004; Cheung, 2007; Cheung et al., 2008).

Traditionalism versus Modernity measures the degree of individual modernisation as an indication of one's responses to social modernisation. This scale covers attitudes towards traditional Chinese beliefs and values in the areas of filial piety, family relationships, rituals and chastity (Cheung, 2006; Cheung et al., 2001). High scores correspond to the traditionalism dimension and indicate individuals who tend to be conservative, obedient to authority, protect old customs, lack courage in exceeding boundaries and generally oppose

new ideas and new things. Low scores are indicative of the modernity dimension and indicates individuals who have the courage to challenge traditional concepts, advocate democracy and personal freedom, and oppose superstition (Cheung, 2006; Cheung et al., 1996; Cheung et al., 2001).

Relationship Orientation, also known as *Ren Qing,* measures an individual's adherence to cultural norms of interaction such as courteous rituals, exchange of resources, maintaining and utilising useful ties, and nepotism (Cheung, 2006). High scores indicate individuals who actively strengthen their relationships with others, bend their principles because of the emphasis put on others' needs, and are willing to help others to strengthen their social ties. Low scorers are transactional and instrumental, generally not bothered with social customs and avoid unnecessary social interactions and exchange of favours with others (Cheung et al., 1996; Cheung et al., 2001).

Social Sensitivity refers to the extent to which individuals are sensitive to how others feel, with high scores indicating individuals who are more empathic, more understanding, willing to listen and communicate, approachable and easy to get along with (Cheung, 2006; Cheung et al., 2001; Cheung et al., 2008).

Discipline measures the extent to which people are rigid and disciplined as opposed to adaptable, responsive and flexible. High scores are indicative of individuals who tend to be tedious, stubborn, organised, who stick to convention, dislike interference in original planning and dislike unpredictable events. Low scorers are not bound by formality, and are more ready to adapt to change in the environment and act according to the situation (Cheung, 2006; Cheung et al., 2001).

Harmony refers to inner peace of mind, contentment and interpersonal harmony. According to Cheung (2006), the avoidance of conflict and the maintenance of equilibrium are considered virtues in the Chinese culture. Individuals who obtain high scores on this tend to be peaceful and even-tempered. They have a high degree of endurance and are careful about not offending others. Low scorers tend to be confrontational and brash and are insensitive about offending others. They do not mind disputes and conflicts and always want to get ahead (Cheung et al., 1996; Cheung et al., 2001).

Thrift versus Extravagance measures the tendency to save rather than waste, as well as carefulness in spending. Thrift is, according to Cheung (2006), one of the basic traditional Confucian Chinese values, and the characteristic of Thrift versus Extravagance is an

indicator of the social response to rapid economic development and increasing materialism. High scores on this scale correspond with the Thrift dimension and describe individuals who live a simple life, are thrifty in the expenditure of money and the use of material resources, like to buy bargain goods and do not like to throw away old things. Low scores correspond to the Extravagance dimension and are characteristic of individuals who spend a lot of money, pursue extravagant enjoyment in all spheres of life and tend to show off their wealth (Cheung et al., 1996; Cheung et al., 2001).

5.6.3.3. Psychometric properties of the CPAI-2

The CPAI-2 is a fairly new instrument compared to the NEO-PI-R, which was over 15 years in the making and has a research tradition exceeding 15 years. Hence information on the psychometric properties of this instrument is still being compiled.

The Chinese version of the CPAI-2 was standardised in a sample of 1 911 adults, with an age of 18 to 70 years, from Mainland China and Hong Kong (Cheung et al., 2006; Cheung, 2007, Cheung et al., 2008). Cheung et al. (2008) report alpha coefficients for the normative sample that range between .80 and .51 for the 28 personality scales as evident in Table 3.4. No reliability coefficients were available for the factors. Cheung (2004) reports a median Cronbach alpha coefficient of .63 for the personality scales of the original CPAI. All other information available pertains to the original CPAI and is in relation to the Chinese version.

The English version of the original CPAI was validated in a sample of 675 Singaporean Chinese and 144 Caucasian American students at a Midwestern university. Similar factor structures were obtained in both samples. These were also similar to those obtained from the standardisation sample that completed the Chinese version of the CPAI (Cheung et al., 2003). Cheung et al. (2006) also cite evidence for the construct validity of the CPAI-2, particularly in terms of its correlations with the NEO-PI-R. However, as discussed in the development section, the Openness and Interpersonal Relatedness dimensions are still debated (see Cheung et al., 2008).

5.7. RESEARCH DESIGN

The current study took the form of a quantitative, non-experimental, cross-sectional design since students completed the questionnaires at a single point in time in a natural setting, no variables were manipulated and there was a single group of subjects over whom the researcher had no control. There was also no experimenter-controlled random assignment or random selection in the research design since there was only a single group of subjects

who were chosen primarily for convenience. Thus the research did not fulfil the requirements for true-, quasi-, or pre-experimental research and would therefore be classified as a non-experimental research design (Rosenthal & Rosnow, 1991; Whitley, 2002). Since the questionnaires were completed at a single point in time, the design was cross-sectional. Given that I explored test-retest reliability over a period of three weeks and this involved two observations over a space of time, the design also incorporated a longitudinal element. Finally, the inclusion of the open-ended questions, which were subjected to thematic content analysis, and the opportunity to cross out or underline words or items suggest a qualitative – albeit minimal – element to the design.

5.8. PROCEDURE

Students were approached during lecture times and briefed about the study. They then took questionnaires to complete on a voluntary basis in their own time. These were returned to a sealed box in the main administrative office for the discipline of Psychology or directly to the researcher via the internal mail system. As elucidated briefly in the sample section of this chapter, obtaining respondents for the test-retest segment of the study was extremely challenging. During the initial year of data collection the researcher approached three different groups of students at different times of the year and attempted to obtain a test-retest sample. However students completed the questionnaire the first time if at all and did not want to do it a second time. The researcher managed to secure funding the following year to pay an honorarium of R50 to a maximum of 50 students to participate in the test-retest phase of the study. This was done with a test-retest interval of three weeks. On both occasions, students returned completed questionnaires to a sealed box in the lecture theatre. Once questionnaires were received, the responses were entered and scored on computer and the relevant statistical analyses were conducted using the SAS Enterprise Guide (Version 4.0) computer program.

5.9. ETHICAL CONSIDERATIONS

Ethical clearance was received from the Humanities Ethics Committee at the University of the Witwatersrand (Protocol No. H60417). Participation in the research study was voluntary. Informed consent was obtained and confidentiality and anonymity were maintained for the questionnaires. This was done in a cover letter attached to the questionnaire.[6] The cover letter briefly outlined the purpose of the study and provided a statement of anonymity and

6 See Appendix A on page 398 for the cover letter.

confidentiality. Anonymity was further ensured in that no identifying data were requested from respondents. It was also stated that by completing and handing in the questionnaire, respondents agreed that their responses may be used in the research. The researcher provided contact details in the cover letter should students feel that they required additional information. It was stated that the research sought to establish general trends and that general feedback would be available after completion of the study on the University of the Witwatersrand Psychology website. The website address was provided in the cover letter. Respondents were reassured that there were no negative consequences should they choose not to participate. Respondents were informed that once responses were received they could not be withdrawn as the researcher was unable to identify a particular individual's questionnaire given the anonymity of responses. Respondents were also informed that raw data would be kept in a locked cupboard for up to three years and destroyed thereafter as per university policy. Respondents were asked to detach and keep the cover letter.

The same ethical procedures were followed for the test-retest sample. However the researcher needed to be able to match responses to calculate test-retest coefficients. Respondents were asked to identify their questionnaires with a four-digit code and this was used to match responses.[7] Also individuals in the test-retest sample were paid an honorarium for participation. This honorarium was made available to all who completed questionnaires even if the questionnaire was only completed once.

5.10. DATA ANALYSIS

Data analysis was primarily statistical, as outlined below. However, content analysis was used to analyse responses to the questions, asking students to explain why they had found items difficult to understand and/or inappropriate.

5.10.1. Descriptive statistics

The descriptive statistics obtained include frequencies for the nominal variables, that is, all the demographic variables except age, and means, standard deviations, maximum and minimum scores, and skewness coefficients for the continuous variables (i.e. scores on the NEO-PI-R and the CPAI-2, age, English reading, English comprehension and test familiarity). These were analysed in order to describe various aspects and characteristics of the data gathered, particularly the demographic data. Skewness coefficients were calculated

7See Appendix B on page 404 for the test-retest questionnaire.

to determine if the NEO-PI-R and the CPAI-2 scales were normally distributed or not. According to Huck (2009) skewness values that lie between +1 and -1 indicate that the distribution is sufficiently normal and the use of parametric procedures will be acceptable, on condition that the other conditions for parametric testing are met; namely, random, independent sampling, the dependent variable must be at least interval and there should be homogeneity of variance (Huck, 2009).

5.10.2. Examining the reliability of the NEO-PI-R and the CPAI-2

5.10.2.1. Internal consistency reliability

Internal consistency reliability for the scales of the two instruments was determined using the CronbachAlpha (CA) reliability coefficient. This measure of reliability assesses the degree to which the different parts of the instrument measure the same construct, by calculating inter-item correlations (Murphy & Davidshofer, 2005). It is the mean of all split half reliabilities (Moerdyk, 2009).

5.10.2.2. Test-retest reliability

Test-retest reliability was determined using Pearson's correlation coefficients. The Pearson product-moment correlation coefficient represents the relationship between two variables, indicating the extent to which variation in one variable is related to variation in another. It indicates the strength and direction of a linear relation between variables (Huck, 2009).

5.10.3. Examining the validity of the NEO-PI-R and the CPAI-2

5.10.3.1. Face validity

Frequencies were calculated for a single question included after each instrument ("Does this questionnaire appear to be assessing personality?"). These were used to determine face validity for the NEO-PI-R and the CPAI-2.

5.10.3.2. Construct validity

Exploratory factor analyses were conducted to determine the construct validity of the scales in the NEO-PI-R and the CPAI-2. Principal components analysis was the method selected since it is a simple but effective method of determining factors that explains all the variance including the error variance in any particular correlation matrix (Kline, 1993; 1994). It is also the method utilised by the developers of both instruments (see Cheung et al., 2008; Costa & McCrae, 1992).

Since principal components analysis is prone to an algebraic artifact, that is, it generally produces one general factor followed by bipolar factors, it must usually be simplified before it can be interpreted. Hence rotated factor solutions utilising varimax rotation were considered. Varimax rotation was utilised since it aims to maximise the sum of variances of squared loadings in the columns of the factor matrix. This produces in each column loadings that are either high or near zero, thereby facilitating interpretation (Kline, 1993; 1994). The use of varimax rotation is also in keeping with the methods employed by the developers of both instruments (see Cheung, 2004; Cheung et al., 2003; Cheung et al., 2008; Costa & McCrae, 1992).

In terms of extracting factors, six methods are generally advised, namely, the Guttman-Kaiser eigenvalue greater-than-one rule (K1 rule), Cattell's scree test, parallel analysis (PA), Velicer's minimum average partial (MAP), Bartlett's test for equality of eigenvalues, and maximum likelihood tests (Glorfeld, 1995). Traditionally scree plots and the K1 rule are used more than any of the other methods (Hayton, Allen & Scarpello, 2004). According to Kline (1994), Cattell's scree test is one of the best solutions to selecting the correct number of factors. The rationale for the scree test is that a few major factors account for most of the variance, resulting in a steep "cliff" as these factors are identified first, followed by a shallow "scree" describing the small and relatively consistent variance accounted for by the numerous minor factors. Only factors that occur before the scree and above the breakpoint between the scree and cliff are retained (Hayton et al., 2004). However, researchers (Hayton et al., 2004; Ledesma & Valero-Mora, 2007; O'Connor, 2000) argue that the scree plot involves eyeball searches for sharp demarcations between eigenvalues, which in practice do not always exist, or often there may be more than one sharp demarcation point – suggesting that the scree plot is not the most reliable method for factor extraction.

Thus the K1 rule is often used in conjunction with the scree plot to determine the number of factors. In support of using this method for factor extraction, Hayton et al. (2004) cite Guttman's (1954) proof as well as Kaiser's argument that the reliability of a component must always be non-negative when its eigenvalue is greater than one. However, they also argue that this rule is problematic; since Guttman's proof applies only to the population correlation matrix and for finite samples, the K1 criterion would tend to overestimate the number of factors. The rule is also arbitrary in that it draws distinctions between factors just above and just below 1 (Hayton et al., 2004; Ledesma & Valero-Mora, 2007). Finally, the rule is intended as a lower bound for the rank of the correlation matrix and thus an upper bound for the number of factors to be retained, but in practice the rule is used as a criterion to determine the exact number of factors to retain (Hayton et al., 2004).

Hayton et al. (2004) also cite research evidence that indicates that Bartlett's test as well as maximum likelihood procedures tend to overfactor and are heavily influenced by sample size. Thus they are not suitable alternatives to the scree test and K1 criterion. Both Hayton et al. (2004) and O'Connor (2000) propose the use of parallel analysis and MAP since these procedures are statistically based.

Parallel analysis is a Monte Carlo simulation technique in which the focus is on the number of factors that account for more variance than the components derived from random data. The eigenvalues obtained from the actual data are compared to the eigenvalues obtained from the random data. If the *i*th eigenvalue from the actual data is greater than the *i*th eigenvalue from the random data, the factor is retained (Hayton et al., 2004; Ledesma & Valero-Mora, 2007; O'Connor, 2000). In the original description of the process by Horn (1965), the mean eigenvalues from the random data served as the comparison baseline. Glorfeld (1995) argued that although Horn's procedure is relatively accurate, it tends to err in the direction of indicating the retention of one or two more factors than is actually warranted and/or of retaining poorly defined factors. Hence Glorfeld (1995) proposed a modification to Horn's parallel analysis where the eigenvalue corresponding to a given percentile, such as the 99^{th} or 95^{th} percentile, of the distribution of random data eigenvalues be used. Currently, Glorfeld's modification of Horn's parallel analysis is recommended (Ledesma & Valero-Mora, 2007; O'Connor, 2000). Thus this study follows current practice and uses the 95^{th} percentile.

Velicer's (1976) MAP test seeks to determine what factors are common and is proposed as a rule to find the best factor solution, rather than to find the cut-off point for the number of factors (Ledesma & Valero-Mora, 2007). In the MAP test, the focus is on the relative amounts of systematic and unsystematic variance remaining in a correlation matrix after extraction of increasing numbers of factors (O'Connor, 2000). Factors are retained as long as the variance in the correlation matrix represents systematic variance. Factors are no longer retained when there is proportionately more unsystematic variance than systematic variance (O'Connor, 2000).

Both parallel analysis and the MAP test should result in the same decision regarding the number of factors to retain. However, researchers are encouraged to use both tests, since MAP when it errs tends to make errors of underextraction, while parallel analysis tends to err in the direction of overextraction (O'Connor, 2000). Hayton et al. (2004) suggest the use of MAP and parallel analysis, and argue that these two methods by themselves are sufficient but one can use the scree plot and the K1 criterion as adjuncts to MAP and parallel analysis.

Hence in the current study all four methods were used. These were used in conjunction with the empirical findings of the test developers as well as the FFM to determine the number of factors to be extracted. Thus both theoretical and empirical considerations determined the number of factors to be explored in each case.

Separate factor analyses for each instrument were conducted as well as a joint factor analysis. The separate analysis allowed one to determine the construct validity of each instrument individually, while the joint analysis provided information on the convergent and discriminant validity of the scales as well as the construct validity of the FFM and will assist in contributing to the etic-emic debates.

Kline (1994) reports that it is usual to regard factor loadings[8] as high if they are greater than .60 and moderately high if they are above .30. Other loadings can be ignored. However studies using the NEO-PI-R and the CPAI-2 generally only consider loadings above .40 (see Cheung et al., 2003; Cheung et al., 2008; McCrae et al., 2005a). Therefore for the purposes of this study scales with a factor loading of .40 or more on any factor were considered as contributing to that particular factor.

Debate exists in the literature in terms of whether it is better to use exploratory or confirmatory factor analysis in studies of this nature (see Hopwood & Donnellan, 2010; McCrae et al., 1996). More often than not, sample sizes do not allow for confirmatory factor analysis. However McCrae et al. (1996) make a convincing argument for the use of exploratory factor analysis and Procrustes rotation instead of confirmatory factor analysis. Firstly, according to McCrae et al. (1996), there is no theoretical reason to assume that all personality scales load on only one factor. Also, secondary loadings in a factor structure can be meaningful and replicable. Even though a limited number of secondary loadings may be specified in a confirmatory factor analysis, the most appropriate model should be a model in which all scales are allowed to load on all factors. Despite the lack of goodness-of-fit indices as in confirmatory factor analysis, McCrae et al. (1996) suggest that the degree of replication can be evaluated by orthagonal Procrustes rotation and congruence coefficients.

Van de Vijver and Leung (1997) argue that the spatial orientation of factors in a factor analysis are arbitrary. Thus factors need to be rotated with regard to each other so as to allow for calculation of a meaningful measure of agreement. Therefore prior to evaluating the agreement of factors between two groups, the matrices of loadings are rotated in relation to

8 Factor loadings may be regarded as correlations of the variables with the factors (Kline, 1994).

each other so as to maximise their agreement. This is called target rotation. Factor loadings of the second group are rotated towards the first group (target group). This is usually done using Procrustes rotation. Thus, in Procrustes rotation the initial factor structures are rotated orthagonally as closely as possible to a target structure (Mulaik, 1972, Van de Vijver & Leung, 1997). The choice of the target group and the second group can be arbitrary or may be dictated by theoretical or empirical findings. In this case, the matrices by Costa and McCrae (1992) and Cheung et al. (2008) were the target matrices and the varimax rotated solutions from this study were the second groups.

Following the Procrustes rotation, factor congruence coefficients are computed to quantify the degree that a factor structure is replicated (Wrigley & Neuhaus, 1955). Factor congruence coefficients of .90 or larger generally indicate adequacy of fit (Cheung et al., 2003; McCrae et al., 1996; McCrae et al., 2005a; Mulaik, 1972). However the .90 is merely a rule of thumb. McCrae et al. (1996) argue though that values of .90 or larger are virtually never produced by chance; but to evaluate this more clearly, Paunonen, Jackson, Trzebinski and Forsteling (1992) proposed a Monte Carlo simulation that allows one to assess at the 95% level whether the fit of real data is due to capitalisation on chance. Haven and Ten Berge (1977) argue for a .85 criterion of factor replicability. McCrae et al. (1996) provide a SAS program to use in conducting Procrustes rotations. This program includes the calculation of factor congruence coefficients as well as the evaluation of these coefficients at the 1% and 5% levels. This program was used to conduct the Procrustes rotation and calculate congruence coefficients in the current study.

5.10.4. Examining bias in the NEO-PI-R and the CPAI-2

Apart from the examination of reliability and validity issues, establishing the utility of an instrument also involves some assessment of the bias of the instrument. Construct, method and item bias were assessed using a variety of techniques, namely parametric and non-parametric ANOVAs, internal consistency reliability analyses, factor analyses using varimax and Procrustes rotations, frequencies and Chi^2 tests. Sample sizes of at least 150 are required for factor analyses to yield stable results (Guadagnoli & Velicer, 1988). Hence samples were collapsed to examine bias.

5.10.4.1. Analysis of variance

This study sought to examine construct bias utilising Analysis of Variance (ANOVA) techniques to determine whether any differences would exist between demographic

information – namely gender, population group and home language – and the scales of each instrument.

ANOVAs were used to examine method bias on the NEO-PI-R where extreme response scores were compared across gender, population group and home language. An extreme response score was obtained for each individual in the study by noting the number of times a particular individual endorsed an extreme response, that is, chose a “0” or a “4” on the NEO-PI-R Likert-type response format. If an individual chose an extreme response, I coded it as “1” and if not, I coded that as “0”. I then calculated the total number of extreme responses an individual chose and this resulted in an extreme response score. ANOVAs were also used to assess method bias on the CPAI-2 by examining whether differences would exist across gender, population group and home language on the Social Desirability scale of the CPAI-2.

Finally ANOVAs were used to examine item bias in terms of whether any differences would exist between demographic information – namely gender, population group and home language – and the items of each instrument.

Since gender, population group and home language are categorical, nominal variables, parametric Analysis of Variance (ANOVA) and non-parametric Kruskal Wallis Analysis of Variance were used in analysing these variables in relation to the NEO-PI-R and the CPAI-2 (Huck, 2009). ANOVA is a robust statistical procedure that assesses the likelihood that the means of groups are equal to a common population mean by comparing an estimate of the population variance determined between groups with an estimate of the same population variance determined within groups (Huck, 2009). However, three assumptions need to be fulfilled before conducting a parametric ANOVA test, namely, the dependent variable needs to be at least interval, the dependent variable needs to be normally distributed and the variances of the population should be equal, that is, there should be homogeneity of variance (Huck, 2009). The scores obtained on both instruments are classifiable as interval data. Normality was examined using the skewness coefficient, as described earlier in this chapter. Levene’s test for homogeneity of variance was used to determine whether the variances were equal (Huck, 2009). In cases where there was no normality and/or no homogeneity of variance, the non-parametric Kruskal-Wallis one-way ANOVA test was used.

For both parametric and non-parametric testing, post hoc testing was not necessary since in all cases there were only two groups being compared. Hence a comparison of mean or mean ranks indicated the direction of significant results. Effect sizes for significant parametric ANOVAs were calculated using Cohen’s *d* (Huck, 2009). Cut-offs of .20 for a

small effect size, .50 for a moderate effect size and .80 for a large effect size are suggested for Chen's *d* (Huck, 2009).

For the non-parametric tests, Cohen's *d* was an inappropriate effect size measure. Hogarty and Kromrey (2000) demonstrated that effect size estimates like Cohen's *d* are extremely sensitive to departures from normality and heterogeneity of variance. Leech and Onwuegbuzie (2002) therefore advocate the use of non-parametric effect sizes like Kraemer and Andrews y_1^*, the Common Language (CL) effect size statistic, Vargha and Delaney's *A*, Cliff's *d,* and Wilcox and Muska's *W.* However Hogarty and Kromrey (2000) argue that of these effect sizes the ones that are best in datasets with violations of normality and/or homogeneity of variance are Cliff's *d* and Vargha and Delaney's *A*. These effect size calculations though are not readily available on statistical software and are not adequately addressed in statistical textbooks in the social sciences. I located a paper by Hogarty and Kromrey (1999) that included a SAS program to calculate Cliff's *d*. Hence Cliff's *d* was computed for all significant non-parametric ANOVAs at scale and item level. Cut-offs for the interpretation of Cliff's *d* are not readily available in the literature. According to J. D. Kromrey (personal communication, December 4, 2009) official cut-offs have not formally been suggested in the literature. However, using the logic postulated by Cohen in his power analysis text, J. D. Kromrey (personal communication, December 4, 2009) suggests that a small effect size would correspond to a Cliff's *d* of .147, and medium and large effect sizes would correspond to Cliff's *d* values of .33 and .474 respectively.

5.10.4.2. Internal consistency reliability analyses across groups

Construct bias was also examined by calculating the internal consistency reliability coefficients for all the scales and subscales on both the instruments across gender, population group and home language. This information complements the results obtained on the ANOVAs and the factor analyses. Internal consistency reliability for each scale on each instrument for each grouping variable (gender, population group and home language) was calculated using Cronbach alpha coefficients. No statistical test was located to determine whether these coefficients were different across the groupings. I therefore considered the difference between the two coefficients and used this to comment on the possible existence of construct bias.

5.10.4.3. Factor analyses across groups

Factor analysis was conducted for both groups in each of the three grouping variables (gender, population group and home language) using a principal components analysis with varimax rotation. In each case, one of the matrices was identified as the target matrix while

the other assumed the position of the second matrix. For example, in the case of an analysis of gender, the varimax rotated male matrix was compared to the female matrix using Procrustes rotation. Procrustes rotation was used to establish congruence across the two matrices.

5.10.4.4. Frequencies and Chi^2

Frequencies were calculated based on whether students identified any items as problematic or not in terms of understanding or appropriateness. Items that were identified as problematic were also noted, together with the frequency with which the item was cited.

Chi^2 tests were conducted to determine whether there would be any associations with gender, population group and language group and the understanding of items, as well as whether there would be any associations with gender, population group and language group and the identification of inappropriate items. Chi^2 tests were also used to determine whether any associations existed between the CPAI-2 items and gender, population group and home language, respectively.

This non-parametric technique was chosen since both variables examined in each Chi^2 test were nominal in nature. In all cases a Pearson's approximation to Chi^2 test of homogeneity of proportions was used (Huck, 2009).

5.10.5. Thematic content analysis

At the end of each instrument, two open-ended questions were included, on respondents' understanding of items and their opinion of their appropriateness. Respondents were asked to indicate their reasons for describing an item as inappropriate as well as to indicate what the problems associated with understanding of items was. These open-ended responses were analysed using a theoretical thematic analysis at the semantic level (Braun & Clarke, 2006).

Content analysis in the context of the current study is defined very differently to the qualitative content analysis technique as defined by Krippendorf (1980). According to Krippendorf (1980), content analysis is an approach to the study of the entire range of communicative and symbolic media, including verbal dialogue, films, advertisements and the like. Researchers use these to make inferences about other phenomena that are of interest. More recently content analysis has moved away from analysing just the descriptive aspects of texts and has started considering both manifest and latent meanings. The emphasis is no

longer on the mere counting up of the number of times a certain thing occurs (Braun & Clarke, 2006). According to Mayring (2000), thematic content analysis has developed so much as a technique that even a researcher wanting to explore only surface meaning goes through processes of open coding, development of coding frames and so on.

Braun and Clarke (2006) argue that thematic content analysis is a versatile and flexible technique that can be used in many ways. It is a technique that is not enveloped within a particular way of perceiving things. Thus they argue that thematic content analysis may be inductive or may be driven by the researchers' theoretical or analytic interest. In the current study the focus was largely empirical, informed by the FFM, the two instruments (NEO-PI-R and CPAI-2), and research in the field. As the researcher I already had a sense of what I might expect. Thus the technique employed was that of theoretical thematic analysis.

As indicated earlier in the discussion thematic analysis now involves the search for latent meanings in text. However this was not my core interest. I was interested in the surface level results and interpretation of the data collected. Hence the choice of thematic content analysis at the semantic level (Braun & Clarke, 2006).

The recommended six steps by Braun and Clarke (2006) guided the analysis. I read through all the responses on the four questions and familiarised myself with the responses. I had the data transcribed and I read through and checked the transcriptions once they were complete. Initial codes were then generated bearing in mind my pre-existing theoretical position. Codes were then grouped under possible themes and subthemes, which were revised until a suitable solution was found that captured the essence of the responses in the themes and subthemes. Themes and subthemes were then named and defined. Frequencies and percentages for themes and subthemes were calculated. Finally a number of specific items were mentioned in the open-ended responses. These were noted separately and a separate set of tables was created for the NEO-PI-R problematic items and the CPAI-2 problematic items as identified in the thematic content analysis.

5.11. CONCLUSION

This chapter has presented the methods used in this study. The aims and rationale were presented first, followed by the research questions and hypotheses. Participants and sampling were then detailed followed by a description of the instruments used in this study. Research design, the procedure of data collection and ethical issues were presented. The

chapter concluded with some discussion on the quantitative and qualitative techniques used for the analysis of data in this study. The results obtained for this study are presented in the next chapter – Chapter 6.

CHAPTER 6: RESULTS

6.1. INTRODUCTION

This chapter presents all of the results obtained in this study. Descriptive statistics for the sample in terms of the demographic characteristics pertinent to the analysis – namely, gender, population group and home language – are initially presented.[9] Following this, descriptive statistics for the NEO-PI-R and the CPAI-2 are presented. The chapter then presents results in a structure mirroring the aims of the study. Thus all results pertaining to the internal consistency and test-retest reliability of the NEO-PI-R and the CPAI-2 are presented. Following this, the results pertaining to the face and construct validity of the two instruments are presented. Finally results pertaining to construct, method and item bias are reported.

6.2. DESCRIPTIVE STATISTICS: DEMOGRAPHIC INFORMATION

Table 6.1 presents the frequencies obtained for the three demographic variables pertinent to the analysis, namely gender, population group and home language. It is evident that the frequencies for population group and home language were collapsed. This was done since the group sizes were grossly unequal, which would have compromised further statistical analyses. The decision to collapse the population groupings into White and non-White stem from the discussion on bias in Chapter 4. In South Africa affirmative action policies have been put in place to redress past inequalities. Based on these policies individuals are assessed in terms of belonging to either a White or non-White (African, Indian, Coloured) grouping. Furthermore, it is often argued in a South African context that language, that is, whether English is one's first or second language, impacts on test performance (see Bedell et al., 1999; Claasen, 1997; Cohen & Swerdlik, 2005; Foxcroft, 2004; Franklin-Ross, 2009; Horn, 2000; Van de Vijver & Rothmann, 2004; Van Eeden & Mantsha, 2007). Hence, given that the home language groupings were so unequal, it was decided to collapse the variable into English first language speakers and English second language speakers. It is acknowledged that these collapsed groupings are not homogeneous groups and a lot of within-group variance exists. However, the rationale on which the collapsing is based is one that is frequently employed in practice to make important decisions about individuals. Hence it is vital to examine issues of bias using these collapsed groupings since it should further our knowledge on the utility of these groupings in the South African context.

9 See Table 5.1, Chapter 5, page 137 for uncollapsed descriptive statistics for the sample.

From Table 6.1, it is evident that the majority of the sample were female (71.29%). Of the sample, 44.47% were White and 55.53% were non-White, while majority of individuals (68.94%) in the sample spoke English as their first language.

Table 6.1: Frequencies for gender, population group and home language

Variable		Frequency	%
GENDER	Male	122	28.71
	Female	303	71.29
POPULATION	White	189	44.47
GROUP	Non-White	236	55.53
HOME	English first language	293	68.94
LANGUAGE	English second language	132	31.06

6.3. DESCRIPTIVE STATISTICS: NEO-PI-R

Table 6.2 presents the means, standard deviations, minimum and maximum values, and skewness coefficients for the domain and facet scales of the NEO-PI-R. It is evident that all the variables are normally distributed since the skewness coefficients are within the range of +1 to -1 (Huck, 2009). Neuroticism has a mean of 97.87 (*SD* = 22.37), with scores ranging between 31 and 160. Extraversion has a mean of 117.23 (*SD* = 19.84), with scores ranging between 57 and 168. Openness to Experience has a mean of 122.71, with a standard deviation of 18.13 and scores ranging between 70 and 175. Agreeableness has a mean of 115.74 (*SD* = 17.81) and scores ranging between 57 and 161. Conscientiousness has a mean of 115.40 (*SD* = 21.45) and scores ranging between 44 and 174.

From Table 6.2 it is evident that all the Neuroticism facets, with the exception of Angry Hostility (*M* = 15.01) and Vulnerability (*M* = 12.79), have means between 17 and 18 and standard deviations between 4.35 and 5.87. Minimum and maximum scores are in the appropriate range of 0 to 32, with minimum scores ranging between 0 and 3 and maximum scores ranging between 29 and 32.

Descriptive statistics for the Extraversion facets are also presented in Table 6.2. The Extraversion facet means for three facets, namely Gregariousness, Assertiveness and Activity, fall in the 17 to 18 range, while Warmth has a mean of 22.93, Excitement-Seeking 19.61 and Positive Emotions 22.36. Standard deviations for the facets range between 4 and 5. While the maximum score for all facets generally corresponds to the highest possible

Table 6.2: Descriptive statistics for the NEO-PI-R

Scale	Mean	*SD*	Minimum	Maximum	Skewness
Neuroticism	97.87	22.37	31	160	.12
Anxiety	18.03	5.25	0	32	-.09
Angry Hostility	15.01	5.15	2	29	.22
Depression	16.92	5.87	2	32	.08
Self-Consciousness	16.93	5.23	2	30	.003
Impulsiveness	18.22	4.35	3	29	-.07
Vulnerability	12.79	4.87	0	29	.36
Extraversion	117.23	19.84	57	168	-.16
Warmth	22.93	4.42	8	32	-.50
Gregariousness	17.62	5.46	2	32	-.13
Assertiveness	16.78	5.13	3	30	-.10
Activity	17.91	4.22	8	30	.07
Excitement-Seeking	19.61	5.17	4	32	-.25
Positive Emotions	22.36	4.96	5	32	-.57
Openness to Experience	122.71	18.13	70	175	.02
Fantasy	21.07	5.12	5	32	-.07
Aesthetics	20.92	5.53	4	32	-.40
Feelings	22.88	4.26	10	32	-.19
Actions	15.71	3.89	6	28	.04
Ideas	21.65	5.24	2	32	-.32
Values	20.53	4.32	4	31	.13
Agreeableness	115.74	17.81	57	161	-.37
Trust	17.03	5.19	2	31	-.22
Straightforwardness	19.17	4.54	7	31	-.17
Altruism	23.18	3.83	11	32	-.26
Compliance	16.50	4.67	2	29	-.05
Modesty	18.61	5.19	0	32	-.37
Tender-Mindedness	21.33	3.60	9	29	-.37
Conscientiousness	115.40	21.45	44	174	-.36
Competence	20.52	3.92	8	31	-.21
Order	18.29	5.26	2	31	-.29
Dutifulness	21.74	4.21	8	32	-.26
Achievement Striving	19.37	4.95	4	31	-.29
Self-Discipline	18.03	5.04	4	31	-.19
Deliberation	17.46	4.82	0	30	-.22

maximum score on the scale (32) ranging between 29 and 32, the minimum scores show a fair amount of variation, with Warmth and Activity demonstrating minimum scores of 8, Positive Emotions 5, Excitement-Seeking 4, Assertiveness 3, and Gregariousness 2.

The Openness facets have means that range between 20 and 23 and standard deviations ranging between 4 and 5, with the exception of Actions, which has a mean of 15.71 and a standard deviation of 3.89 as evident in Table 6.2. Actions also has a minimum score of 6 and a maximum score of 28. All the remaining facets have a maximum score corresponding with the upper limit of the scale (32) ranging between 30 and 32, but the minimum scores show more variation, with Feelings having a minimum score of 10, Fantasy a score of 5, Aesthetics and Values 4, and Ideas 2.

The Agreeableness facets demonstrate more variation in their mean scores, with Altruism having a mean of 23.18, Tender-Mindedness a mean of 21.33, Straightforwardness 19.17, Modesty 18.61, Trust 17.03 and Compliance 16.50. Standard deviations for all facets are in the 4 to 5 range, with the exception of Altruism (*SD* = 3.83) and Tender-Mindedness (*SD* = 3.6). Maximum scores generally correspond to the upper limit for the scales (32), ranging between 29 and 32 but minimum scores show more variation, with Altruism having a minimum score of 11, Tender-Mindedness having a minimum score of 9, Straightforwardness 7, Trust and Compliance 2 and Modesty 0, as indicated in Table 6.2.

From Table 6.2 it is evident that Conscientiousness facets have means in the range of 17 to 19, with the exception of Dutifulness (*M* = 21.74) and Competence (*M* = 20.52). Standard deviations for the facets range from 3.92 to 5.26. Maximum scores correspond to the upper limit of the scales (32), ranging between 30 and 32. Minimum scores range between 0 and 8, with Competence and Dutifulness having a minimum score of 8, Achievement Striving and Self-Discipline having a minimum score of 4, Order 2 and Deliberation 0.

6.4. DESCRIPTIVE STATISTICS: CPAI-2

Descriptive statistics, namely means, standard deviations, minimum and maximum values and skewness coefficients, for the CPAI-2 are presented in Table 6.3. All the variables are normally distributed, since the skewness coefficients are within the range of +1 to -1 (Huck, 2009) with the exception of Diversity (-1.39) and Interpersonal Tolerance (-1.57). Social Potency has a mean of 55.39 (*SD* = 11.36) and scores ranging between 20 and 77, as is evident in Table 6.3. Dependability has a mean of 49.90 (*SD* = 6.64) and scores ranging from 25 to 66. Accommodation has a mean score of 29.40 (*SD* = 4.18) and a range of 7 to

40. Interpersonal Relatedness has a mean score of 41.26 (*SD* = 7.41) and scores ranging between 9 and 61.

Unlike the NEO-PI-R, which has an equal number of items in each of the facets and therefore in the resulting domains, the number of items per subscale and factor in the CPAI-2 varies. Generally 10 items constitute a subscale. For Social Potency and Accommodation all subscales have 10 items. However for the remaining two factors, namely, Dependability and Interpersonal Relatedness, the number of items per subscale ranges between 10 and 16. The descriptive statistics for those subscales with 10 items will be reported in a summarised form, while individual sentences will report on subscales with more than 10 items.

For the Social Potency subscales, means range between 5.82 and 8.54, with standard deviations between 1.59 and 2.69. Minimum scores range between 0 and 2 and maximum scores correspond to the upper limit of the subscale (10), as is evident in Table 6.3.

For the Dependability subscales with 10 items – namely, Responsibility, Emotionality, Optimism versus Pessimism, Meticulousness, Internal versus External Locus of Control and Family Orientation – mean scores range between 4.58 and 7.11, with standard deviations ranging between 1.81 and 2.41. Minimum and maximum scores are in the appropriate range of 0 to 10. From Table 6.3 it is also evident that the Inferiority versus Self-Acceptance subscale has a mean of 4.55, with a standard deviation of 3.89 and a range of 0 to 16 within a possible range of 0 to 17. The Practical Mindedness subscale has a mean of 7.25 (*SD* = 1.91) and scores that range between 2 and 11 within a possible range of 0 to 12. Face has a mean of 5.34, with a standard deviation of 2.28 and a range corresponding to the upper and lower limits of the subscale, that is, 0 to 11.

Table 6.3 also presents the descriptive statistics for the Accommodation factor. Means for the subscales on this factor show a huge range, with Defensiveness having a mean of 2.45 (*SD* = 2.11), Self versus Social Orientation having a mean of 5.63 (*SD* = 1.88), Graciousness versus Meanness 6.29 (*SD* = 2.12), Veraciousness versus Slickness 6.77 (*SD* = 2.21) and Interpersonal Tolerance 8.43 (*SD* = 1.86). Minimum scores range between 0 and 1 and maximum scores correspond to the upper limit of 10 for all scales except for Defensiveness, which has a maximum score of 9.

Table 6.3: Descriptive statistics for the CPAI-2

Scale	Mean	*SD*	Minimum	Maximum	Skewness
Social Potency	55.39	11.36	20	77	-.44
Novelty	7.37	2.19	0	10	-.98
Diversity	8.54	1.59	2	10	-1.39
Divergent Thinking	7.89	1.82	2	10	-.80
Leadership	6.46	2.29	0	10	-.45
Logical vs Affective Orientation	7.06	1.79	1	10	-.76
Aesthetics	6.13	2.36	0	10	-.25
Extraversion vs Introversion	6.56	2.69	0	10	-.66
Enterprise	5.82	2.42	0	10	-.14
Dependability	49.90	6.64	25	66	-.34
Responsibility	5.15	2.41	0	10	-.12
Emotionality	4.58	2.11	0	10	.31
Inferiority vs Self-Acceptance	4.55	3.89	0	16	.75
Practical Mindedness	7.25	1.91	2	11	-.17
Optimism vs Pessimism	5.39	2.41	0	10	-.24
Meticulousness	5.78	2.37	0	10	-.17
Face	5.34	2.28	0	11	-.00
Internal vs External LOC	7.11	1.81	0	10	-.67
Family Orientation	5.15	2.19	0	10	-.15
Accommodation	29.40	4.18	7	40	-.74
Defensiveness	2.45	2.11	0	9	.88
Graciousness vs Meanness	6.29	2.12	0	10	-.40
Interpersonal Tolerance	8.43	1.86	1	10	-1.57
Self vs Social Orientation	5.63	1.88	1	10	-.05
Veraciousness vs Slickness	6.77	2.21	0	10	-.68
Interpersonal Relatedness	41.26	7.41	9	61	-.28
Traditionalism vs Modernity	4.92	2.74	0	14	.44
Relationship Orientation	7.95	1.82	3	12	-.25
Social Sensitivity	8.31	1.68	3	11	-.57
Discipline	5.41	2.35	0	10	.04
Harmony	10.36	2.12	3	14	-.70
Thrift vs Extravagance	5.22	1.82	0	10	-.16

For Interpersonal Relatedness, only two subscales – namely Discipline and Thrift versus Extravagance – have 10 items. Discipline has a mean of 5.41 (*SD* = 2.35), while Thrift versus Extravagance has a mean of 5.22 (*SD* = 1.82). Both subscale scores are in the appropriate range, that is, 0 to 10. Traditionalism versus Modernity has a mean of 4.92, with a standard deviation of 2.74 and scores that range between 0 and 14 in a possible range of 0 to 15. Relationship Orientation scores range between 3 and 12 within a possible range of 0 to 12 and demonstrate a mean score of 7.95 (*SD* = 1.82). Social Sensitivity has a mean of 8.31 and a standard deviation of 1.68, with scores ranging between 3 and 11 in a possible range of 0 to 11. Harmony has a mean of 10.36 (*SD* = 2.12) and scores ranging between 3 and 14 out of a possible range of 0 to 14, as is evident in Table 6.3.

6.5. RELIABILITY: NEO-PI-R & CPAI-2

Internal consistency reliability and test-retest reliability were examined for both instruments. Results for the internal consistency reliability of both instruments are presented first, followed by the test-retest reliability coefficients for both instruments.

6.5.1. Internal consistency reliability: NEO-PI-R

Cronbach Alpha (CA) reliability coefficients for each of the domain and facet scales of the NEO-PI-R and for each factor and subscale of the CPAI-2 are presented in Table 6.4. From Table 6.4, it is evident that internal consistency reliability coefficients of .91, .89, .87, .87 and .92 are found for the NEO-PI-R domain scales of Neuroticism, Extraversion, Openness to Experience, Agreeableness and Conscientiousness, respectively.

Reliability coefficients for the Neuroticism facets range between .59 and .81, with an average coefficient alpha of .73. The median reliability coefficient for the Neuroticism facets is .75. With the exception of Impulsiveness (α = .59), internal consistency reliability coefficients for the Neuroticism facets are above .71. Extraversion facets range between .60 and .77, with an average CA coefficient of .72. The median reliability coefficient for the Extraversion facets is .75.

Openness facets range between .55 and .79, with an average CA coefficient of .69. The median reliability coefficient for the Openness facets is .73. With the exception of the Actions subscale (α = .55) all other reliability coefficients for the Openness facets are in excess of .61. Agreeableness coefficients range between .50 and .81, with an average CA coefficient

Table 6.4: Internal consistency reliability coefficients for the NEO-PI-R and the CPAI-2

NEO-PI-R	α	CPAI-2	α
Neuroticism	.91	**Social Potency**	.90
Anxiety	.75	Novelty	.72
Angry Hostility	.74	Diversity	.60
Depression	.81	Divergent Thinking	.58
Self-Consciousness	.71	Leadership	.68
Impulsiveness	.59	Logical vs Affective Orientation	.41
Vulnerability	.77	Aesthetics	.68
Extraversion	.89	Extraversion vs Introversion	.79
Warmth	.75	Enterprise	.68
Gregariousness	.75	**Dependability**	.75
Assertiveness	.76	Responsibility	.70
Activity	.60	Emotionality	.69
Excitement-Seeking	.69	Inferiority vs Self-Acceptance	.83
Positive Emotions	.77	Practical Mindedness	.37
Openness to Experience	.87	Optimism vs Pessimism	.68
Fantasy	.76	Meticulousness	.66
Aesthetics	.76	Face	.57
Feelings	.69	Internal vs External LOC	.54
Actions	.55	Family Orientation	.62
Ideas	.79	**Accommodation**	.76
Values	.61	Defensiveness	.69
Agreeableness	.87	Graciousness vs Meanness	.62
Trust	.81	Interpersonal Tolerance	.74
Straightforwardness	.60	Self vs Social Orientation	.52
Altruism	.66	Veraciousness vs Slickness	.66
Compliance	.61	**Interpersonal Relatedness**	.74
Modesty	.75	Traditionalism vs Modernity	.69
Tender-Mindedness	.50	Relationship Orientation	.39
Conscientiousness	.92	Social Sensitivity	.45
Competence	.67	Discipline	.60
Order	.72	Harmony	.56
Dutifulness	.64	Thrift vs Extravagance	.37
Achievement Striving	.79		
Self-Discipline	.77		
Deliberation	.76		

of .66. The median reliability coefficient for the Agreeableness facets is .64. All of the facets with the exception of Tender-Mindedness (α = .50) have coefficients greater than .60.

Conscientiousness facets have internal consistency coefficients ranging from .64 to 79, with an average CA coefficient of .73. The median reliability coefficient for the Conscientiousness facets is .74.

6.5.2. Internal consistency reliability: CPAI-2

Table 6.4 also indicates internal consistency reliability coefficients for the factors and subscales of the CPAI-2. Internal consistency reliability coefficients of .90, .75, .76 and .74 are found for the Social Potency, Dependability, Accommodation and Interpersonal Relatedness factors, respectively.

Social Potency subscale reliability coefficients range between .41 and .79 with a mean reliability coefficient of .64. The median reliability coefficient for the Social Potency subscales is .68. With the exception of Logical versus Affective Orientation (α = .41) and Divergent Thinking (α = .58), the Social Potency subscale reliabilities range between .60 and .79.

Dependability subscale reliabilities range between .37 and .83, with a mean reliability coefficient of .63. With the exception of Practical Mindedness (α = .37), Internal versus External Locus of Control (α = .54) and Face (α = .57), all subscales evidence internal consistency reliability coefficients above .62. The median CA coefficient for the Dependability subscales is .66.

The Accommodation subscales have internal consistency reliability coefficients ranging between .52 and .74, with an average reliability coefficient of .65. With the exception of Self versus Social Orientation (α = .52), all reliability coefficients on the Accommodation factor are above .62. The median reliability coefficient for the Accommodation factor is .66.

Interpersonal Relatedness subscales evidence reliability coefficients ranging between .37 and .69, with an average reliability coefficient of .51. The median reliability coefficient for the Interpersonal Relatedness factor is .51. For the Interpersonal Relatedness factor the only reliability coefficient above .60 is Tradition versus Modernity (α = .69). Discipline has a reliability coefficient of .60, while Harmony has a reliability coefficient of .56, Social Sensitivity .45, Relationship Orientation .39 and Thrift versus Extravagance .37.

6.5.3. Test-retest reliability: NEO-PI-R

Table 6.5 presents the test-retest reliability coefficients for the NEO-PI-R. The test-retest reliability coefficients for the NEO-PI-R domain scales are as follows: Neuroticism .91, Extraversion .43, Openness .81, Agreeableness .94 and Conscientiousness .77.

The Neuroticism facets have test-retest coefficients ranging between .57 and .90, with a median test-retest coefficient of .68. Extraversion facets demonstrate greater variation in the test-retest coefficients, with Positive Emotions having a coefficient of .21, Warmth .43, Assertiveness .48, Gregariousness .62, Activity .67 and Excitement-Seeking .81. The median test-retest coefficient for the Extraversion facets is .55.

The Openness to Experience facets have a median test-retest coefficient of .60 but also demonstrate great variation in terms of the coefficients. Aesthetics has a test-retest coefficient of .16. Feelings has a coefficient of .45, Fantasy .51, Actions .69, Values .70 and Ideas .78. The Agreeableness facets have coefficients ranging between .71 and .92, with a median test-retest coefficient of .82. With the exception of Self-Discipline (r = .35), the test retest coefficients for the Conscientiousness facets range between .63 and .84 with a median test-retest coefficient of .71.

6.5.4. Test-retest reliability: CPAI-2

Test-retest reliability coefficients for the factors and subscales of the CPAI-2 are also presented in Table 6.5. Social Potency evidences a test-retest coefficient of .76. Dependability has a test-retest coefficient of .58, Accommodation .60 and Interpersonal Relatedness .59.

The Social Potency subscales evidence great variety in the test-retest coefficients, with Diversity having a coefficient of .11, Logical versus Affective Orientation .32, Extraversion versus Introversion .56, Divergent Thinking .59, Leadership .61, Aesthetics .73, Enterprise .74 and Novelty .87. A median test-retest coefficient of .60 is found for the Social Potency subscales.

Table 6.5: Test-retest reliability coefficients for the NEO-PI-R and the CPAI-2

Scale	r	Scale	r
Neuroticism	.91	**Social Potency**	.76
Anxiety	.59	Novelty	.87
Angry Hostility	.90	Diversity	.11
Depression	.65	Divergent Thinking	.59
Self-Consciousness	.57	Leadership	.61
Impulsiveness	.74	Logical vs Affective Orientation	.32
Vulnerability	.71	Aesthetics	.73
Extraversion	.43	Extraversion vs Introversion	.56
Warmth	.43	Enterprise	.74
Gregariousness	.62	**Dependability**	.58
Assertiveness	.48	Responsibility	.27
Activity	.67	Emotionality	.88
Excitement-Seeking	.81	Inferiority vs Self-Acceptance	.58
Positive Emotions	.21	Practical Mindedness	.45
Openness to Experience	.81	Optimism vs Pessimism	.53
Fantasy	.51	Meticulousness	.62
Aesthetics	.16	Face	.19
Feelings	.45	Internal vs External LOC	.29
Actions	.69	Family Orientation	.77
Ideas	.78	**Accommodation**	.60
Values	.70	Defensiveness	.70
Agreeableness	.94	Graciousness vs Meanness	.70
Trust	.71	Interpersonal Tolerance	.84
Straightforwardness	.92	Self vs Social Orientation	.05
Altruism	.81	Veraciousness vs Slickness	.86
Compliance	.82	**Interpersonal Relatedness**	.59
Modesty	.87	Traditionalism vs Modernity	.55
Tender-Mindedness	.82	Relationship Orientation	.87
Conscientiousness	.77	Social Sensitivity	.38
Competence	.65	Discipline	.53
Order	.77	Harmony	.55
Dutifulness	.63	Thrift vs Extravagance	.44
Achievement Striving	.84		
Self-Discipline	.35		
Deliberation	.83		

Like Social Potency, Dependability also has a diverse range of test-retest coefficients. Face has a coefficient of .19, Responsibility .27, Internal versus External Locus of Control .29, Practical Mindedness .45, Optimism vs Pessimism .53, Inferiority versus Self-Acceptance .58, Meticulousness .62, Family Orientation .77 and Emotionality .88. Dependability has a median test-retest coefficient of .53.

With the exception of Self versus Social Orientation (r = .05), all test-retest coefficients on the Accommodation factor are above .70, with a median coefficient of .70. Interpersonal Relatedness had a median coefficient of .55, with Social Sensitivity demonstrating a test-retest coefficient of .38, Thrift versus Extravagance .44, Discipline .53, Traditionalism versus Modernity .55, Harmony .55 and Relationship Orientation .87.

6.6. VALIDITY: NEO-PI-R & CPAI-2

Results for both face and construct validity are presented in this section. Frequencies for the face validity question are presented first for each of the two instruments, followed by the factor analyses assessing the construct validity of the NEO-PI-R and the CPAI-2.

6.6.1. Face validity: NEO-PI-R

Frequencies obtained on the third question following each instrument, “Did this instrument **appear** to be measuring personality? Briefly substantiate your answer”, are presented in Table 6.6. Of the respondents, 97.18% (n = 413) agreed that the NEO-PI-R did appear to be assessing personality, while 2.82% (n = 12) were of the opinion that it did not appear to be assessing personality.

Most respondents of the opinion that the questionnaire appeared to be measuring personality substantiated their responses with a brief statement like, “Due to the fact that you were asking questions about both the person’s environment and experiences, while relating to their behaviours and feelings, it did bear a resemblance to a personality test” (Individual 9), or “Questioned different facets of a person – could be used to gauge an idea of personality of that person” (Individual 133), or “Statements referred to character traits specific to people, they encompassed a large variety of actions and mannerisms pertaining to individual people hence, personality measured (Individual 261).

From the 12 respondents of the opinion that the NEO-PI-R did not measure personality, only six substantiated their answer. The remaining six made reference to their answers on the

two other open-ended questions. For those who did substantiate their responses, the reasoning was largely located within the culturally and linguistically inappropriate arguments, which are addressed in Section 6.8.3 on item bias in this chapter. For example, Individual 299 stated, “I think that quite a number of items were just irrelevant and pointless. They were just a complete waste of time. The test was rather assessing one’s ability to understand first language English”. Individual 239 reported, “Indifferent at times, they would be asking questions you can put on a rating system, at times you felt you required an explanation, some questions are reductionist, trying to reduce complex personal phenomena through simple questioning”.

Table 6.6: Face validity frequencies for the NEO-PI-R and the CPAI-2

Face validity		Frequency	%	Cumulative %
NEO-PI-R	Yes	413	97.18	97.18
	No	12	2.82	100
CPAI-2	Yes	397	93.41	93.41
	No	28	6.59	100

6.6.2. Face validity: CPAI-2

From Table 6.6, it is evident that 93.41% (*n* = 397) of respondents agreed that the CPAI-2 appeared to be measuring personality. Most of these respondents provided a brief substantiation along the lines of, “The questions relate to how you react to others and situations which reflect personality traits” (Individual 288). Individual 26 wrote, “Once again I could relate to certain statements and many of them are personality traits and aspects and I think it was able to measure my personality by getting me to think about the type of person I am. Therefore I think that this questionnaire can be considered to be measuring personality”.

Of the respondents, 6.59% (*n* = 28) were of the opinion that the questionnaire did not assess personality. Only 10 of these individuals substantiated their answers along the lines of, “I was considering my opinions, attitudes and beliefs which isn’t always related to personality. True/false dichotomy didn’t allow for expression of nuances and complexities in my thinking so I felt limited in answering some questions” (Individual 80). Individual 27 wrote, “It does but the questions about aliens and possession indicate psychosis rather than personality”. According to Individual 103, “For most part yes but at times seemed related to cultural issues”, and Individual 338, “But only to a certain degree. I believe many of the questions are ambiguous and unclear and therefore make it difficult to get accurate results from them. The

extremes of true/false questions leaves very little to variance and can also be inaccurate". From the substantiations given it would appear that the same reasoning is applied by the respondents as those applied for the NEO-PI-R. These arguments are developed further in the item bias section of this chapter.

6.7. CONSTRUCT VALIDITY

In keeping with other research on psychometric instruments as well as standards for empirical validation of a psychometric instrument, this study conducted a factor analysis procedure on the facets of the NEO-PI-R and the subscales of the CPAI-2, in an attempt to comment on the construct validity of the instrument. All loadings above .40 or below -.40 were considered as a loading on that particular factor. This was decided based on the loading cut-off points used by both Costa and McCrae (1992) and Cheung et al. (2008).

6.7.1. Factor analysis: NEO-PI-R

In deciding on the number of factors to be examined I considered both theoretical and empirical factors. At a theoretical level, the FFM postulates five broad factors. Empirically, examination of Cattell's scree plot (see Figure 6.1) suggests six factors. Using the eigenvalues greater-than-one rule, six factors are also indicated. However the limitations of both of these empirical techniques were discussed in Chapter 5 and an argument was made for using parallel analysis (PA) and Velicer's MAP to determine the number of factors to be retained. Table 6.7 presents the actual eigenvalues obtained for the NEO-PI-R in the current

Table 6.7: Eigenvalues for the NEO-PI-R

	Actual eigenvalue	**Random eigenvalue MAP**	**Random eigenvalue PA mean**	**Random eigenvalue PA 95th percentile**
Factor 1	5.35	5.38	1.53	1.60
Factor 2	3.83	3.91	1.46	1.51
Factor 3	3.32	3.31	1.40	1.44
Factor 4	2.76	2.77	1.35	1.39
Factor 5	1.75	1.71	1.31	1.35
Factor 6	1.13	1.10	1.27	1.31
MAP factors to retain		5		

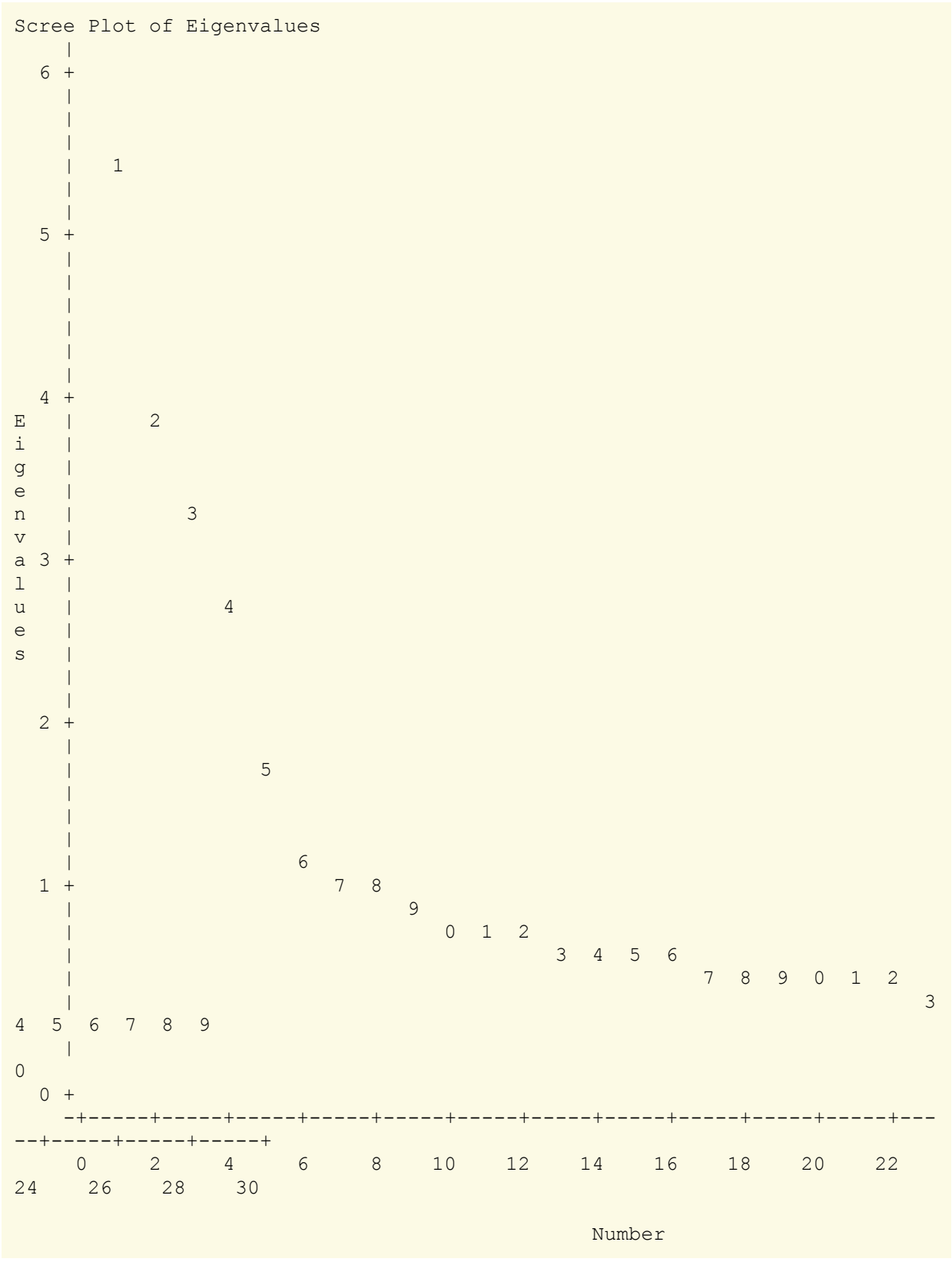


Figure 6.1: Cattell's scree plot for NEO-PI-R factors

study together with the random eigenvalues calculated using Horn's technique and the more recent technique proposed by Glorfeld. Both parallel analysis results indicate the extraction of five factors. Velicer's MAP technique also indicates the extraction of five factors. Hence a five factor solution is regarded as the optimal solution for the NEO-PI-R results in this study.

Table 6.8 presents the results obtained for the five factor solution using both the varimax and Procrustes rotation techniques. Procrustes rotation was conducted using the varimax solution obtained in the current study as well as the five factor matrix presented in Costa and McCrae (1992).

In total the five factor solution explains 56.73% of the shared variance. Factor 1 explains 17.86% of the variance, Factor 2 explains 12.78% of the variance, Factor 3 11.07%, Factor 4 9.19%, and Factor 5 5.83%.

From the varimax solution it is evident that the five factors load as expected. Factor 1 may be described as the Conscientiousness factor, with all six Conscientiousness facets loading positively with moderate to high loadings on this factor. Two Extraversion facets, namely Assertiveness and Activity, also load positively on Factor 1, with a small secondary loading of .41. These facets load with a higher loading on Factor 4, the Extraversion facet. The second factor has moderate to high loadings on all the Neuroticism facets. Only Impulsiveness has a small loading (.44) on this factor. Factor 3 is best defined as the Agreeableness factor, with all six Agreeableness facets loading positively with moderate to high loadings on this factor. Angry Hostility loads negatively (-.45) and Warmth loads positively (.42) on Factor 3 but the higher loading for both facets occurs in their respective domains. Factor 4 has moderate to high loadings on all the Extraversion facets with the exception of Assertiveness, which has a moderate to small loading. Finally, Factor 5 is characterised by moderate to high loadings on all the Openness to Experience facets with the exception of Actions, which has a loading of .34 on Factor 5 and -.38 on Factor 2 (see Table 6.8).

From the Procrustes results it is evident that sufficient agreement exists between Costa and McCrae's (1992) results and those from the current study. With the exception of Fantasy, Actions, Trust and Altruism, which have congruence coefficients of between .91 and .93 (α = .05), all other facets have congruence coefficients above .94, indicating agreement at the .01 level of significance.

Table 6.8: Five factor solution for the NEO-PI-R using varimax and Procrustes rotation

Leaving two pages cos will need two pages to insert the horizontal table. Have sent horizontal tables in an attachment called FINAL chapter 6 results tables

6.7.2. Factor analysis: CPAI-2

As with the NEO-PI-R, in deciding on the number of factors to be examined I considered both theoretical and empirical factors. At a theoretical level, the developers of the CPAI-2 argue for four factors. At an empirical level, an examination of Cattell's scree plot (see Figure 6.2) suggests seven factors. Using the eigenvalues greater-than-one rule, seven factors are also indicated. PA and Velicer's MAP technique both suggest the extraction of five factors, as evident in Table 6.9. Given this, together with the fact that the NEO-PI-R and its theoretical underpinning, the FFM, also argue for five factors, a five factor solution was extracted. However in order to do a Procrustes rotation with the factor matrix of Cheung et al. (2008) to determine the level of agreement between the two matrices, a four factor solution also needed to be extracted. Results for the five factor solution are discussed first, followed by results for the four factor solution and Procrustes rotation.

Table 6.9: Eigenvalues for the CPAI-2

	Actual eigenvalue	**Random eigenvalue MAP**	**Random eigenvalue PA mean**	**Random eigenvalue PA 95th percentile**
Factor 1	6.33	6.20	1.50	1.58
Factor 2	2.71	2.92	1.43	1.48
Factor 3	2.61	2.56	1.38	1.42
Factor 4	2.18	2.18	1.33	1.37
Factor 5	1.64	1.63	1.29	1.32
Factor 6	1.14	1.09	1.25	1.28
Factor 7	1.03	0.98	1.21	1.25
MAP factors to retain		5		

6.7.2.1. CPAI-2: Five factor solution

Table 6.10 presents the results obtained from the five factor solution of the CPAI-2. The five factor solution was obtained using a varimax rotation. In total the five factor solution explains 55.25% of the variance. Factor 1 explains 22.63% of the variance, Factor 2 explains 9.66% of the variance, Factor 3 9.32%, Factor 4 7.79% and Factor 5 5.85%.

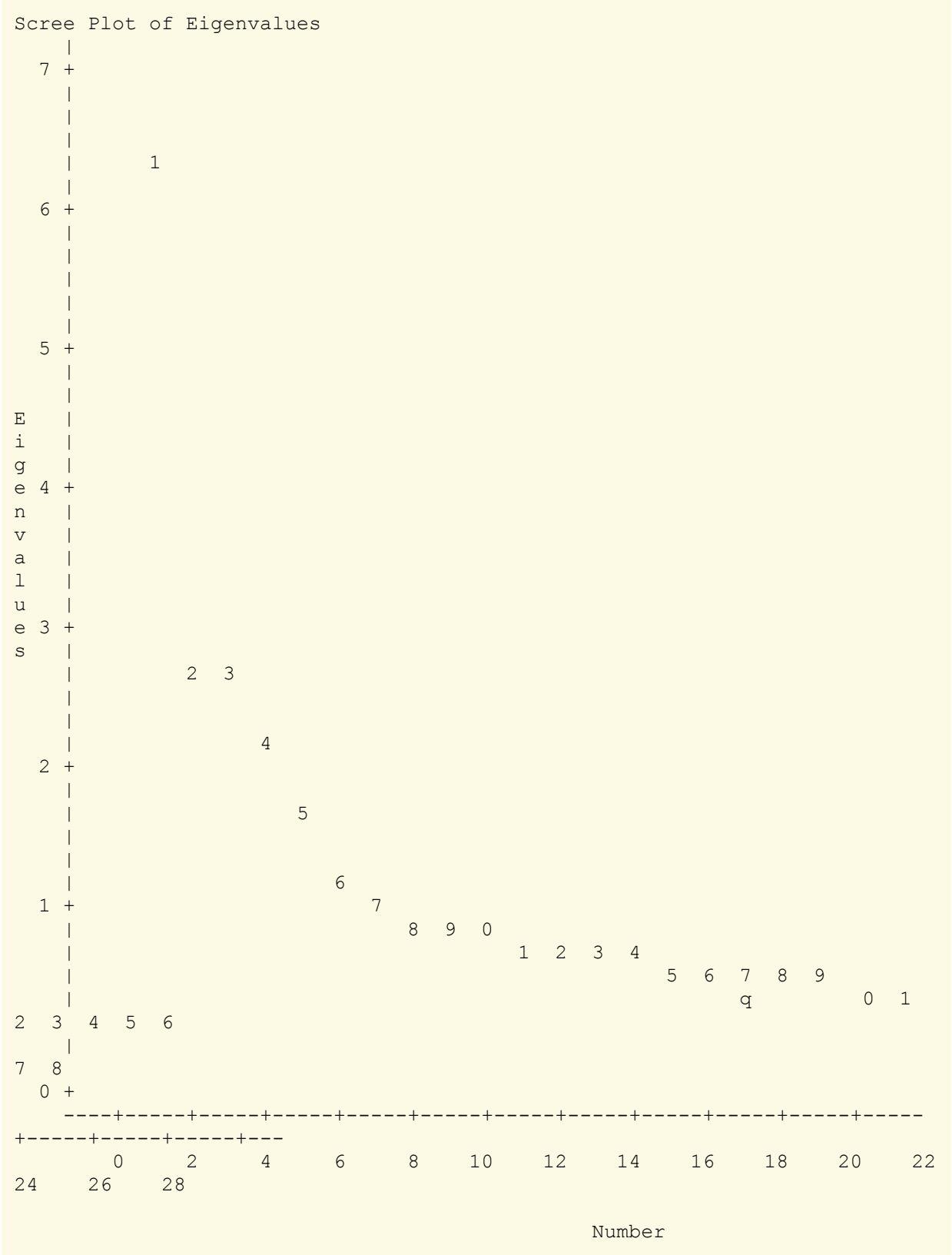


Figure 6.2: Cattell's scree plot for CPAI-2 factors

Factor 1 has 9 of the 28 CPAI-2 subscales loading on it. With the exception of Enterprise, all of the Social Potency scales load on Factor 1, together with Social Sensitivity from the Interpersonal Relatedness factor and Interpersonal Tolerance from the Accommodation factor. These loadings are moderately high with the exception of Extraversion versus Introversion, which loads at .40 and Interpersonal Tolerance, which loads at .41. These two subscales are cross-loaded, with Interpersonal Tolerance having a secondary loading on Factor 1 and a moderately high primary loading on Factor 3. Extraversion versus Introversion cross-loads positively on Factor 1 and negatively with the same value (.40) on Factor 4.

Factor 2 has moderate to high positive loadings on Enterprise and Optimism versus Pessimism and moderate to high negative loadings on Emotionality and Inferiority versus Self-Acceptance. Novelty and Leadership have small to moderate positive secondary loadings on Factor 2.

Factor 3 is characterised by moderate to high positive loadings on three of the five Accommodation scales (Graciousness versus Meanness, Interpersonal Tolerance, Veraciousness versus Slickness) and the Harmony subscale from the Interpersonal Relatedness factor, as well as a moderate negative loading on the Defensiveness subscale of the Accommodation factor. The only Accommodation subscale that does not load at the .40 cut-off on Factor 3 is the Self versus Social Orientation subscale but it does have a loading of -.31 on Factor 3. Family Orientation from the Dependability factor also loads at .43 on Factor 3.

Factor 4 is characterised by small to moderate positive loadings on the Dependability subscales of Responsibility, Practical Mindedness and Meticulousness, the Accommodation subscale of Self versus Social Orientation, and the Interpersonal Relatedness subscale of Discipline, and a small negative loading on Extraversion versus Introversion. Thrift versus Extravagance from the Interpersonal Relatedness factor does not load on any factor at the .40 cut-off but loads at .39 on Factor 4.

Factor 5 is characterised by small to moderate positive loadings on the Dependability subscale of Face and four of the six Interpersonal Relatedness subscales (Traditionalism versus Modernity, Relationship Orientation, Social Sensitivity, Discipline). However Social Sensitivity and Discipline have their secondary loadings, not their primary loadings, on this factor. Internal versus External locus of Control also has a small to moderate negative loading on this factor.

Table 6.10: Five factor solution for the CPAI-2 using varimax rotation

Scale	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Social Potency					
Novelty	**.69**	**.43**	-.10	-.06	.01
Diversity	**.68**	.16	.27	-.03	-.03
Divergent Thinking	**.80**	.09	.07	.13	-.07
Leadership	**.56**	**.53**	-.32	-.02	.06
Logical vs Affective Orientation	**.56**	.19	-.01	.38	-.13
Aesthetics	**.63**	-.13	.07	-.00	-.13
Extraversion vs Introversion	**.40**	.38	.11	**-.40**	.22
Enterprise	.38	**.77**	-.02	-.05	-.18
Dependability					
Responsibility	.15	.24	.06	**.69**	-.02
Emotionality	.11	**-.68**	-.28	-.16	.01
Inferiority vs Self-Acceptance	-.18	**-.70**	-.24	-.13	.35
Practical Mindedness	.03	.31	.33	**.48**	-.03
Optimism vs Pessimism	.21	**.77**	.11	.08	-.10
Meticulousness	-.05	.04	.15	**.69**	.06
Face	-.07	-.38	-.28	-.03	**.47**
Internal vs External LOC	.22	.28	.24	.07	**-.49**
Family Orientation	-.15	.33	**.43**	.19	.13
Accommodation					
Defensiveness	-.16	-.15	**-.66**	.16	.32
Graciousness vs Meanness	.07	.36	**.65**	-.09	-.22
Interpersonal Tolerance	**.41**	.20	**.63**	-.09	-.09
Self vs Social Orientation	.18	-.19	-.31	**.45**	-.36
Veraciousness vs Slickness	-.03	-.13	**.74**	.14	-.05
Interpersonal Relatedness					
Traditionalism vs Modernity	-.37	.17	-.23	.30	**.55**
Relationship Orientation	.09	-.19	.05	.07	**.61**
Social Sensitivity	**.50**	.03	.33	.01	**.41**
Discipline	-.14	-.02	-.21	**.60**	**.41**
Harmony	.26	.06	**.53**	.25	.28
Thrift vs Extravagance	.20	-.31	-.02	***.39***	.19
% VARIANCE EXPLAINED	22.63	9.66	9.32	7.79	5.85

6.7.2.2. CPAI-2: Four factor solution

Aside from the five factor solution, a four factor solution was also extracted using varimax rotation. This was done primarily to explore the degree of agreement between the factor matrix of the current study and that of the developers (Cheung et al., 2008). Procrustes rotation was used to do this. Results are presented in Table 6.11.

The four factor solution in this study explains 49.40% of the variance. Factor 1 explains 22.63% of the variance, Factor 2 9.66%, Factor 3 9.32% and Factor 4 7.79%.

Factor 1 in the CPAI-2 four factor solution is characterised by moderate to high positive loadings on the Social Potency subscale of Enterprise, and the Dependability subscale of Optimism versus Pessimism, and moderate to high negative loadings on the Dependability subscales of Emotionality, Inferiority versus Self-Acceptance and Face. Small to moderate positive loadings are also found for the Social Potency subscale of Leadership, the Dependability subscale of Internal versus External Locus of Control, and the Accommodation subscale of Graciousness versus Meanness, and small to moderate negative loadings on the Interpersonal Relatedness subscale of Relationship Orientation. Leadership and Graciousness versus Meanness have secondary loadings on Factor 1. The Interpersonal Relatedness subscale of Thrift versus Extravagance does not load at the .40 cut-off on any factor but has its highest loading on -.37 on this factor.

Factor 2 has moderate to high positive loadings on the Social Potency subscales of Novelty, Diversity, Divergent Thinking, Leadership, Logical versus Affective Orientation and Aesthetics, and small to moderate positive loadings on Extraversion versus Introversion and Enterprise, as well as the Accommodation subscale of Interpersonal Tolerance and the Interpersonal Relatedness subscale of Social Sensitivity. Leadership and Enterprise are cross-loaded on Factors 1 and 2 but Leadership has a higher loading on Factor 2, whereas Enterprise has a higher loading on Factor 1.

Factor 3 has moderate to high positive loadings on the Accommodation subscales of Graciousness and Meanness, Interpersonal Tolerance, and Veraciousness versus Slickness, as well as the Interpersonal Relatedness subscale of Harmony. Defensiveness (Accommodation) has a moderate to high negative loading on Factor 3. The fifth Accommodation subscale, Self versus Social Orientation, does not load at the .40 cut-off on any of the factors but has its highest loading of -.28 on this factor. The Dependability subscale of Family Orientation loads positively at .39 on Factor 3 and does not load above

Table 6.11: Four factor solution for the CPAI-2 using varimax and Procrustes rotation

.40 on any other factor. Interpersonal Tolerance is cross-loaded on Factors 2 and 3 but the higher loading is on Factor 3.

Factor 4 has moderate to high positive loadings on the Dependability subscales of Responsibility and Meticulousness and the Interpersonal Relatedness subscale of Discipline. Small to moderate positive loadings on the Dependability subscale of Practical Mindedness and the Interpersonal Relatedness subscale of Traditionalism versus Modernity are also found. Thrift versus Extravagance (Interpersonal Relatedness subscale) does not load positively or negatively at the .40 level on any of the four factors but loads negatively with -37 on Factor 1 and positively with .36 on Factor 4.

The four factor varimax solution was subjected to a Procrustes rotation using the four factor solution provided by Cheung et al. (2008). From Table 6.11 it is evident that the subscales of Novelty, Diversity, Divergent Thinking, Leadership, Logical versus Affective Orientation, Aesthetics, Enterprise, Responsibility, Emotionality, Inferiority versus Self-Acceptance, Practical Mindedness, Optimism versus Pessimism, Internal versus External Locus of Control, Family Orientation, Defensiveness, Graciousness versus Meanness, Interpersonal Tolerance, Traditionalism versus Modernity, Discipline and Harmony have congruence coefficients at or above .94, indicating agreement at the .01 level of significance. Extraversion versus Introversion, Meticulousness, Face, Self versus Social Orientation, Veraciousness versus Slickness, Relationship Orientation and Thrift versus Extravagance have congruence coefficients at or above .88, indicating agreement at the .05 level of significance. Social Sensitivity had a nonsignificant congruence coefficient of .86.

6.7.3 FACTOR ANALYSIS: NEO-PI-R & CPAI-2

Given the arguments presented in Chapters 1 and 3 around the universal applicability of the NEO-PI-R and by extension the FFM, as well as the arguments around etic versus emic approaches and the need to test dominant Western instruments and models in non-Western cultures, a joint factor analysis using the facets of the NEO-PI-R and the subscales of the CPAI-2 was a necessity. Deciding on the number of factors to extract was a challenge. Theoretically the NEO-PI-R located within the FFM suggests the extraction of five factors. Cheung and her colleagues argue for four factors in the CPAI-2 (Cheung et al., 2003; Cheung et al., 2008). If these are indeed separate factors for both instruments, the extraction of nine factors appears warranted. However, Cheung et al. (2008) argue that the FFM does not subsume their Interpersonal Relatedness factor but that their model does not adequately cover Openness, in which case six factors are warranted. Thus at the theoretical level

arguments may be made for four, five, six or nine factors to be extracted. At an empirical level, examination of Cattell's scree plot (see Figure 6.3) indicates the possible extraction of eight factors. Using the eigenvalues greater-than-one rule, one is inclined to extract 13 factors. From the information presented in Table 6.12 it is evident that both Velicer's MAP and the parallel analysis (PA) techniques are in favour of eight factors. Hence an eight factor solution is extracted for the joint factor analysis of the NEO-PI-R and the CPAI-2. Additionally, since there appears to be almost universal support for a five factor model (see McCrae & Costa, 2008a; McCrae et al., 2005a) a five factor solution was also explored. Finally Cheung et al. (2008) make a valid case for six factors, hence a six factor solution was also explored. All three factor analyses were conducted using varimax rotation.

Table 6.12: Eigenvalues for the NEO-PI-R & CPAI-2 combined

	Actual eigenvalue	**Random eigenvalue MAP**	**Random eigenvalue PA mean**	**Random eigenvalue PA 95th percentile**
Factor 1	10.64	10.30	1.71	1.79
Factor 2	5.55	5.90	1.64	1.70
Factor 3	4.93	4.86	1.59	1.63
Factor 4	4.31	4.28	1.54	1.58
Factor 5	3.13	3.13	1.50	1.54
Factor 6	2.15	2.06	1.46	1.50
Factor 7	1.59	1.56	1.42	1.46
Factor 8	1.41	1.39	1.39	1.42
MAP factors to retain		8		

The eight factor solution explains 58.14% of the total variance in the model. The six factor solution explains 52.97% of total variance in the model while the five factor solution explains 49.26%. From Table 6.13 it is evident that Factor 1 accounts for 18.35% of the variance explained. Factor 2 accounts for 9.57% of the variance explained while Factor 3 accounts for 8.51%. Factor 4 accounts for 7.44%, Factor 5 5.39%, Factor 6 3.71%, Factor 7 2.74% and Factor 8 2.43%.

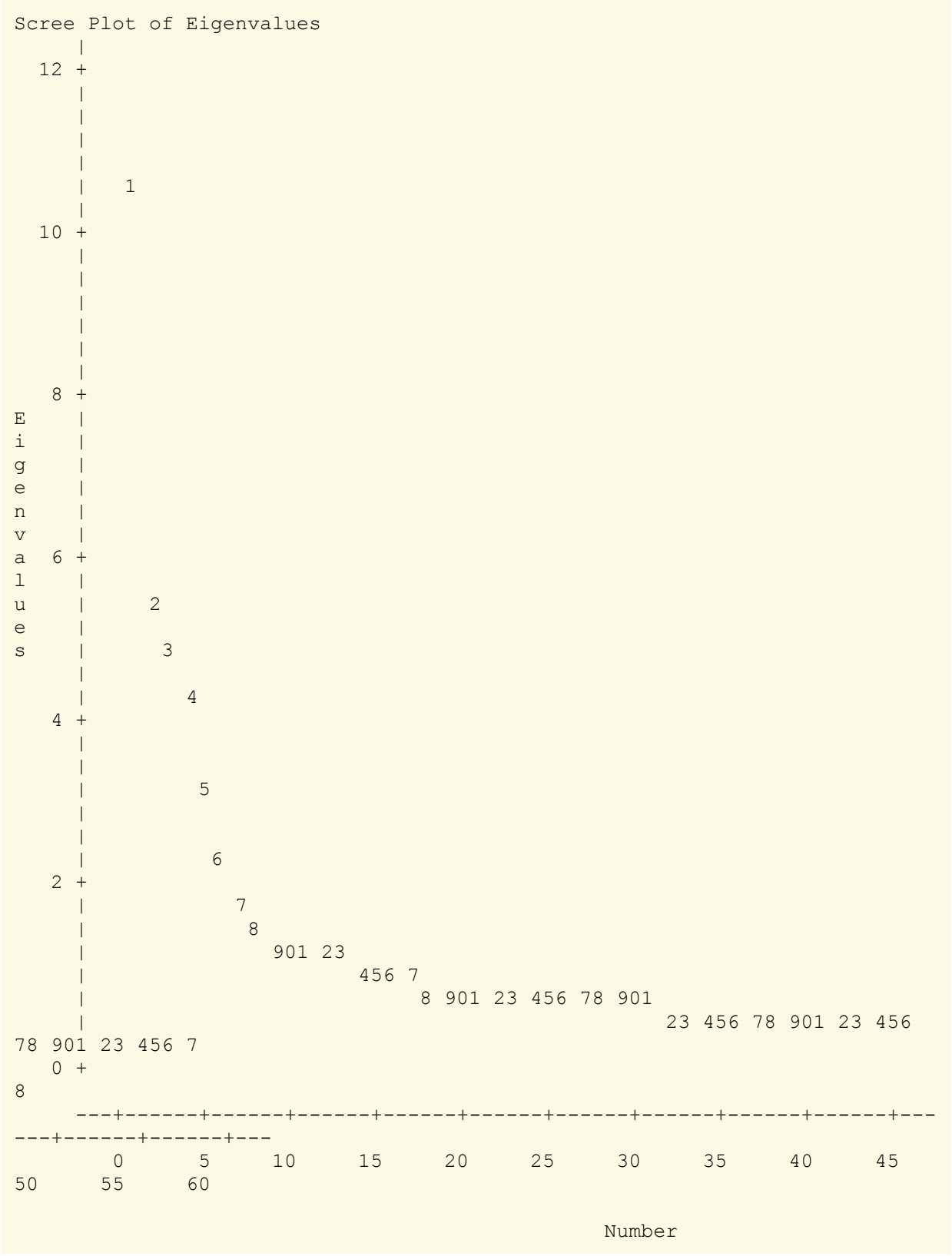


Figure 6.3: Cattell's scree plot for NEO-PI-R AND CPAI-2 factors

6.7.3.1. NEO-PI-R & CPAI-2: Eight factor solution

The eight factor solution is presented in Table 6.13. All of the NEO-PI-R Neuroticism facets, with the exception of Impulsiveness and the Dependability subscales of Emotionality and Inferiority versus Self-Acceptance, load with moderate to high positive loadings on Factor 1. Impulsiveness and the Dependability subscale of Face have a small to moderate positive loading on Factor 1. The Enterprise subscale from the Social Potency factor and the Optimism versus Pessimism subscale of the Dependability factor load with moderate to high negative loadings on Factor 1, while Graciousness versus Meanness (Accommodation factor) has a small, negative, secondary loading on Factor 1.

All of the NEO-PI-R Conscientiousness facets and the Responsibility and Meticulousness subscales from the CPAI-2 Dependability factor load with moderate to high positive loadings on Factor 2. Practical Mindedness from the Dependability factor and Discipline from the Interpersonal Relatedness factor load with small to moderate loadings on this factor.

Factor 3 is characterised by moderate to high positive loadings on the Warmth and Gregariousness facets of the NEO-PI-R Extraversion domain as well as a moderate to high positive loading on the CPAI-2 Extraversion versus Introversion subscale (Social Potency). Small to moderate positive loadings are found on the NEO-PI-R Extraversion facets of Assertiveness, Excitement-Seeking and Positive Emotions. A small to moderate negative loading is found on the CPAI-2 Accommodation factor subscale of Self versus Social Orientation. The CPAI-2 Interpersonal Relatedness factor subscale of Social Sensitivity does not load positively or negatively at .40 on any factor in the eight factor solution but it has its highest loading of .38 on Factor 3.

Factor 4 is characterised by moderate to high positive loadings on the NEO-PI-R Agreeableness facets of Straightforwardness and Modesty as well as the CPAI-2 Accommodation subscale of Veraciousness versus Slickness. Small to moderate positive loadings are also found on the NEO-PI-R Agreeableness facets of Trust, Altruism, Compliance and Tender-Mindedness.

Factor 5 is characterised by moderate to high positive loadings on the NEO-PI-R Openness to Experience facets of Fantasy, Aesthetics, Feelings and Ideas, as well as a moderate to high loading on the CPAI-2 Social Potency subscale of Aesthetics. Small to moderate secondary positive loadings are found on the NEO-PI-R Openness to Experience subscale of Values and the CPAI-2 Social Potency subscale of Divergent Thinking. A small to

Table 6.13: Eight factor solution using varimax rotation for the joint factor analysis of the NEO-PI-R and the CPAI-2

Scale	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8
Neuroticism								
Anxiety	**.74**	.03	-.09	.01	.16	.06	-.12	-.02
Angry Hostility	**.60**	.04	-.07	-.27	-.11	.02	.06	**-.47**
Depression	**.81**	-.15	-.12	.08	.06	.09	-.02	.10
Self-Consciousness	**.70**	-.09	-.18	.12	.06	.24	-.07	.10
Impulsiveness	**.44**	-.23	.27	-.10	-.06	-.20	-.02	-.14
Vulnerability	**.66**	-.29	.04	.16	.00	.13	-.28	-.11
Extraversion								
Warmth	-.06	.02	**.74**	.29	.28	-.04	.01	.06
Gregariousness	-.09	-.13	**.81**	-.11	.00	-.01	.11	.07
Assertiveness	-.32	.32	**.43**	-.31	-.03	-.05	.20	-.28
Activity	-.21	.32	.38	.01	.21	.07	.17	**-.45**
Excitement-Seeking	.04	-.23	**.52**	-.23	.06	.07	.28	-.09
Positive Emotions	-.27	.04	**.59**	.16	.34	.01	.07	-.09
Openness to Experience								
Fantasy	.07	-.25	.07	-.01	**.64**	-.01	.02	.12
Aesthetics	.11	.10	.07	.13	**.74**	-.10	.23	.05
Feelings	.18	.14	.21	.05	**.64**	-.16	.00	-.16
Actions	-.32	-.08	.19	.15	.17	-.18	**.43**	-.11
Ideas	-.19	.12	-.05	-.06	**.61**	-.07	.37	.02
Values	.03	-.00	.14	-.03	**.40**	**-.51**	.06	-.03
Agreeableness								
Trust	-.32	-.06	.39	**.48**	.15	-.08	-.10	.14
Straightforwardness	-.07	.13	-.02	**.74**	-.11	-.07	.05	.04
Altruism	.04	.21	.37	**.53**	.25	.14	-.03	.16
Compliance	-.10	-.05	-.17	**.53**	.19	.17	-.14	**.51**
Modesty	.31	-.10	-.12	**.70**	-.04	-.07	.13	.11
Tender-Mindedness	.04	.08	.22	**.55**	.19	.17	-.04	.03
Conscientiousness								
Competence	-.28	**.68**	.15	-.13	.18	.01	.14	-.02
Order	.07	**.77**	-.04	-.02	-.10	-.03	-.06	.08
Dutifulness	-.10	**.68**	.02	.26	.12	-.03	.08	.01
Achievement Striving	-.11	**.78**	.11	-.02	.15	.01	.10	-.24
Self-Discipline	-.24	**.74**	.07	.04	-.01	-.07	.11	-.09
Deliberation	-.05	**.62**	-.21	.10	-.02	.12	-.05	.27
Social Potency								
Novelty	-.39	.03	.26	-.03	.22	.00	**.63**	-.17
Diversity	-.15	.05	.19	.14	.20	-.29	**.66**	.03
Divergent Thinking	-.11	.14	.10	-.04	**.46**	-.14	**.63**	.06
Leadership	-.37	.17	.31	-.29	.15	.10	**.46**	-.20
Logical vs Affective Orientation	-.21	.30	-.11	-.09	.28	-.07	**.53**	.17
Aesthetics	-.01	-.00	.03	.04	**.66**	-.14	.29	.00
Extraversion vs Introversion	-.18	-.05	**.73**	.02	.05	-.15	.21	-.16
Enterprise	**-.68**	.11	.22	-.18	.07	-.18	.35	-.09
Dependability								
Responsibility	-.19	**.71**	-.11	.10	.07	.03	.11	-.03
Emotionality	**.72**	-.14	.01	-.10	.06	.04	.06	-.32
Inferiority vs Self-	**.62**	-.31	-.09	.12	.02	**.44**	-.15	.10

Acceptance								
Practical Mindedness	-.25	**.41**	-.11	.38	-.20	-.13	.21	-.07
Optimism vs Pessimism	**-.79**	.11	.13	.09	.02	-.05	.20	-.06
Meticulousness	.09	**.70**	-.15	-.03	-.10	-.08	-.02	.26
Face	**.48**	.05	.17	-.20	-.07	.39	-.08	.24
Internal vs External LOC	-.29	.14	-.07	-.11	.11	**-.53**	.14	-.03
Family Orientation	-.24	.22	-.00	.10	-.11	-.26	-.08	**.40**
Accommodation								
Defensiveness	.18	-.02	-.01	-.20	-.01	**.70**	-.13	-.15
Graciousness vs Meanness	**-.43**	.01	.12	.35	.04	**-.51**	-.03	.15
Interpersonal Tolerance	-.19	.02	.19	.27	.06	**-.54**	**.40**	.18
Self vs Social Orientation	-.02	.09	**-.53**	-.04	.26	.20	.19	-.21
Veraciousness vs Slickness	.06	.11	-.07	**.69**	-.11	**-.43**	.05	.06
Interpersonal Relatedness								
Traditionalism vs Modernity	-.02	.13	-.07	.11	**-.41**	**.63**	-.02	.12
Relationship Orientation	.30	.02	.23	.08	-.07	.29	.21	***.38***
Social Sensitivity	.04	.12	***.38***	.29	.20	-.02	.36	.18
Discipline	.22	**.50**	-.07	.09	-.20	**.46**	.03	.06
Harmony	-.12	.17	.09	.27	.17	-.09	.21	**.60**
Thrift vs Extravagance	.22	.17	-.17	.22	.05	.26	**.30**	-.06
% Variance explained	18.35	9.57	8.51	7.44	5.39	3.71	2.74	2.43

moderate secondary negative loading is found for the CPAI-2 Interpersonal Relatedness subscale of Traditionalism versus Modernity.

Factor 6 is characterised by moderate to high positive loadings on the CPAI-2 Accommodation subscale of Defensiveness and the Interpersonal Relatedness subscale of Traditionalism versus Modernity. Small to moderate positive loadings are found for the CPAI-2 Dependability subscale of Inferiority versus Self-Acceptance and the Interpersonal Relatedness subscale of Discipline. Small to moderate negative loadings are found on the NEO-PI-R Openness to Experience subscale of Values, the CPAI-2 Dependability subscale of Internal versus External Locus of Control, and the Accommodation subscales of Graciousness versus Meanness, Interpersonal Tolerance and Veraciousness versus Slickness. Veraciousness versus Slickness has a secondary loading on Factor 6 though.

Factor 7 is characterised by small to moderate positive loadings on the NEO-PI-R Actions facet (Openness domain) and the CPAI-2 Social Potency subscales of Novelty, Diversity, Divergent Thinking, Leadership and Logical versus Affective Orientation. The Accommodation subscale of Interpersonal Tolerance has a small to moderate positive secondary loading on Factor 7. The Interpersonal Relatedness subscale of the Thrift versus Extravagance subscale from the CPAI-2 factor of Interpersonal Relatedness does not load at

the .40 cut-off on any factor but has its strongest loading of .30 on this factor. The finding is similar with the Interpersonal Relatedness subscale of Social Sensitivity, which does not load at the .40 cut-off on any factor but has a primary loading of .38 on Factor 3 and a secondary loading of .36 on this factor.

Factor 8 is characterised by small to moderate positive loadings on the NEO-PI-R Compliance facet (Agreeableness), the CPAI-2 Dependability subscale of Family Orientation, and the Interpersonal Relatedness subscale of Harmony. The NEO-PI-R facet of Compliance is cross-loaded though, with the stronger loading occurring on Factor 4. Small to moderate negative loadings are found for the NEO-PI-R Neuroticism facet of Angry Hostility and the NEO-PI-R Extraversion facet of Activity but Angry Hostility has a secondary loading on this factor. Relationship Orientation from the CPAI-2 Interpersonal Relatedness factor does not load on any factor at the .40 cut-off but loads positively at .38 on Factor 8.

6.7.3.2. NEO-PI-R & CPAI-2: Six factor solution

Results for the six factor joint NEO-PI-R and CPAI-2 analysis are presented in Table 6.14. All the NEO-PI-R Neuroticism facets load with moderate to high positive loadings on Factor 1 with the exception of Impulsiveness, which has a small positive loading on Factor 1. Moderate to high positive loadings also occur on the CPAI-2 Dependability subscales of Emotionality and Inferiority versus Self-Acceptance. Moderate to high negative loadings are found on the CPAI-2 Social Potency subscale of Enterprise and the Dependability subscale of Optimism versus Pessimism. The CPAI-2 Social Potency subscale of Novelty and the Dependability subscale of Face have small secondary loadings on Factor 1. The CPAI-2 Dependability subscale of Family Orientation does not load on any of the six factors at the .40 cut-off. The strongest loadings for Family Orientation occur on Factors 1 and 5. On Factor 1 the subscale loads at -.28 and on Factor 5 it loads at .28.

All of the NEO-PI-R Conscientiousness facets, the CPAI-2 Dependability subscales of Responsibility and Meticulousness and the CPAI-2 Interpersonal Relatedness subscale of Discipline load with moderate to high positive loadings on Factor 2. The CPAI-2 Dependability subscale of Practical Mindedness also has a small to moderate loading on Factor 2.

Factor 3 is characterised by moderate to high positive loadings on the NEO-PI-R Openness to Experience facets of Fantasy, Aesthetics, Feelings and Ideas, as well as the CPAI-2 Social Potency subscales of Novelty, Diversity, Divergent Thinking, Logical versus Affective

Table 6.14: Six factor solution using varimax rotation for the joint factor analysis of the NEO-PI-R and the CPAI-2

Scale	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
Neuroticism						
Anxiety	**.75**	.01	.07	-.12	.00	.11
Angry Hostility	**.61**	.08	-.06	.00	**-.48**	-.00
Depression	**.79**	-.14	.04	-.15	.06	.14
Self-Consciousness	**.67**	-.01	.02	-.23	.14	.28
Impulsiveness	**.45**	-.23	-.08	.26	-.13	-.17
Vulnerability	**.71**	-.29	-.17	.01	.11	.14
Extraversion						
Warmth	-.00	-.02	.17	**.72**	.37	-.04
Gregariousness	-.11	-.16	.01	**.79**	.02	.04
Assertiveness	-.30	.32	.08	**.51**	-.38	-.07
Activity	-.12	.34	.24	**.51**	-.17	-.02
Excitement-Seeking	.01	-.24	.17	**.55**	-.21	.10
Positive Emotions	-.19	.01	.26	**.62**	.18	-.02
Openness to Experience						
Fantasy	.12	.31	**.53**	.05	.10	.01
Aesthetics	.16	-.06	**.73**	.09	.19	-.10
Feelings	.29	.10	**.51**	.24	.03	-.17
Actions	-.31	.05	**.35**	.27	.08	-.23
Ideas	-.17	-.09	**.72**	.01	-.02	-.08
Values	.09	-.03	.36	.15	.00	**-.49**
Agreeableness						
Trust	-.25	-.08	.02	.36	**.54**	-.12
Straightforwardness	-.04	.18	-.09	-.01	**.65**	-.14
Altruism	.09	.19	.15	.33	**.59**	.13
Compliance	-.11	-.09	.07	-.27	**.71**	.19
Modesty	.31	-.04	.02	-.14	**.63**	-.09
Tender-Mindedness	.09	.09	.10	.21	**.53**	.12
Conscientiousness						
Competence	-.27	**.66**	.23	.19	-.10	.02
Order	.05	**.75**	-.09	-.06	.01	.01
Dutifulness	-.08	**.68**	.14	.05	.24	-.04
Achievement Striving	-.06	**.78**	.18	.18	-.11	-.02
Self-Discipline	-.23	**.75**	.06	.12	-.00	-.08
Deliberation	-.09	**.60**	-.01	-.25	.19	.16
Social Potency						
Novelty	**-.42**	.07	**.51**	.37	-.10	-.05
Diversity	-.20	.09	**.52**	.25	.13	-.28
Divergent Thinking	-.16	.14	**.73**	.16	.01	-.12
Leadership	-.39	.18	.37	**.41**	-.33	.08
Logical vs Affective Orientation	-.29	.29	**.56**	-.08	-.02	-.03
Aesthetics	.03	-.03	**.70**	.07	.07	-.14
Extraversion vs Introversion	-.15	-.05	.11	**.78**	.00	-.16
Enterprise	**-.69**	.12	.24	.30	-.19	-.21
Dependability						
Responsibility	-.18	**.72**	.14	-.07	.06	.01
Emotionality	**.74**	-.11	.08	.04	-.24	.04
Inferiority vs Self-Acceptance	**.60**	-.31	-.07	-.15	.15	**.47**
Practical Mindedness	-.26	**.47**	-.04	-.05	.26	-.19
Optimism vs Pessimism	**-.77**	.12	.12	.19	.05	-.12
Meticulousness	.03	**.67**	-.05	-.20	.08	-.00
Face	**.40**	.00	-.10	.08	-.04	**.49**

Internal vs External LOC	-.28	.13	.18	-.03	-.11	**-.53**
Family Orientation	***-.28***	.19	-.12	-.08	***.28***	-.18
Accommodation						
Defensiveness	.18	-.03	-.08	-.00	-.25	**.68**
Graciousness vs Meanness	-.39	.00	-.00	.10	**.40**	**-.54**
Interpersonal Tolerance	-.22	.03	.26	.20	.32	**-.52**
Self vs Social Orientation	-.01	.12	.35	**-.44**	-.19	.13
Veraciousness vs Slickness	.09	.16	-.08	-.07	**.61**	**-.47**
Interpersonal Relatedness						
Traditionalism vs Modernity	-.10	.16	-.34	-.10	.12	**.63**
Relationship Orientation	.19	.01	.05	.15	.26	***.39***
Social Sensitivity	.01	.12	.34	***.37***	***.37***	.01
Discipline	.16	**.51**	-.13	-.08	.08	**.48**
Harmony	-.20	.13	.26	.00	**.54**	.01
Thrift vs Extravagance	.18	.22	.21	-.12	.13	***.24***
Eigen value	10.64	5.55	4.93	4.31	3.13	2.15
% Variance explained	18.35	9.57	8.51	7.44	5.39	3.71

Orientation and Aesthetics. The Openness to Experience facet of Actions does not load at the .40 cut-off on any of the factors but it has its strongest loading of .36 on this factor.

All of the NEO-PI-R Extraversion facets load positively with moderate to high loadings on Factor 4. Factor 4 is also characterised by a high positive loading on the CPAI-2 Social Potency subscale of Extraversion versus Introversion, a small positive loading on the CPAI-2 Social subscale of Leadership and a small negative loading on the CPAI-2 Accommodation subscale of Self versus Social Orientation. The CPAI-2 Interpersonal Relatedness subscale of Social Sensitivity does not load at the cut-off of .40 on any of the six factors but is equally cross-loaded at .37 on Factors 4 and 5.

The fifth factor is characterised by moderate to high positive loadings on all of the NEO-PI-R Agreeableness facets as well as a small to moderate loading on the Angry Hostility facet from the Neuroticism domain. The CPAI-2 Accommodation subscale of Veraciousness versus Slickness and the CPAI-2 Interpersonal Relatedness subscale of Harmony have moderate to high positive loadings on this factor. The CPAI-2 Accommodation subscale of Graciousness versus Meanness has a small, secondary, positive loading on this factor. As indicated earlier, the CPAI-2 Dependability subscale of Family Orientation and the Interpersonal Relatedness subscale of Social Sensitivity are cross-loaded on Factor 5.

Factor 6 is characterised by small to moderate negative loadings on the NEO-PI-R Openness to Experience Values facet, the CPAI-2 Dependability subscale of Internal versus External Locus of Control, and the CPAI-2 Accommodation facets of Graciousness versus Meanness, Interpersonal Tolerance and Veraciousness versus Slickness. Small to moderate

positive loadings are found for the Dependability subscales of Inferiority versus Self-Acceptance and Face, the Accommodation subscale of Defensiveness, and the Interpersonal Relatedness subscales of Traditionalism versus Modernity and Discipline. The CPAI-2 Interpersonal Relatedness subscales of Relationship Orientation and Thrift versus Extravagance do not load at the .40 cut-off on any of the factors but load positively on this factor. Relationship Orientation loads at .39 but Thrift versus Extravagance loads at .24.

6.7.3.3. NEO-PI-R & CPAI-2: Five factor solution

Table 6.15 presents the results for the five factor solution. From Table 6.15 it is evident that all of the NEO-PI-R Neuroticism facets, with the exception of Impulsiveness, load positively with moderate to high loadings on Factor 1. Impulsiveness loads positively on Factor 1 with a loading of .30 but has its highest loading of -.34 on Factor 2. The CPAI-2 Dependability subscales of Emotionality and Inferiority versus Self-Acceptance load with moderate to high positive loadings on Factor 1. Small to moderate positive loadings are found for the Dependability subscale of Face, and the Accommodation subscale of Defensiveness. Moderate to high negative loadings are found for the CPAI-2 Social Potency subscale of Enterprise and the Dependability subscale of Optimism versus Pessimism, while small to moderate negative loadings are found for the Dependability subscale of Internal versus External Locus of Control and the Accommodation subscale of Graciousness versus Meanness. The CPAI-2 Interpersonal Relatedness subscale Relationship Orientation does not load at the .40 cut-off on any of the factors but loads at .36 on Factor 1. The Dependability subscale of Family Orientation does not load at the .40 cut-off on any of the factors but is cross-loaded on Factor 1 with a negative loading of -.32 and Factor 5 with a positive loading of .32. The finding is similar with the Interpersonal Relatedness subscale Thrift versus Extravagance, which does not load at the .40 cut-off on any of the factors but is cross-loaded at .29 on Factors 1 and 2.

All the NEO-PI-R Conscientiousness scales load with moderate to high positive loadings on Factor 2, together with moderate to high positive loadings from the CPAI-2 Dependability subscales of Responsibility and Meticulousness and the Interpersonal Relatedness subscale of Discipline. A small positive loading on the CPAI-2 Dependability subscale of Practical Mindedness is also found.

Factor 3 is characterised by moderate to high positive loadings on the NEO-PI-R Openness to Experience facets of Aesthetics, Feelings, Ideas and Values as well as the CPAI-2 Social Potency subscales of Diversity, Divergent Thinking and Aesthetics. Small to moderate

Table 6.15: Five factor solution using varimax rotation for the joint factor analysis of the NEO-PI-R and the CPAI-2

Scale	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Neuroticism					
Anxiety	**.72**	-.02	.11	-.17	-.00
Angry Hostility	**.50**	-.01	.04	-.14	**-.46**
Depression	**.78**	-.17	.07	-.18	.06
Self-Consciousness	**.75**	.01	-.03	-.20	.11
Impulsiveness	.30	-.34	.08	.13	-.12
Vulnerability	**.69**	-.34	-.12	-.03	.09
Extraversion					
Warmth	-.00	-.04	.21	**.74**	.30
Gregariousness	-.10	-.19	.02	**.77**	-.06
Assertiveness	-.35	.28	.09	**.44**	**-.41**
Activity	-.14	.32	.24	**.47**	-.22
Excitement-Seeking	.04	-.23	.15	**.53**	-.28
Positive Emotions	-.17	.02	.25	**.65**	.11
Openness to Experience					
Fantasy	.17	-.23	**.48**	.10	.07
Aesthetics	.17	.12	**.72**	.13	.15
Feelings	.21	.08	**.59**	.19	.01
Actions	-.35	-.04	***.39***	.27	.07
Ideas	-.13	.19	**.65**	.06	-.05
Values	-.11	-.12	**.55**	.03	.05
Agreeableness					
Trust	-.24	-.08	.05	**.41**	**.51**
Straightforwardness	-.06	.16	-.04	.03	**.66**
Altruism	.17	.22	.10	.43	**.53**
Compliance	.06	.03	-.06	-.09	**.69**
Modesty	.28	-.06	.08	-.10	**.65**
Tender-Mindedness	.17	.12	.06	.30	**.48**
Conscientiousness					
Competence	-.25	**.67**	.18	.20	-.13
Order	.02	**.71**	-.08	-.08	.03
Dutifulness	-.08	**.67**	.14	.07	.23
Achievement Striving	-.09	**.75**	.18	.15	-.13
Self-Discipline	-.26	**.71**	.07	.10	-.00
Deliberation	-.00	**.64**	-.11	-.18	.19
Social Potency					
Novelty	-.37	.13	**.45**	**.41**	-.16
Diversity	-.26	.09	**.57**	.25	.13
Divergent Thinking	-.14	.21	**.69**	.20	-.03
Leadership	-.33	.24	.27	**.43**	**-.40**
Logical vs Affective Orientation	-.23	.38	**.47**	-.01	-.04
Aesthetics	.03	.03	**.68**	.10	.05
Extraversion vs Introversion	-.22	-.11	.19	**.72**	-.05
Enterprise	**-.72**	.14	.24	.29	-.19
Dependability					
Responsibility	-.16	**.73**	.09	-.04	.06
Emotionality	**.66**	-.17	.16	-.06	-.25
Inferiority vs Self-Acceptance	**.76**	-.24	-.20	-.06	.09
Practical Mindedness	-.31	**.43**	.00	-.05	.29
Optimism vs Pessimism	**-.73**	.17	.06	.25	.04
Meticulousness	.02	**.65**	-.05	-.21	.11

Face	**.56**	.06	-.24	.14	-.12
Internal vs External LOC	**-.48**	.05	.35	-.14	-.03
Family Orientation	-.32	.16	-.08	-.07	.32
Accommodation					
Defensiveness	**.44**	.10	-.33	.12	-.35
Graciousness vs Meanness	**-.56**	-.08	.17	.05	**.47**
Interpersonal Tolerance	-.39	-.04	**.43**	.14	.37
Self vs Social Orientation	.08	.22	.23	***-.38***	-.19
Veraciousness vs Slickness	-.09	.04	.13	-.13	**.68**
Interpersonal Relatedness					
Traditionalism vs Modernity	.17	.28	**-.59**	.07	.04
Relationship Orientation	***.36***	.09	-.09	.27	.17
Social Sensitivity	.05	.15	.31	**.43**	.31
Discipline	.34	**.58**	-.31	.01	.01
Harmony	-.12	.21	.20	.12	**.51**
Thrift vs Extravagance	***.29***	***.29***	.10	-.05	.09
Eigen value	10.64	5.55	4.93	4.31	3.13
% Variance explained	18.35	9.57	8.51	7.44	5.39

positive loadings are found for the NEO-PI-R subscale of Fantasy, the CPAI-2 Social Potency subscales of Novelty and Logical versus Affective Orientation, and the Accommodation subscale of Interpersonal Tolerance. The CPAI-2 Interpersonal Relatedness subscale of Traditionalism versus Modernity has a moderate negative loading on this factor. While all of the Openness facets load above .40, the Actions facet loads at .39 and does not load above .40 on any of the factors.

Moderate to high positive loadings are found on Factor 4 for the NEO-PI-R Extraversion facets of Warmth, Gregariousness, Excitement-Seeking and Positive Emotions as well as on the CPAI-2 Social Potency subscale of Extraversion versus Introversion. Small to moderate positive loadings are found on the NEO-PI-R Extraversion facets of Assertiveness and Activity as well as on the CPAI-2 Social Potency subscale of Leadership and the Interpersonal Relatedness subscale of Social Sensitivity. The NEO-PI-R Agreeableness subscale of Trust and the CPAI-2 Social Potency subscale of Novelty both have secondary positive loadings of .41 on Factor 4. Self versus Social Orientation on the CPAI-2 Accommodation factor does not load at the .40 cut-off on any of the five factors but it has its highest loading of -.38 on this factor.

Factor 5 is characterised by small to moderate positive loadings on all the NEO-PI-R Agreeableness scales, as well as moderate to high positive loadings on the CPAI-2 Accommodation subscales of Graciousness versus Meanness and Veraciousness versus Slickness, and the Interpersonal Relatedness subscale of Harmony. Angry Hostility (NEO-PI-R, Neuroticism), Assertiveness (NEO-PI-R, Extraversion) and Leadership (CPAI-2, Social Potency) have small, negative, secondary loadings on Factor 5.

6.8. BIAS AND THE NEO-PI-R AND THE CPAI-2

Results for the bias analyses are presented as set out in the aims and research questions, where results for construct bias are presented first, followed by method bias and lastly item bias. Evidence for bias is examined across three variables, namely gender, population group and home language for both instruments. The rationale for this decision is discussed in Chapter 4.

6.8.1. Construct bias

Construct bias as discussed in Chapter 4 was examined at the scale level for the two instruments using ANOVAs, internal consistency reliability coefficients and factor analyses with Procrustes rotations.

Parametric one-way ANOVAs were used for all comparisons if the conditions of normality and homogeneity of variance were met. In cases where either of the conditions or both of the conditions were not fulfilled, the non-parametric Kruskal-Wallis one-way ANOVA technique was used. Parametric and non-parametric ANOVA results are presented in the same table but non-parametric results are italicised. Mean scores were examined for significant parametric results and mean rank scores for significant non-parametric results. Cohen's *d* was used as a measure of effect size for significant results for the parametric ANOVAs and Cliff's *d* was used to measure effect size for significant results for the non-parametric ANOVAs.

Results for gender are presented first, followed by population group and home language.

6.8.1.1. Gender and the NEO-PI-R

Table 6.16 presents the ANOVA results obtained for gender and the NEO-PI-R domains and scales. All the scales were normally distributed. However, *Agreeableness, Straightforwardness, Tender-Mindedness* and *Achievement Striving* did not meet the homogeneity of variance criterion. Hence non-parametric Kruskal-Wallis ANOVAs were conducted on these scales.

From Table 6.16 it is evident that significant differences occur between gender and Neuroticism, Anxiety, Depression, Self-Consciousness, Vulnerability, Warmth, Positive Emotions, Aesthetics, Feelings, *Agreeableness, Straightforwardness*, Altruism and Modesty at the .01 level of significance. At the .05 level of significance, significant differences are noted between gender and Assertiveness, Ideas, Compliance, *Tender-Mindedness*, Order

Table 6.16: ANOVA results for gender on the NEO-PI-R

Scale	*Df*	*F / X²*	*p*	Mean scores/ranks		Cohen's
				M	F	*d*
Neuroticism	1, 422	16.48	<0.0001**	91.06	100.62	.44
Anxiety	1,423	22.14	<0.0001**	16.18	18.76	.50
Angry Hostility	1,421	0.31	0.5803			
Depression	1,422	7.75	0.0056**	15.67	17.41	.30
Self-Consciousness	1,421	10.04	0.0016**	15.67	17.43	.34
Impulsiveness	1,421	3.18	0.0754			
Vulnerability	1,423	19.50	<0.0001**	11.18	13.43	.47
Extraversion	1.423	0.79	0.3772			
Warmth	1,423	11.16	0.0009**	21.81	23.38	.36
Gregariousness	1.423	0.59	0.4440			
Assertiveness	1,421	4.54	0.0337*	17.61	16.44	.23
Activity	1.423	0.34	0.5619			
Excitement-Seeking	1,422	1.33	0.2496			
Positive Emotions	1,422	7.31	0.0072**	21.35	22.77	.29
Openness to Experience	1,422	2.72	0.10			
Fantasy	1,421	0.10	0.7549			
Aesthetics	1,419	12.94	0.0004**	19.42	21.53	39
Feelings	1,420	9.98	0.0017**	21.86	23.29	.34
Actions	1,422	1.71	0.1916			
Ideas	1.423	4.78	0.0294*	22.53	21.30	.24
Values	1,420	1.79	0.1815			
Agreeableness	*1*	*25.04*	*<0.0001***	*109.116*	*118.41*	*.25*
Trust	1,422	2.89	0.0898			
Straightforwardness	*1.420*	*15.87*	*<0.0001***	*17.82*	*19.72*	*.21*
Altruism	1,423	16.97	<0.0001**	22.0	23.66	.44
Compliance	1,420	4.41	0.0363	15.75	16.8	.23
Modesty	1,422	27.83	<0.0001**	16.58	19.53	.57
Tender-Mindedness	*1*	*5.63*	*0.0182**	*20.67*	*21.59*	*.10*
Conscientiousness	1,423	3.24	0.0724			
Competence	1,422	0.09	0.7628			
Order	1,417	4.58	0.0329*	17.43	18.64	.23
Dutifulness	1,423	1.98	0.1600			
Achievement Striving	*1*	*5.44*	*0.0201**	*18.49*	*19.72*	*.12*
Self-Discipline	1.423	2.16	0.1428			
Deliberation	1,422	0.30	0.5849			

*** p < 0.05**

**** p < 0.01**

and *Achievement Striving*. There are no other statistically significant differences between gender and the scales of the NEO-PI-R.

An examination of mean scores and *mean rank scores* for significant differences indicates that, in this sample, females score higher on Neuroticism, Anxiety, Depression, Self-Consciousness, Vulnerability, Warmth, Positive Emotions, Aesthetics, Feelings, *Agreeableness, Straightforwardness*, Altruism, Compliance, Modesty, *Tender-Mindedness*, Order and *Achievement Striving* and lower on Assertiveness and Ideas.

Moderate effect sizes are found for the Anxiety (d = .50) and Modesty (d = .57) facets, while small to moderate effect sizes in the range of .34 to .47 are found for the Neuroticism domain and the Self-Consciousness, Vulnerability, Warmth, Aesthetics, Feelings and Altruism facets. The domain of *Agreeableness* as well as the remaining facets of Depression, Assertiveness, Positive Emotions, Ideas, *Straightforwardness,* Compliance and Order have small effect sizes in the range of .21 to .30. *Tender-Mindedness* and *Achievement Striving* have effect sizes of .10 and .12 respectively.

Table 6.17 presents the internal consistency reliability coefficients for each scale for each of the gender groupings. From the differences presented, it is evident that the only large difference between male and female reliability coefficients is for the Tender-Mindedness facet of the Agreeableness domain. A .24 difference is found between the coefficients, with the male group having a reliability coefficient of .61 and the female group .37. The remaining domain and facet scales show differences of .09 or less.

As an adjunct to the ANOVAs and reliability analyses, I conducted exploratory factor analyses using varimax rotation on the female group and the male group in the sample. These rotated solutions were then subjected to Procrustes rotation, with the male matrix as the target matrix, to determine the degree of fit between the male and female matrices. Congruence coefficients were also calculated.

Table 6.18 presents the factor analysis results for gender and the NEO-PI-R. It is evident from the varimax rotations that both the male and female matrices load in a pattern congruent with the five factors. Hence the Neuroticism, Extraversion, Openness to Experience, Agreeableness and Conscientiousness domains are represented with the appropriate facets loading on them. Of more immediate interest to this study are the results of the Procrustes rotation. The matrix obtained from the Procrustes rotation indicates that with the male matrix as the target matrix and the female matrix as the second matrix, it is

Table 6.17: Internal consistency reliability coefficients for the NEO-PI-R across gender groupings

NEO-PI-R	α_{MALES}	$\alpha_{FEMALES}$	$\alpha_{MALE - FEMALE}$
Neuroticism	.91	.91	0
Anxiety	.75	.74	0.01
Angry Hostility	.74	.74	0
Depression	.81	.80	0.01
Self-Consciousness	.73	.70	0.03
Impulsiveness	.61	.58	0.03
Vulnerability	.80	.74	0.04
Extraversion	.88	.89	-0.01
Warmth	.74	.74	0
Gregariousness	.68	.77	-0.09
Assertiveness	.73	.76	-0.03
Activity	.57	.61	-0.04
Excitement-Seeking	.63	.71	-.0.08
Positive Emotions	.79	.75	0.04
Openness to Experience	.86	.87	-0.01
Fantasy	.75	.76	-0.01
Aesthetics	.74	.77	-0.03
Feelings	.66	.68	-0.02
Actions	.53	.55	-0.02
Ideas	.77	.80	-0.03
Values	.62	.60	0.02
Agreeableness	.88	.83	0.05
Trust	.79	.81	-0.02
Straightforwardness	.63	.57	0.06
Altruism	.65	.65	0
Compliance	.63	.60	0.03
Modesty	.76	.72	0.04
Tender-Mindedness	.61	.37	0.24
Conscientiousness	.92	.92	0
Competence	.68	.67	0.01
Order	.69	.73	-0.04
Dutifulness	.69	.61	0.08
Achievement Striving	.83	.76	0.07
Self-Discipline	.79	.76	0.03
Deliberation	.69	.78	-0.09

possible to obtain a solution that produces some degree of agreement. This agreement is better assessed with the magnitude of the congruence coefficients as well as their significance at the 5% and 1% levels.

The Agreeableness and Extraversion domains have congruence coefficients of .95, which are significant at the 1% level, and the Conscientiousness and Neuroticism domains have congruence coefficients of .92, while the Openness to Experience domain has a coefficient of .89, all of which are significant at the 5% level of significance. Congruence coefficients of above .95 ($\alpha = .01$) are obtained for the Anxiety, Angry Hostility, Depression, Self-Consciousness, Vulnerability, Warmth, Gregariousness, Activity, Positive Emotions, Aesthetics, Feelings, Ideas, Modesty, Tender-Mindedness, Competence, Order, Achievement Striving, Self-Discipline and Deliberation facets. Congruence coefficients above .89 ($\alpha = .05$) are obtained for the Assertiveness, Fantasy, Straightforwardness, Trust and Compliance facet scales. The Impulsiveness (.82), Excitement-Seeking (.70), Actions (.47), Altruism (.85) and Dutifulness (.85) facets demonstrate nonsignificant congruence coefficients. However, Altruism and Dutifulness have coefficients of .85, which according to Haven and Ten Berge's (1977) criterion of factor replicability should be adequate. The Values facet has a nonsignificant congruence coefficient of .81.

Table 6.18: Factor analysis using Procrustes rotation for gender and the NEO-PI-R

6.8.1.2. Gender and the CPAI-2

Results for gender and the CPAI-2 factors and subscales are presented in Table 6.19. *Diversity* and *Interpersonal Tolerance* are not normally distributed. *Diversity, Divergent Thinking, Optimism versus Pessimism, Defensiveness, Social Sensitivity* and *Harmony* did not meet the homogeneity of variance criterion. Hence Kruskal-Wallis tests were used for these scales.

Significant differences are found for gender and Leadership, Logical versus Affective Orientation, Enterprise, Emotionality, *Optimism versus Pessimism*, Internal versus External Locus of Control, Accommodation, Graciousness versus Meanness, Veraciousness versus Slickness, *Social Sensitivity* and Harmony at the .01 level of significance. Significant differences at the .05 level of significance are found between gender and Social Potency, *Novelty*, Practical Mindedness, Self versus Social Orientation, Interpersonal Relatedness and Thrift versus Extravagance. No other significant differences are found between gender and the CPAI-2 factors and subscales.

An examination of mean scores and *mean rank scores* in Table 6.19 indicates that males score higher than females on Social Potency, *Novelty*, Leadership, Logical versus Affective Orientation, Enterprise, *Optimism versus Pessimism,* Internal versus External Locus of Control and Self versus Social Orientation, and lower than females on Emotionality, Practical Mindedness, Accommodation, Graciousness versus Meanness, Veraciousness versus Slickness, Interpersonal Relatedness, *Social Sensitivity, Harmony* and Thrift versus Extravagance.

Small effect sizes in the range of .21 to .30 are obtained for the differences observed on the Social Potency and Interpersonal Relatedness factors, and on the Novelty, Emotionality, *Optimism versus Pessimism,* Practical Mindedness, Self versus Social Orientation and Thrift versus Extravagance subscales. *Social Sensitivity* (.17) and *Harmony* (.18) also demonstrate small effect sizes. Small to moderate effect sizes in the range of .31 to .43 are found for the differences on the Leadership, Logical versus Affective Orientation, Internal versus External Locus of Control and Graciousness versus Meanness subscales. Moderate effect sizes are found for the Enterprise (d = .52) and the Veraciousness versus Slickness (d = .50) subscales.

Table 6.19: ANOVA results for gender on the CPAI-2

Scale	*Df*	*F/X²*	*p*	Mean score/rank		Cohen's/Cliff's
				M	F	*d*
Social Potency	1,423	3.89	0.0494*	57.10	54.71	.21
Novelty	1,420	5.47	0.0198*	7.76	7.21	.25
Diversity	*1*	*0.3796*	*0.5378*			
Divergent Thinking	*1*	*0.0762*	*0.7825*			
Leadership	1,418	9.96	0.0017**	7.02	6.24	.34
Logical vs Affective Orientation	1,416	15.85	<0.0001**	7.60	6.84	.43
Aesthetics	1,420	0.68	0.4100			
Extraversion vs Introversion	1,420	1.15	0.2834			
Enterprise	1,420	23.11	<0.0001**	6.70	5.47	.52
Dependability	1,423	0.51	0.4755			
Responsibility	1,421	0.08	0.7737			
Emotionality	1,419	8.07	0.0047**	4.12	4.76	.30
Inferiority vs Self-Acceptance	1,417	0.83	0.3627			
Practical Mindedness	1.421	4.43	0.0359*	6.94	7.37	.23
Optimism vs Pessimism	*1*	*15.75*	*<0.0001***	*247.79*	*196.16*	*.24*
Meticulousness	1,421	3.51	0.0615			
Face	1.422	0.04	0.8363			
Internal vs External LOC	1.416	8.93	0.0030**	7.53	6.95	.32
Family Orientation	1,421	0.07	0.7892			
Accommodation	1,423	9.53	0.0022**	28.41	29.79	.33
Defensiveness	*1*	*4.85*	*0.1743*			
Graciousness vs Meanness	1,420	9.95	0.0017**	5.78	6.50	.34
Interpersonal Tolerance	*1*	*1.42*	*0.2335*			
Self vs Social Orientation	1,418	4.39	0.0368*	5.93	5.51	.23
Veraciousness vs Slickness	1.421	21.62	<0.0001**	6.00	7.08	.50
Interpersonal Relatedness	1,423	6.43	0.0116*	39.84	41.84	.27
Traditionalism vs Modernity	1,385	1.28	0.2579			
Relationship Orientation	1,418	0.64	0.4230			
Social Sensitivity	*1*	*7.86*	*0.0051***	*84.28*	*220.32*	.17
Discipline	1,421	0.14	0.7127			
Harmony	*1*	*9.11*	*0.0025***	*181.30*	*220.19*	.18
Thrift vs Extravagance	1.420	4.12	0.0430*	4.93	5.33	.22

*** p < 0.05**

****p < 0.01**

From Table 6.20 it is evident that differences between male and female reliability coefficients of .10 or more are found for the Accommodation factor as well as the Dependability subscale of Practical Mindedness, and the Interpersonal Relatedness subscales of Traditionalism versus Modernity, Social Sensitivity and Thrift versus Extravagance. Higher reliability coefficients are found for males on Practical Mindedness, Social Sensitivity and Thrift versus Extravagance. Males have lower reliability coefficients on the Accommodation factor and the Traditionalism versus Modernity subscale. More generally though reliability coefficients for 8 of the 32 scales are poor for males and females alike, even when small differences between coefficients are noted. Poor reliability coefficients (< .60) are found for the Social Potency subscale of Logical versus Affective Orientation, the Dependability subscales of Practical Mindedness and Internal versus External Locus of Control, the Accommodation subscale of Self versus Social Orientation, and the Interpersonal Relatedness subscales of Relationship Orientation, Social Sensitivity, Harmony and Thrift versus Extravagance.

Factor analysis with Procrustes rotation was used on the varimax rotated solutions of males and females to ascertain the degree of fit between the varimax rotated matrices. The male varimax matrix was used as the target matrix. These results are presented in Table 6.21. Unlike the NEO-PI-R, the varimax solutions for both males and females do not load according to the four factors defined by Cheung et al. (2008). This was ascertained in the section on construct validity as well, where the data of the entire sample were subjected to varimax rotation. Despite this, the rotated factor solutions do provide a useful way in which to assess whether any gender differences exist in this sample based on the degree of fit obtained from the congruence coefficients. Hence, for the CPAI-2 I will not comment on the varimax solutions nor the resultant Procrustes matrix since it has already been established that these will result in problematic solutions for this sample. I will however consider the congruence coefficients since they yield useful information about the gender, population group and language group differences.

Although congruence coefficients were calculated at the factor level, it does not make sense to report on them since they cannot be meaningfully interpreted. The subscales are not loading on the factors in a manner that is congruent with the model specified by Cheung et al. (2008). For example, the Accommodation factor is supposed to have five subscales loading on it. Of the five subscales, only two subscales (Defensiveness and Graciousness versus Meanness) load on the factor as predicted. At best one is able to conclude from Table 6.21

Table 6.20: Internal consistency reliability coefficients for the CPAI-2 across gender

CPAI-2	α_{MALES}	$\alpha_{FEMALES}$	$\alpha_{MALE - FEMALE}$
Social Potency	.91	.90	0.01
Novelty	.72	.71	0.01
Diversity	.65	.59	0.06
Divergent Thinking	.60	.58	0.02
Leadership	.68	.64	0.04
Logical vs Affective Orientation	.39	.41	-0.02
Aesthetics	.65	.70	-0.05
Extraversion vs Introversion	.75	.80	-0.05
Enterprise	.74	.64	0.1
Dependability	.72	.69	0.03
Responsibility	.70	.70	0.00
Emotionality	.70	.70	0.00
Inferiority vs Self-Acceptance	.85	.82	0.03
Practical Mindedness	.44	.32	0.12
Optimism vs Pessimism	.68	.66	0.02
Meticulousness	.70	.64	0.06
Face	.55	.57	-0.02
Internal vs External LOC	.49	.57	-0.08
Family Orientation	.60	.62	-0.02
Accommodation	.63	.78	-0.15
Defensiveness	.75	.66	0.09
Graciousness vs Meanness	.61	.62	-0.01
Interpersonal Tolerance	.71	.76	-0.05
Self vs Social Orientation	.47	.53	-0.06
Veraciousness vs Slickness	.66	.63	0.03
Interpersonal Relatedness	.73	.75	-0.02
Traditionalism vs Modernity	.60	.72	-0.12
Relationship Orientation	.41	.39	0.02
Social Sensitivity	.52	.38	0.14
Discipline	.57	.60	-0.03
Harmony	.56	.54	0.02
Thrift vs Extravagance	.47	.31	0.16

Table 6.21: Factor analysis using Procrustes rotation for gender and the CPAI-2

that a .96 coefficient of agreement is found between the male and female matrices on Factors 1 and 3 and that this is significant at the 1% level of significance. A .92 coefficient of agreement is found between the male and female matrices on Factor 4 and this is significant at the 5% level of significance. A nonsignificant coefficient of agreement of .79 is found for Factor 2.

From Table 6.21 it is also evident that the Novelty, Diversity, Divergent Thinking, Leadership, Extraversion versus Introversion, Enterprise, Responsibility, Inferiority versus Self-Acceptance, Practical Mindedness, Optimism versus Pessimism, Meticulousness, Internal versus External Locus of Control, Defensiveness, Graciousness versus Meanness, Discipline and Harmony subscales all have congruence coefficients exceeding .94, which are significant at the 1% level of significance. The Logical versus Affective Orientation, Emotionality, Family Orientation, Interpersonal Tolerance and Veraciousness versus Slickness subscales have congruence coefficients exceeding .89, which are significant at the .05 level of significance. Nonsignificant congruence coefficients are obtained for Aesthetics (.83), Face (.86), Self versus Social Orientation (-.21), Traditionalism versus Modernity (.62), Relationship Orientation (.85), Social Sensitivity (.65) and Thrift versus Extravagance (.69). However, Face and Relationship Orientation have coefficients of .85, which according to Haven and Ten Berge's (1977) criterion of factor replicability should be adequate.

6.8.1.3. Population group and the NEO-PI-R

Table 6.22 presents the results obtained for population group and the NEO-PI-R scales. All the scales were normally distributed. However, *Neuroticism, Anxiety, Impulsiveness, Positive Emotions, Actions,* and *Values* did not meet the homogeneity of variance criterion. Hence non-parametric Kruskal-Wallis ANOVAs were conducted on these scales.

From Table 6.22 it is evident that significant differences occur between population group and *Impulsiveness,* Activity, Openness to Experience, Fantasy, Feelings, *Values* and Deliberation at the .01 level of significance. Significant differences also occur between gender and *Anxiety,* Warmth, Ideas and Compliance at the .05 level of significance. Trust has a p-value of .0503. Hence I examined the mean differences for the two groups on the Trust facet and calculated the effect size (.19), both of which suggest an insignificant difference. Aside from the scales reported, there were no other significant differences between population group and the NEO-PI-R domain and facet scales.

An examination of mean scores and *mean rank scores* for the significant differences indicates that White individuals score higher on *Anxiety, Impulsiveness,* Warmth, Activity, Openness to Experience, Fantasy, Feelings, Ideas and *Values,* and lower on Compliance, and Deliberation.

Anxiety has an effect size of .12. Effect sizes are in the small range for *Impulsiveness* (.16), Warmth (.22), Ideas (.21), *Values* (.28), Trust (.19), Compliance (.25), Activity (.33) and Deliberation (.31), and in the small to moderate range for Openness to Experience (.43) and Fantasy (.40). The Feelings facet has a moderate effect size of .50.

Table 6.23 presents the internal consistency reliability coefficients obtained for both population groups. It is evident that the White grouping obtained higher reliability coefficients on all scales, with the exception of Deliberation where the non-White grouping was higher but with a difference of only .01 between the two groupings. The Neuroticism facets of Anxiety and Impulsiveness, the Openness facets of Actions and Values and the Agreeableness facet of Tender-Mindedness have differences of between .11 and .17 on the facet scales, with White individuals demonstrating better coefficients. Impulsiveness, Actions and Tender-Mindedness have poor reliability coefficients (> .60 in both cases) for both groupings.

Table 6.22: ANOVA results for population group on the NEO-PI-R

Scale	*df*	*F/X²*	*p*	Mean scores/*ranks*		Cohen's/Cliff's
				W	NW	*d*
Neuroticism	*1*	*3.55*	*0.0595*	*224.83*	*202.30*	*.11*
Anxiety	*1*	*4.45*	*0.0350**	*226.82*	*201.61*	*.12*
Angry Hostility	1,421	2.12	0.1458			
Depression	1,422	1.44	0.2312			
Self-Consciousness	1,421	0.41	0.5227			
Impulsiveness	*1*	*8.78*	*0.0030***	*231.36*	*196.06*	*.16*
Vulnerability	1,423	3.36	0.0673			
Extraversion	1,423	2.60	0.1078			
Warmth	1,423	5.10	0.0244*	23.46	22.49	.22
Gregariousness	1,423	1.74	0.1881			
Assertiveness	1,421	0.82	0.3666			
Activity	1,423	11.65	0.0007**	18.67	17.29	.33
Excitement-Seeking	1,422	2.68	0.1022			
Positive Emotions	*1*	*3.16*	*0.0754*			
Openness to Experience	1,422	19.55	<0.0001**	126.9	119.25	.43
Fantasy	1,421	16.51	<0.0001**	22.16	2.17	.40
Aesthetics	1,419	2.61	0.1068			
Feelings	1,420	26.42	<0.0001**	24.01	21.93	.50
Actions	*1*	*0.03*	*0.9548*			
Ideas	1.423	4.64	0.0312*	22.26	21.16	.21
Values	*1*	*22.04*	*<0.0001***	*241.95*	*186.08*	*.28*
Agreeableness	1,423	0.00	0.9858			
Trust	1,422	3.85	0.0503	17.57	16.58	.19
Straightforwardness	1,420	0.19	0.6617			
Altruism	1,423	1.01	0.3166			
Compliance	1.420	6.36	0.0121*	15.88	17.02	.25
Modesty	1,422	0.15	0.6985			
Tender-Mindedness	1,416	0.11	0.7372			
Conscientiousness	1,423	0.11	0.7368			
Competence	1,422	1,20	0.2732			
Order	1,417	0.36	0.5473			
Dutifulness	1,423	2.94	0.0872			
Achievement Striving	1,423	0.44	0.5056			
Self-Discipline	1,423	0.24	0.6269			
Deliberation	1,422	10.39	0.0014**	16.64	18.14	.31

***p < 0.05**

**** p < 0.01**

Table 6.23: Internal consistency reliability coefficients for the NEO-PI-R across population group

NEO-PI-R	α_{WHITE}	$\alpha_{NON\text{-}WHITE}$	$\alpha_{WHITE - NON\text{-}WHITE}$
Neuroticism	.91	.88	0.03
Anxiety	.75	.63	0.12
Angry Hostility	.74	.71	0.03
Depression	.81	.78	0.03
Self-Consciousness	.72	.69	0.03
Impulsiveness	.59	.44	0.15
Vulnerability	.77	.71	0.06
Extraversion	.89	.87	0.02
Warmth	.75	.68	0.07
Gregariousness	.75	.68	0.07
Assertiveness	.76	.74	0.02
Activity	.60	.59	0.01
Excitement-Seeking	.69	.63	0.06
Positive Emotions	.77	.69	0.07
Openness to Experience	.87	.85	0.02
Fantasy	.76	.68	0.08
Aesthetics	.76	.72	0.04
Feelings	.68	.63	0.05
Actions	.54	.43	0.11
Ideas	.79	.76	0.03
Values	.61	.44	0.17
Agreeableness	.87	.86	0.01
Trust	.80	.76	0.04
Straightforwardness	.60	.57	0.03
Altruism	.66	.62	0.04
Compliance	.61	.60	0.01
Modesty	.75	.75	0
Tender-Mindedness	.50	.35	0.15
Conscientiousness	.92	.91	0.01
Competence	.67	.60	0.07
Order	.72	.71	0.01
Dutifulness	.64	.58	0.06
Achievement Striving	.79	.77	0.02
Self-Discipline	.77	.75	0.02
Deliberation	.75	.76	-0.01

As discussed earlier varimax rotated solutions for both groups, in this case White and Non-White, were used to conduct a Procrustes rotation and calculate congruence coefficients. The White varimax matrix was used as the target matrix. Results are presented in Table 6.24.

From the varimax solutions presented in Table 6.24, it is evident that both the White and Non-White groupings demonstrate loadings that are congruent with the five factors as defined and measured by the NEO-PI-R. However the order of the loadings as well as the percentage of variance explained by the factors on the Factors 2, 3 and 4 differs between the two groupings. In the White group, Factor 2 can be defined as the Neuroticism and explains 12.23% of the variance, Factor 3 can be defined as the Extraversion factor and explains 10.47% of the variance and Factor 4 can be defined as the Agreeableness factor and explains 9.75% of the variance. In the Non-White group, Factor 2 is characterized by loadings on the Agreeableness domain and explains 13.50% of the variance, Factor 3 is characterized by loadings on the Neuroticism domain and explains 12.33% of the variance and Factor 4 is characterized by loadings on the Extraversion domain and explains 8.36% of the variance. In total the varimax solution for the White grouping explains 58.17% of the variance while the varimax solution for the Non-White grouping explains 57.13% of the variance.

The Procrustes solution presented in Table 6.24 indicates that it was possible to obtain a solution that produced some degree of agreement between the White and Non-White groupings. This agreement is better assessed with the magnitude of the congruence coefficients as well as their significance at the 5% and 1% levels. Congruence coefficients exceeding .94, which are significant at the .01 level of significance, are found for Factor 1 (Conscientiousness), Factor 2 (Neuroticism), Factor 3 (Extraversion) and Factor 4 (Agreeableness). A congruence coefficient of .89, significant at the 5% level, is found for Factor 5 (Openness to Experience).

It is also evident from Table 6.24 that the Neuroticism facets of Anxiety, Angry Hostility, Depression and Self-Consciousness, the Extraversion facets of Warmth, Gregariousness, Assertiveness and Positive Emotions, the Openness facet of Aesthetics, the Agreeableness facets of Trust and Altruism, and the Conscientiousness facets of Competence, Order, Dutifulness, Achievement Striving, Self-Discipline and Deliberation all have congruence coefficients exceeding .94 and are significant at the .01 level of significance. The Neuroticism facets of Impulsiveness and Vulnerability, the Extraversion facet of Activity, the

Table 6.24: Factor analysis using Procrustes rotation for population group and the NEO-PI-R

Openness facets of Fantasy, Feelings, Ideas and Values, and the Agreeableness facets of Modesty, Compliance and Tender-Mindedness have congruence coefficients in the range of .88 to .93 and are significant at the .05 level of significance. Non-significant congruence coefficients are obtained for the Excitement-Seeking (.85), Actions (.77) and Straightforwardness (.85) facets. However using the criterion of factor replicability suggested by Haven and Ten Berge (1977), Excitement-Seeking and Straightforwardness have a sufficient degree of agreement.

6.8.1.4. Population group and the CPAI-2

Table 6.25 presents the results obtained for population group and the CPAI-2 factors and subscales. *Diversity* and *Interpersonal Tolerance* are not normally distributed, while *Diversity, Divergent Thinking, Defensiveness* and *Traditionalism versus Modernity* did not meet the homogeneity of variance criterion. Hence Kruskal-Wallis tests were used for these scales.

Significant differences are found between population group and *Divergent Thinking,* Extraversion versus Introversion, Internal versus External Locus of Control, Family Orientation, *Defensiveness,* Veraciousness versus Slickness and *Traditionalism versus Modernity* at the .01 level of significance. Significant differences at the .05 level of significance are found for Social Potency, Aesthetics, Emotionality, Practical Mindedness, Graciousness versus Meanness, *Interpersonal Tolerance* and Social Sensitivity. No other significant differences are found for the CPAI-2 factors and subscales.

The mean scores and *mean rank scores* presented in Table 6.25 indicate that White individuals score higher than non-White individuals on Social Potency, *Divergent Thinking,* Aesthetics, Extraversion versus Introversion, Emotionality, Internal versus External Locus of Control, Family Orientation, Graciousness versus Meanness, *Interpersonal Tolerance,* Veraciousness versus Slickness and Social Sensitivity. White individuals score lower than Black individuals on Practical Mindedness, *Defensiveness and Traditionalism versus Modernity.*

An examination of effect sizes for significant mean score difference reveals that Social Potency (*d* = .24), *Divergent Thinking (d* = .16), Logical versus Affective Orientation (*d* = .24), Extraversion versus Introversion (*d* = .27), Emotionality (*d* = .21), Practical Mindedness (*d* = .21), *Defensiveness* (*d* = .16), Graciousness versus Meanness (*d* = .22), Social Sensitivity (*d* = .23) and *Traditionalism versus Modernity* (*d* = .26) have effect sizes in the small range while Family Orientation (*d* = .30) and Veraciousness versus Slickness (*d* = .29)

Table 6.25: ANOVA results for population group on the CPAI-2

Scale	*Df*	*F/X²*	*P*	Mean score/*ranks*		Cohen's/Cliff's
				W	NW	*d*
Social Potency	1,423	6.30	0.0125*	56.91	54.15	.24
Novelty	1,420	0.80	0.3712			
Diversity	*1*	*0.54*	*0.4646*			
Divergent Thinking	*1*	*9.23*	*0.0024***	*231.18*	*195.53*	*.16*
Leadership	1,418	2.90	0.0892			
Logical vs Affective Orientation	1,416	1.07	0.3023			
Aesthetics	1,420	5.83	0.0162*	6.43	5.87	.24
Extraversion vs Introversion	1,420	7.29	0.0072**	6.95	6.24	.27
Enterprise	1,420	3.29	0.0704			
Dependability	1,423	0.64	0.4240			
Responsibility	1,421	0.01	0.9065			
Emotionality	1,419	4.53	0.0339*	4.82	4.38	.21
Inferiority vs Self-Acceptance	1,417	3.35	0.0681			
Practical Mindedness	1,421	4.53	0.0338*	7.03	7.43	.21
Optimism vs Pessimism	1,419	0.67	0.4127			
Meticulousness	1,421	0.57	0.4499			
Face	1,422	0.14	0.7108			
Internal vs External LOC	1,416	29.97	<0.0001**	7.63	6.69	.54
Family Orientation	1,421	9.28	0.0025**	5.51	4.86	.30
Accommodation	1,423	3.42	0.0652			
Defensiveness	*1*	*9.31*	*0.0023***	*190.98*	*226.78*	*.16*
Graciousness vs Meanness	1,420	5.21	0.0229*	6.55	6.08	.22
Interpersonal Tolerance	*1*	*3.91*	*0.0478**	*225.04*	*202.22*	*.10*
Self vs Social Orientation	1,418	0.06	0.8078			
Veraciousness vs Slickness	1,421	8.83	0.0031**	7.12	6.48	.29
Interpersonal Relatedness	1,423	2.96	0.0858			
Traditionalism vs Modernity	*1*	*34.78*	*<0.0001***	*157.88*	*224.76*	*.26*
Relationship Orientation	1,418	3.27	0.0713			
Social Sensitivity	1,417	5.69	0.0175*	8.52	8.13	.23
Discipline	1,421	0.02	0.9003			
Harmony	1,415	0.47	0.4956			
Thrift vs Extravagance	1,420	0.15	0.4772			

*** p < 0.05**

**** p < 0.01**

have effect sizes in the small to moderate range. The only large effect size is observed for Internal versus External Locus of Control (*d* = .54). An effect size of .10 is found for the Interpersonal Tolerance subscale.

Table 6.26 presents the results obtained for the internal consistency reliability analyses for each of the two groupings. Differences exceeding .11 are found for the Social Potency subscale of Diversity, and the Accommodation subscales of Graciousness versus Meanness and Self versus Social Orientation. The White grouping obtain better reliability coefficients on the Graciousness versus Meanness and Self versus Social Orientation subscales but have a poorer coefficient on the Diversity scale. Even when differences are not so substantial, there are certain scales where both groups exhibit poor reliability coefficients (> .60 in both cases). These are: the Social Potency subscale of Logical versus Affective Orientation, the Dependability subscales of Practical Mindedness and Internal versus External Locus of Control, the Accommodation subscale of Self versus Social Orientation, and the Interpersonal Relatedness subscales of Relationship Orientation, Social Sensitivity, Harmony and Thrift versus Extravagance.

Table 6.27 presents the results obtained from the Procrustes rotation conducted on the varimax solutions of the White and non-White groupings, using the White grouping as the target matrix. As discussed in the previous section the varimax rotated solutions in themselves do not provide accessible results but they were used to conduct a Procrustes rotation on which congruence coefficients could be calculated. It is the congruence coefficients that will provide the answers to the question of whether any systematic difference xists between the White and non-White groupings on the CPAI-2.

From Table 6.27 it is evident that Factors 1, 2, and 4 have congruence coefficients exceeding .95, which are significant at the .01 level of significance, while Factor 3 has a congruence coefficient of .92, which is significant at the .05 level of significance. The subscales of Novelty, Diversity, Divergent Thinking, Leadership, Logical versus Affective Orientation, Enterprise, Responsibility, Emotionality, Inferiority versus Self-Acceptance, Practical Mindedness, Optimism versus Pessimism, Meticulousness, Graciousness versus Meanness, Interpersonal Tolerance, Traditionalism versus Modernity, Discipline, Harmony and Thrift versus Extravagance all have congruence coefficients exceeding .94, which are significant at the 1% level. The subscales of Aesthetics, Extraversion versus Introversion, Face, Defensiveness, Internal versus External Locus of Control, Self versus Social Orientation, Veraciousness versus Slickness, Relationship Orientation and Social Sensitivity have congruence coefficients in the range of .88 and .93, which are significant at the 5%

level of significance. A nonsignificant congruence coefficient is found for the Family Orientation (.81) subscale.

Table 6.26: Internal consistency reliability coefficients for the CPAI-2 across population group

CPAI-2	α_{WHITE}	$\alpha_{NON\text{-}WHITE}$	$\alpha_{WHITE - NON\text{-}WHITE}$
Social Potency	.89	.9	-.01
Novelty	.7	.73	-.03
Diversity	.53	.66	-.13
Divergent Thinking	.61	.55	.06
Leadership	.66	.66	.0
Logical vs Affective Orientation	.42	.42	.0
Aesthetics	.67	.7	-.03
Extraversion vs Introversion	.82	.76	.06
Enterprise	.7	.66	.04
Dependability	.7	.70	.0
Responsibility	.67	.72	-.05
Emotionality	.67	.72	-.05
Inferiority vs Self-Acceptance	.84	.82	.02
Practical Mindedness	.37	.37	.0
Optimism vs Pessimism	.71	.64	.07
Meticulousness	.7	.63	.07
Face	.53	.60	-.07
Internal vs External LOC	.47	.56	-.09
Family Orientation	.62	.59	.03
Accommodation	.72	.76	-.04
Defensiveness	.65	.71	-.06
Graciousness vs Meanness	.68	.56	.12
Interpersonal Tolerance	.70	.76	-.06
Self vs Social Orientation	.59	.45	.14
Veraciousness vs Slickness	.66	.65	.01
Interpersonal Relatedness	.71	.77	-.06
Traditionalism vs Modernity	.66	.67	-.01
Relationship Orientation	.38	.41	-.03
Social Sensitivity	.45	.44	.01
Discipline	.64	.56	.08
Harmony	.58	.55	.03
Thrift vs Extravagance	.42	.32	.10

Table 6.27: Factor analysis using Procrustes rotation for population group and the CPAI-2

6.8.1.5. Home language and the NEO-PI-R

Table 6.28 presents the ANOVA results obtained for home language and the NEO-PI-R domains and scales. All the scales were normally distributed. However, *Anxiety, Impulsiveness, Positive Emotions, Feelings,* and *Values* did not meet the homogeneity of variance criterion. Hence non-parametric Kruskal-Wallis ANOVAs were conducted on these scales.

From Table 6.28 it is evident that significant differences occur between home language and Activity, Openness to Experience, *Feelings, Values,* Compliance, Tender-Mindedness and Deliberation at the .01 level of significance. Significant differences are found between home language and *Anxiety, Impulsiveness* and Fantasy at the 5% level of significance. There are no other statistically significant differences between home language and the NEO-PI-R domain and facet scales.

From the mean scores and the *mean rank scores* presented in Table 6.28 it is evident that English first language speakers score higher than second language speakers on *Anxiety, Impulsiveness,* Activity*,* Openness to Experience*,* Fantasy*, Feelings and Values,* and lower on Compliance*,* Tender-Mindedness and Deliberation.

Effect sizes for *Anxiety (*Cliff's *d = .12)* and *Impulsiveness (*Cliff's *d = .14)* are below the cut-off for qualifying as small effect sizes. Small effect sizes were calculated for Fantasy (*d* = .23), *Feelings (*Cliff's *d = .32), Values (*Cliff's *d = .24),* Activity (*d* = .30) and Tender-Mindedness (*d* = .31), and small to moderate effect sizes were calculated for Openness to Experience (*d* = .35), Compliance (*d* = .35) and Deliberation (*d* = .38).

It is evident from Table 6.29 that English first language speakers demonstrate higher internal consistency reliability coefficients on all the scales, with 15 of the 35 scales on the NEO-PI-R demonstrating differences exceeding .10. The biggest differences are found on the Anxiety facet (Neuroticism domain, .22) and the Values facet (Openness to Experience domain, .29). Differences between .11 and .19 are found on the Neuroticism facets of Depression, Impulsiveness and Vulnerability, the Extraversion facets of Warmth, Excitement-Seeking and Positive Emotions, the Openness to Experience facet of Actions, the Agreeableness facets of Straightforwardness, Altruism, Modesty and Tender-Mindedness, and the Conscientiousness facets of Competence and Self-Discipline. The Actions and Tender-Mindedness facets demonstrate poor reliability coefficients (> .60 for both cases) across both groupings.

Table 6.28: ANOVA results for home language on the NEO-PI-R

Scale	*df*	*F/X²*	*P*	Mean scores/*ranks*		Cohen's/Cliff's *d*
				E_1	E_2	
Neuroticism	*1*	*2.59*	*0.1074*			
Anxiety	*1*	*4.25*	*0.0392**	*218.35*	*199.84*	*.12*
Angry Hostility	1,421	0.13	0.7136			
Depression	*1*	*2.10*	*0.1475*			
Self-Consciousness	1,421	0.03	0.8524			
Impulsiveness	*1*	*5.08*	*0.0242**	*221.01*	*192.15*	*.14*
Vulnerability	1,423	2.83	0.0932			
Extraversion	*1*	*0.61*	*0.4335*			
Warmth	*1*	*1.25*	*0.2628*			
Gregariousness	1.423	0.00	0.9745			
Assertiveness	1,421	0.53	0.4679			
Activity	1.423	8.30	0.0042**	18.31	17.05	.30
Excitement-Seeking	1,422	1.55	0.2146			
Positive Emotions	*1*	*0.14*	*0.7040*			
Openness to Experience	1,422	10.99	0.0010**	124.66	118.44	.35
Fantasy	1,421	4.96	0.0265*	21.45	20.26	.23
Aesthetics	1,419	0.29	0.5881			
Feelings	*1*	*24.30*	*<.0001***	*231.09*	*167.99*	*.32*
Actions	1,422	0.63	0.4261			
Ideas	1.423	2.24	0.1349			
Values	*1*	*14.21*	*0.0002***	*226.57*	*178.40*	*.24*
Agreeableness	1,423	0.41	0.5224			
Trust	1,422	0.03	0.8519			
Straightforwardness	1.420	0.31	0.5797			
Altruism	1,423	0.59	0.4418			
Compliance	1,420	11.02	0.0010**	16	17.60	.35
Modesty	1,422	2.72	0.0996			
Tender-Mindedness	1,416	8.55	0.0037**	20.99	22.09	.31
Conscientiousness	1,423	1.60	0.2063			
Competence	1,422	0.22	0.6412			
Order	1,417	1.59	0.2074			
Dutifulness	1,423	0.91	0.3403			
Achievement Striving	1,423	0.00	0.9797			
Self-Discipline	1.423	0.92	0.3392			
Deliberation	1,422	12.94	0.0004**	16.9	18.69	.38

***p < 0.05**

****p < 0.01**

Table 6.29: Internal consistency reliability coefficients for the NEO-PI-R across home language

NEO-PI-R	α_{E1}	α_{E2}	$\alpha_{E1 - E2}$
Neuroticism	.92	.87	.05
Anxiety	.79	.57	.22
Angry Hostility	.76	.68	.08
Depression	.84	.73	.11
Self-Consciousness	.73	.67	.06
Impulsiveness	.64	.45	.19
Vulnerability	.80	.68	.12
Extraversion	.90	.85	.05
Warmth	.79	.60	.19
Gregariousness	.77	.71	.06
Assertiveness	.77	.73	.04
Activity	.61	.56	.05
Excitement-Seeking	.72	.60	.12
Positive Emotions	.80	.64	.16
Openness to Experience	.87	.86	-.01
Fantasy	.78	.70	.08
Aesthetics	.78	.70	.08
Feelings	.67	.69	-.02
Actions	.58	.45	.13
Ideas	.81	.75	.06
Values	.67	.38	.29
Agreeableness	.88	.84	.04
Trust	.82	.77	.05
Straightforwardness	.65	.48	.17
Altruism	.71	.57	.14
Compliance	.61	.59	.02
Modesty	.78	.67	.11
Tender-Mindedness	.54	.38	.16
Conscientiousness	.92	.90	.02
Competence	.71	.58	.12
Order	.75	.66	.09
Dutifulness	.66	.59	.07
Achievement Striving	.80	.77	.03
Self-Discipline	.80	.69	.11
Deliberation	.77	.71	.05

Table 6.30 presents the results obtained from the Procrustes rotation conducted on the varimax solutions with the English first language group (E_1) as the target group. From the varimax solutions it is evident that for both groups the factors load in a manner congruent

with the five factors as specified by Costa and McCrae (1992, 2008). However the order of the factors and the percentage of variance explained by them differs.

For the English first language group, Factor 1 may be described as the Conscientiousness factor and explains 19.01% of the variance. Factor 2 has loadings on the Neuroticism factor and explains 12.83% of the variance. Factor 3 has loadings from the Extraversion facets and explains 11.23% of the variance. Factor 4 may be described as the Agreeableness factor and explains 9.19% of the variance, and Factor 5 has loadings from the Openness to Experience facets and explains 6.18% of the variance in the model for English first language speakers.

In contrast, English second language speakers have Conscientiousness facets loading on Factor 1, with Factor 1 contributing 15.54% of the variance explained. Factor 2 is characterised by loadings on the Agreeableness facet and explains 13.66% of the variance. Factor 3 has loadings from the Neuroticism facets and explains 11.45% of the variance. Factor 4 may be described as the Openness to Experience factor and explains 8.48% of the variance, and Factor 5 has loadings from the Extraversion facets and explains 5.78% of the variance in the model for English second language speakers. In total, 58.44% of variance in the model is explained for English first language speakers, while 54.90% of variance in the model is explained for English second language speakers.

It is also evident from Table 6.30 that congruence coefficients exceeding .95 ($\alpha = .01$) are found for Factor 1 (Conscientiousness), Factor 2 (Neuroticism), Factor 3 (Extraversion) and Factor 4 (Agreeableness). Factor 5 (Openness to Experience) has a nonsignificant congruence coefficient of .88.

For the facet scales, significant congruence coefficients ($\alpha = .01$) exceeding .94 are found for Anxiety, Angry Hostility, Depression, Self-Consciousness, Impulsiveness, Vulnerability, Warmth, Gregariousness, Excitement-Seeking, Positive Emotions, Aesthetics, Feelings, Ideas, Trust, Altruism, Compliance, Competence, Order, Dutifulness, Achievement Striving, Self-Discipline and Deliberation. Congruence coefficients are found as follows: .93 ($\alpha = .05$) for Actions and Modesty,.92 ($\alpha = .05$) for Assertiveness and Tender-Mindedness and .90 for Fantasy. Nonsignificant congruence coefficients are found for Activity (.85), Values (.85) and Straightforwardness (.86). However these have a sufficient degree of agreement by Haven and Ten Berge's (1977) criterion of factor replicability.

Table 6.30: Factor analysis using Procrustes rotation for home language and the NEO-PI-R

6.8.1.6. Home language and the CPAI-2

The ANOVA results obtained for home language and the CPAI-2 factors and subscales are presented in Table 6.31. *Diversity* and *Interpersonal Tolerance* were not normally distributed. *Optimism versus Pessimism,* and *Interpersonal Tolerance* did not meet the homogeneity of variance criterion. Hence non-parametric Kruskal-Wallis ANOVAs were conducted on these scales.

From Table 6.31 it is evident that significant differences are found between Emotionality, Defensiveness and Traditionalism versus Modernity at the 1% level of significance. Significant differences at the 5% level of significance are also found between home language and Aesthetics, Responsibility, Practical Mindedness, Internal versus External Locus of Control, Accommodation and Veraciousness versus Slickness. Two subscales, namely, *Interpersonal Tolerance* and Self versus Social Orientation, have p-values on the .05 cut-off point. Hence the *mean rank score* and the mean score respectively were examined for these facets and an effect size was calculated for Self versus Social Orientation. No other significant differences were found between home language and the CPAI-2 factors and subscales.

It is evident from the mean scores of the significant differences as presented in Table 6.31 that English first language speakers score higher than English second language speakers on Aesthetics, Emotionality, Internal versus External locus of Control, Accommodation, *Interpersonal Tolerance*, Self versus Social Orientation and Veraciousness versus Slickness. English first language speakers score lower than English second language speakers on Responsibility, Practical Mindedness, Defensiveness and Traditionalism versus Modernity.

However an examination of effect sizes indicates that *Interpersonal Tolerance* has an effect size of .11. For most other differences the effect sizes are small, as follows: Aesthetics .22, Responsibility .21, Internal versus External Locus of Control .22, Accommodation .24, Self versus Social Orientation .20 and Veraciousness versus Slickness .24. Small to moderate effect sizes are found for Emotionality (d = .34), Practical Mindedness (d = .39) and Defensiveness (d = .36). Traditionalism versus Modernity has an effect size of .49, which falls on the border of moderate effect sizes (.50).

Table 6.32 presents the internal consistency reliability coefficients for the English first language grouping and the English second language grouping on the CPAI-2 scales. Differences of .11, .20 and .14 are found between the two groupings on the Dependability subscale of Optimism versus Pessimism, the Accommodation subscale of Veraciousness

Table 6.31: ANOVA results for home language on the CPAI-2

Scale	*df*	*F* / X^2	*P*	Mean scores/*ranks*		Cohen's/Cliff's
				E_1	E_2	*d*
Social Potency	1,423	1.27	0.2600			
Novelty	1,420	0.01	0.9159			
Diversity	*1*	*2.53*	*0.1117*			
Divergent Thinking	*1*	*2.85*	*0.0934*			
Leadership	1,418	0.22	0.6392			
Logical vs Affective Orientation	1,416	0.00	0.9539			
Aesthetics	1,420	4.51	0.0342*	6.29	5.77	.22
Extraversion vs Introversion	1,420	2.82	0.0939			
Enterprise	1,420	0.87	0.3515			
Dependability	1,423	0.06	0.8007			
Responsibility	1,421	4.01	0.0458*	5	5.5	.21
Emotionality	1,419	10.59	0.0012**	4.8	4.08	.34
Inferiority vs Self-Acceptance	1,417	1.03	0.3117			
Practical Mindedness	1.421	4.62	0.0322*	7.11	7.54	.39
Optimism vs Pessimism	*1*	*2.21*	*0.1371*			
Meticulousness	1,421	2.92	0.0880			
Face	1.422	0.28	0.5979			
Internal vs External LOC	1.416	4.21	0.0409*	7.24	6.85	.22
Family Orientation	1,421	0.07	0.7953			
Accommodation	1,423	5.09	0.0245*	29.70	28.72	.24
Defensiveness	1,418	11.40	0.0008**	2.22	2.96	.36
Graciousness vs Meanness	1,420	2.08	0.1504			
Interpersonal Tolerance	*1*	*3.56*	*0.0591*	*219.86*	*196.57*	*.11*
Self vs Social Orientation	1,418	3.65	0.0567	5.75	5.37	.20
Veraciousness vs Slickness	1.421	5.34	0.0214*	6.94	6.41	.24
Interpersonal Relatedness	1,423	3.52	0.0615			
Traditionalism vs Modernity	1,385	19.70	<0.0001**	4.53	5.84	.49
Relationship Orientation	1,410	1.34	0.2483			
Social Sensitivity	1,417	0.00	0.9472			
Discipline	1,421	0.61	0.4356			
Harmony	1,415	0.01	0.9031			
Thrift vs Extravagance	1.420	1.58	0.2100			

***p < 0.05**

**** p < 0.01**

versus Slickness and the Interpersonal Relatedness subscale of Thrift versus Extravagance. with the English first language grouping obtaining higher coefficients in all three cases. As with the gender and population groups, it is interesting to note that 8 of the 32 scales of the CPAI-2 demonstrate low reliability coefficients (> .60 in both cases) for both groupings. The groupings do not differ much from each other in terms of the reliability coefficients but both groups demonstrate low coefficients. This is evident for the Social Potency subscale of Logical versus Affective Orientation, the Dependability subscales of Practical Mindedness and Internal versus External Locus of Control, the Accommodation subscale of Self versus Social Orientation and the Interpersonal Relatedness subscales of Relationship Orientation, Social Sensitivity, Harmony and Thrift versus Extravagance.

Table 6.33 presents the results of the Procrustes rotation using the varimax rotated solutions for the English first language grouping and the English second language grouping. The English first language grouping was used as the target group. As was indicated in previous sections, reporting on the varimax and Procrustes matrices would not be of value given that the loadings were not congruent with the model proposed by the developers of the CPAI-2 (Cheung et al., 2003; Cheung et al., 2008). The congruence coefficients are of interest though and yield valuable information at the subscale level in particular.

Congruence coefficients of .96 (α = .01) are found for Factors 1 and 2, .89 (α = .05) for Factor 3 and .92 (α = .05) for Factor 4, as evident in Table 6.33. Congruence coefficients exceeding .93, which are significant at the .01 level of significance, are found for the Novelty, Diversity, Divergent Thinking, Leadership, Logical versus Affective Orientation, Extraversion versus Introversion, Enterprise, Inferiority versus Self-Acceptance, Practical Mindedness, Optimism versus Pessimism, Family Orientation, Defensiveness, Graciousness versus Meanness, Interpersonal Tolerance, Veraciousness versus Slickness, Social Sensitivity, Discipline and Harmony subscales. Congruence coefficients between .88 and .93, which are significant at the .05 level of significance, are found for the Emotionality, Responsibility, Meticulousness, Face, Internal versus External Locus of Control, Self versus Social Orientation and Traditionalism versus Modernity subscales. Nonsignificant congruence coefficients are found for Aesthetics (.77), Relationship Orientation (.85) and Thrift versus Extravagance (.79). However using the criterion of factor replicability suggested by Haven and Ten Berge (1977), Relationship Orientation demonstrates a sufficient degree of agreement.

Table 6.32: Internal consistency reliability coefficients for the CPAI-2 across home language

CPAI-2	α_{E1}	α_{E2}	α_{E1-E2}
Social Potency	.90	.91	-.01
Novelty	.71	.74	-.03
Diversity	.61	.60	.01
Divergent Thinking	.61	.52	.09
Leadership	.66	.67	-.01
Logical vs Affective Orientation	.43	.41	.02
Aesthetics	.69	.68	.01
Extraversion vs Introversion	.79	.76	.03
Enterprise	.71	.62	.09
Dependability	.68	.74	-.06
Responsibility	.71	.64	.07
Emotionality	.71	.64	.07
Inferiority vs Self-Acceptance	.83	.81	.02
Practical Mindedness	.37	.34	.03
Optimism vs Pessimism	.70	.59	.11
Meticulousness	.67	.64	.03
Face	.55	.60	-.05
Internal vs External LOC	.57	.52	.05
Family Orientation	.62	.59	.03
Accommodation	.72	.78	-.06
Defensiveness	.68	.70	-.02
Graciousness vs Meanness	.62	.63	-.01
Interpersonal Tolerance	.71	.77	-.06
Self vs Social Orientation	.53	.50	.03
Veraciousness vs Slickness	.70	.50	.2
Interpersonal Relatedness	.75	.72	.03
Traditionalism vs Modernity	.72	.62	.1
Relationship Orientation	.41	.35	.06
Social Sensitivity	.47	.41	.06
Discipline	.61	.57	.04
Harmony	.58	.52	.06
Thrift vs Extravagance	.40	.26	.14

Table 6.33: Factor analysis using Procrustes rotation for home language and the CPAI-2

TABLE 6.33

6.8.2. Method bias

Not all aspects of method bias could be examined in this study, as discussed in Chapter 4. However it was possible to determine if certain groupings were more likely to endorse extreme responses than others on the NEO-PI-R. This was done by conducting one-way ANOVAs with gender, population group and home language and an extreme response score.[10] These results are presented in Table 6.34.

In the current study there was no significant difference between gender and the endorsement of extreme responses as well as between population group and the endorsement of extreme responses. However, as is evident from Table 6.34, there is a significant difference at the 5% level of significance for home language and the endorsement of extreme responses. The p-value of .0475 though is just within the cut-off point of .05. An examination of mean scores reveals a mean of 50.83 for English first language speakers and a mean of 58.09 for English second language speakers. English second language speakers therefore endorse more extreme responses than English first language speakers. A small effect size of .21 is found for this difference.

Table 6.34: ANOVA results for gender, population group, home language and the extreme responses score of the NEO-PI-R

	df	***F***	***P***		**Cohen's *d***
Gender	1,423	0.13	0.7213		
Population group	1,423	2.64	0.1050		
Language	1,423	3.95	0.0475*	E_1= 50.83 E_2=58.09	.21

*** p < 0.05**

Method bias was examined in the CPAI-2 by examining whether there would be any differences across gender, population group and home language and the Social Desirability scale of the CPAI-2. One-way ANOVAs were conducted for each of the three variables and the Social Desirability score. These results are presented in Table 6.35. It is evident that there is no significant difference for gender or home language on Social Desirability. A significant difference is evident for population group and Social Desirability, with White individuals obtaining a mean score of 5.71 and non-White individuals obtaining a mean score of 5.33. White individuals therefore appear to be responding in a more socially

10 See Chapter 5, Section 5.10.4.1, page 164 for details on extreme score calculation.

desirable fashion than non-White individuals. A small effect size of .22 was calculated for this difference.

Table 6.35: ANOVA results for gender, population group, home language and the Social Desirability scale of the CPAI-2

	df	*F*	*P*	Mean scores	Cohen's *d*
Gender	1,417	0.10	0.7572		
Population group	1,417	4.87	0.0279*	W=5.71 NW=5.33	.22
Language	1,417	1.79	0.1822		

***p < 0.05**

6.8.3. Item bias

Item bias was examined statistically for the NEO-PI-R using one-way ANOVAs, which were conducted for each item for each of the three variables – gender, population group and home language. Item bias was examined statistically for the CPAI-2 using the Chi^2 procedure, which was conducted for each item for each of the three variables – gender, population group and home language. Since the tables containing all the items of the NEO-PI-R and all the items of the CPAI-2 were too long and unwieldy, only the items with significant differences are reported in the tables in this chapter. The complete tables for the NEO-PI-R and the CPAI-2 can be found in Appendices C to H.

Only items with effect sizes in the moderate range ($d \geq .45$) were examined in detail. This was done primarily because differences with smaller effect sizes, although useful, cannot be said to be biased, given the limitations of the sample in terms of both size and composition. Items with smaller effect sizes do suggest the possibility of bias but can only be explored with larger and more diverse samples.

Item bias was also examined for both instruments by asking students to identify items that they did not understand by underlining the item or word. Students were also instructed to identify inappropriate items by crossing them out on the questionnaire. Following each instrument students were asked to substantiate their choice of problematic items with two questions, namely, "If you identified any items or words you did not understand, briefly indicate why they were difficult to understand", and, "If you identified any items as inappropriate, briefly indicate why they were inappropriate". Firstly, questionnaires were examined at the broadest level to determine which students identified problematic items and

which did not. Hence frequencies were determined for both understanding and appropriateness of items, with regard to how many students identified problematic items in terms of understanding and how many did not, as well as how many students identified problematic items in terms of appropriateness and how many did not. These frequencies for understanding and appropriateness were also used in Chi^2 tests, which were conducted to determine whether any associations could be found between gender, population group or home language and the understanding or appropriateness of the items.

Following this, questionnaires were examined in detail for underlined or crossed out items. It became apparent at this stage that a number of students had confused the instruction. Hence the analysis could no longer continue by splitting the understanding and the appropriateness of items. Instead problematic items were identified and frequencies determined for the number of times an item was identified as problematic. The same difficulty was encountered with the responses to the two questions following the instruments. Students had confused and conflated understanding and appropriateness. Hence no separate analysis was conducted for each question. A simple thematic analysis was conducted on the responses to both questions together.

Thus the ANOVA and Chi^2 results for the NEO-PI-R items and CPAI-2 items across gender, population group and home language are presented first. This is followed by the frequencies and Chi^2 results for the understanding and appropriateness of items questions. Following this the items identified as problematic for each instrument are presented. Finally the thematic analysis results are presented for each instrument.

6.8.3.1. Item bias across gender: NEO-PI-R

Table 6.36 presents the results for the gender and item comparisons. A total of 73 of the 240 NEO-PI-R items (30.4%) exhibit significant differences across gender. However only 6 items (2.5%) have effect sizes in the moderate range (> .45). These are items 24, 68, 86, 106, 144 and 193. Items 24 and 144 contribute to the Modesty facet of the Agreeableness domain. Item 24 contains the phrase, “don’t mind bragging about my talents and accomplishments”, while Item 144 requires a response to the statement, “I have a very high opinion of myself”. Males score higher than females on Item 24 and Item 144. Item 68, “watching ballet or modern dance bores me”, occurs on the Aesthetics facet of the Openness to Experience domain and males score higher than females on this item. Item

Table 6.36: Item bias across gender in the NEO-PI-R

Item	Facet	Domain	*df*	*F*	*P*	Mean/*Mean rank* M	F	Cohen's *d*
31	Anxiety	N	1,423	15.93	<0.0001**	1.43	1.92	.43
1	Anxiety	N	1,417	14.18	0.0002**	1.9	1.4	.41
181	Anxiety	N	1,421	13.79	0.0002**	2.19	1.77	.40
61	Anxiety	N	1,420	11.07	0.001**	1.92	1.54	.36
211	Anxiety	N	1,423	3.97	0.0469*	2.53	2.74	.21
161	Depression	N	1,420	10.54	0.0013**	1.24	1.64	.35
41	Depression	N	1,418	7.51	0.0064**	1.74	2.12	.30
191	Depression	N	1,420	5.02	0.0256*	1.93	2.19	.24
221	*Depression*	*N*	*1*	*10.02*	*0.0015***	*183.77*	*223.44*	*.18*
231	Impulsiveness	N	1,422	7.38	0.0069**	2.23	1.92	.29
111	Impulsiveness	N	1,422	3.89	0.0494*	2.83	3.05	.22
106	Self-Consciousness	N	1,423	17.01	<0.0001**	2.2	1.67	.45
16	Self-Consciousness	N	1,415	3.82	0.0513*	2.08	2.33	.22
136	Self-Consciousness	N	1,421	3.77	0.0529*	1.74	1.99	.21
86	Vulnerability	N	1,421	24.66	<0.0001**	1.9	2.54	.54
146	Vulnerability	N	1,423	15.53	<0.0001**	2.03	2.5	.43
116	Vulnerability	N	1,420	4.32	0.0384*	2.76	2.53	.23
206	Vulnerability	N	1,422	4.8	0.029*	2.81	2.63	.23
176	Vulnerability	N	1,421	4.09	0.0439*	2.96	2.78	.22
17	Activity	E	1,419	13.63	0.0003**	2.5	2.09	.39
227	Activity	E	1,423	6.71	0.0099**	2.63	2.36	.34
102	Assertiveness	E	1,422	7.03	0.0083**	1.75	2.07	.29
112	Excitement-Seeking	E	1	9.17	0.0025**	185.32	223.48	.33
172	Excitement-Seeking	E	1,419	5.51	0.0193*	2.72	2.39	.25
187	Gregariousness	E	1,421	7.49	0.0065**	1.35	1.08	.29
27	*Positive Emotions*	*E*	*1*	*7.06*	*0.0079***	*235.99*	*203.75*	*.15*
117	*Positive Emotions*	*E*	*1*	*12.81*	*0.003***	*179*	*221.93*	*.19*
237	*Positive Emotions*	*E*	*1*	*4.81*	*0.0283**	*192.28*	*218.55*	*.12*
92	Warmth	E	1,422	7.48	0.0065**	1.56	1.24	.29
122	Warmth	E	1,423	5.73	0.0171*	2.99	3.19	.25
2	*Warmth*	*E*	*1*	*9.98*	*0.0016***	*184.34*	*223.21*	*.18*
78	Actions	O	1,419	7.83	0.0054**	2.72	2.98	.30
48	Actions	O	1,423	4.77	0.0296*	3.08	3.28	.24
168	Actions	O	1	16.83	<0.0001**	176.48	227.05	.23
68	Aesthetics	O	1,420	49.27	<0.0001**	2.41	1.5	.76
188	Aesthetics	O	1,422	4.31	0.0386*	2.28	2.55	.22
128	*Aesthetics*	*O*	*1*	*6.36*	*0.0117**	*235.04*	*203.39*	*.15*
218	*Aesthetics*	*O*	*1*	*9.81*	*0.0017***	*184.1*	*223.97*	*.18*
193	Feelings	O	1,416	20.14	<0.0001**	2.5	2.91	.49
133	*Feelings*	*O*	*1*	*6.95*	*0.0084***	*190.57*	*222.03*	*.15*
23	Ideas	O	1,420	10.5	0.0013**	2.89	2.51	.35
203	Ideas	O	1,419	4.68	0.0312*	3.14	2.96	.23

113	Ideas	O	1,423	3.98	0.0466*	1.42	1.67	.22
118	Values	O	1,418	8.44	0.0039**	2.64	2.94	.32
104	Altruism	A	1,423	9.18	0.0026**	3.09	3.3	.33
14	*Altruism*	*A*	*1*	*15.78*	*<0.0001***	*248.32*	*198.02*	*.24*
74	*Altruism*	*A*	*1*	*8.86*	*0.0029***	*239.5*	*202.33*	*.17*
49	Compliance	A	1,419	5.33	0.0214*	3.16	2.92	.25
229	Compliance	A	1,421	4.46	0.0352*	1.93	1.7	.22
24	Modesty	A	1,421	23.14	<0.0001**	1.94	1.36	.52
144	Modesty	A	1,419	22.49	<0.0001**	2.54	2	.50
84	Modesty	A	1,419	9.86	0.0018**	2	1.61	.34
204	Modesty	A	1,422	4.38	0.037*	2.25	2.49	.23
234	*Modesty*	*A*	*1*	*17.01*	*<0.0001***	*248.91*	*197.03*	*.25*
159	Straightforwardness	A	1,422	9.83	0.0018**	1.97	1.61	.33
69	Straightforwardness	A	1,422	0.04	0.0028**	1.43	1.8	.32
39	Straightforwardness	A	1,421	7.83	0.0054**	1.95	1.59	.30
219	Straightforwardness	A	1,410	5.04	0.0253**	1.85	1.61	.25
189	*Straightforwardness*	*A*	*1*	*6.12*	*0.0134**	*235.16*	*204.08*	*.15*
179	Tender-Mindedness	A	1,421	5.42	0.0203*	3.12	3.35	.26
209	Tender-Mindedness	A	1,423	4.15	0.0423*	3.11	3.22	.20
184	Trust	A	1,422	7.95	0.005**	2.3	2.6	.31
110	*Achievement Striving*	*C*	*1*	*10.02*	*0.0015***	*184.72*	*222.93*	*.18*
170	*Achievement Striving*	*C*	*1*	*8.11*	*0.0044***	*188.21*	*222.98*	*.16*
215	Competence	C	1,422	9.17	0.0026**	2.72	2.95	.32
35	Competence	C	1,421	3.94	0.0479*	1.88	1.62	.21
45	Dutifulness	C	1,420	5.87	0.0158*	2.03	1.74	.25
75	Dutifulness	C	1,421	5.06	0.025*	2.84	3.07	.24
195	Dutifulness	C	1,422	4.94	0.0267*	2.76	2.95	.24
15	*Dutifulness*	*C*	*1*	*10.76*	*0.001***	*184.28*	*223.91*	*.18*
130	Order	C	1,422	6.69	0.01*	1.73	1.42	.28
40	Order	C	1,420	4.23	0.0403*	2.29	2.55	.22
85	Self-Discipline	C	1,421	14.03	0.0002**	2.64	2.96	.41

***p < 0.05**

**** p < 0.01**

86, “When I’m under a great deal of stress, sometimes I feel like I’m going to pieces”, occurs on the Vulnerability facet of the Neuroticism domain, while Item 106, “It doesn’t embarrass me too much if people ridicule and tease me”, occurs on the Self-Consciousness facet of the Neuroticism domain. Males score higher on Item 106 and lower on Item 86. Item 193, “I find it easy to empathise – to feel myself what others are feeling”, is among the eight items that constitute the Feelings facet on the Openness to Experience domain. Females score higher than males on this facet.

Of the 73 items that show evidence of gender differences, 19 (7.9% of 240 items, 39.5% of domain) are in the Neuroticism domain, 12 (5% of 240 items, 25% of domain) in the Extraversion domain, 13 (5.4% of 240 items, 27% of domain) in the Openness to Experience domain, 18 (7.5% of 240 items, 37.5% of domain) in the Agreeableness domain and 11 (4.6% of 240 items, 22.9% of domain) in the Conscientiousness domain. The facets of Modesty (A), Straightforwardness (A), Dutifulness (C), Depression (N), Vulnerability (N) and Anxiety (N) have four or more items ($\geq$ 50% of the facet) evidencing gender differences.

6.8.3.2. Item bias across gender: CPAI-2

Table 6.37 provides the results for the Chi^2 tests conducted on gender and the CPAI-2 items. Of the 341 CPAI-2 items, 85 (24.9%) demonstrate an association with gender. None of the 85 item associations have effect sizes exceeding .45. Only five items have effect sizes in the small to moderate range of .28 to .37, namely items 106, 138, 192, 227 and 308. Items 106 and 227 contribute to the Logical versus Affective Orientation subscale of the Social Potency factor. Item 106 deals with a preference for reading romantic rather than detective stories while Item 227 suggests a preference for science. Item 138 is from the Optimism versus Pessimism subscale (Dependability factor) and reads as, “I cry easily”. Item 192 contributes to the Dependability subscale of Emotionality and contains the phrase, “feelings are not hurt easily”. Item 308 is from the Consistency scale of the CPAI-2 and reads as, “I do not cry easily”. Males score significantly higher than females on items 227, 192 and 308. Males score significantly lower than females on items 106 and 138.

At the factor level, 24 items are from the Social Potency factor (7% of the 341 items, 30% of the factor), 24 are from the Dependability factor (7% of the 341 items, 23.4% of the factor), 14 from the Accommodation factor (4.1% of the 341 items, 28% of the factor), 14 from the Interpersonal Relatedness factor (4.1% of the 341 items, 20.9% of the factor), 3 from the Infrequency scale (.9% of the 341 items, 18.8% of the scale), 5 from the Consistency scale (1.5% of the 341 items, 31.3% of the scale) and 1 from the Good Impression scale (.3% of the 341 items, 8.3% of the scale). At the subscale level 4 subscales have 5 or more (50% or more) significant items. The Social Potency subscale of Enterprise has 8 items and the Accommodation subscale of Veraciousness versus Slickness has 7 items showing significant associations with gender. The remaining subscales all have 4 or fewer items demonstrating significant associations across gender.

Table 6.37: Item bias across gender in the CPAI-2

Item	Subscale	Factor	X	P	X_m	X_f	effect size
239	Defensiveness	A	6.64	0.01*	0.3	0.19	.11
160	Defensiveness	A	5.96	0.0147*	0.26	0.16	.10
103	Defensiveness	A	5.76	0.0164*	0.17	0.09	.08
279	Graciousness vs Meanness	A	11.67	0.0006**	0.25	0.12	.13
43	Graciousness vs Meanness	A	6.81	0.0091**	0.58	0.44	.14
95	Interpersonal Tolerance	A	7.64	0.0057**	0.83	0.92	.09
150	Self vs Social Orientation	A	6.53	0.0106*	0.28	0.17	.11
276	Self vs Social Orientation	A	6.43	0.0112*	0.29	0.18	.11
7	Veraciousness vs Slickness	A	21.34	0.000**	0.47	0.24	.23
290	Veraciousness vs Slickness	A	20.12	0.000**	0.38	0.18	.21
74	Veraciousness vs Slickness	A	18.11	0.000**	0.65	0.42	.23
209	Veraciousness vs Slickness	A	5.9	0.0152*	0.46	0.33	.13
14	Veraciousness vs Slickness	A	4.92	0.0266*	0.16	0.08	.07
305	Veraciousness vs Slickness	A	4.39	0.0362*	0.54	0.43	.11
308	Consistency	CON	35.51	0.000**	0.69	0.37	.32
159	Consistency	CON	5.22	0.0224*	0.55	0.43	.12
280	Consistency	CON	4.91	0.0267*	0.54	0.42	.11
39	Consistency	CON	4.7	0.0302*	0.64	0.53	.12
4	Consistency	CON	4.25	0.0392*	0.06	0.13	.07
192	Emotionality	D	33.72	0.000**	0.64	0.33	.31
120	Emotionality	D	11.63	0.0006**	0.61	0.43	.18
221	Emotionality	D	8.73	0.0031**	0.46	0.62	.16
67	Family Orientation	D	10.02	0.0015**	0.55	0.71	.16
133	Inferiority vs Self-Acceptance	D	8.98	0.0027**	0.8	0.66	.15
265	Inferiority vs Self-Acceptance	D	5.24	0.0221*	0.85	0.75	.10
60	Inferiority vs Self-Acceptance	D	4.83	0.0279*	0.9	0.96	.06
13	Inferiority vs Self-Acceptance	D	4.83	0.028*	0.15	0.25	.10
240	Inferiority vs Self-Acceptance	D	4.53	0.0333*	0.17	0.09	.07
313	Inferiority vs Self-Acceptance	D	4.52	0.0335*	0.23	0.34	.11
23	Internal vs External LOC	D	17.95	0.000**	0.33	0.55	.23
32	Internal vs External LOC	D	6.55	0.0105*	0.14	0.25	.11
40	Internal vs External LOC	D	4.36	0.0367*	0.35	0.46	.11
288	Meticulousness	D	8.93	0.0028**	0.59	0.74	.15
146	Meticulousness	D	4.68	0.0305*	0.38	0.27	.11
138	Optimism vs Pessimism	D	47.25	0.0000**	0.26	0.63	.37
151	Optimism vs Pessimism	D	10.49	0.0012**	0.35	0.53	.17
335	Optimism vs Pessimism	D	5.97	0.0146*	0.73	0.6	.13
87	Optimism vs Pessimism	D	4.43	0.0352*	0.53	0.64	.11
100	Practical Mindedness	D	22.84	0.0000**	0.28	0.1	.18
337	Practical Mindedness	D	5.23	0.0222*	0.29	0.19	.10
16	Practical Mindedness	D	4.87	0.0273*	0.62	0.73	.11

327	Practical Mindedness	D	4.34	0.0371*	0.91	0.96	.05
307	Responsibility	D	7.18	0.0074**	0.59	0.45	.14
109	Good Impression	GI	4.81	0.0283*	0.53	0.42	.12
172	Infrequency	INF	9.33	0.0023**	0.4	0.25	.15
256	Infrequency	INF	5.28	0.0216*	0.08	0.03	.05
260	Infrequency	INF	4.92	0.0265*	0.08	0.03	.05
341	Harmony	IR	12.35	0.0004**	0.73	0.87	.14
189	Harmony	IR	7.14	0.0075**	0.76	0.87	.11
134	Harmony	IR	6.92	0.0085**	0.19	0.1	.09
317	Harmony	IR	5.98	0.0145*	0.22	0.13	.09
47	Harmony	IR	5.71	0.0169*	0.08	0.03	.05
223	Relationship Orientation	IR	4.66	0.0308*	0.45	0.33	.11
105	Relationship Orientation	IR	4.33	0.0374*	0.56	0.67	.11
187	Relationship Orientation	IR	4.14	0.042*	0.91	0.83	.08
44	Social Sensitivity	IR	10.92	0.0009**	0.61	0.77	.16
255	Social Sensitivity	IR	6.37	0.0116*	0.78	0.87	.10
66	Social Sensitivity	IR	6.06	0.0138*	0.64	0.76	.12
114	Thrift vs Extravagance	IR	5.42	0.0199*	0.39	0.52	.12
56	Thrift vs Extravagance	IR	5.38	0.0203*	0.35	0.24	.11
258	Traditionalism vs Modernity	IR	4.56	0.0327*	0.47	0.36	.11
164	Divergent Thinking	SP	4.14	0.042*	0.39	0.29	.10
162	Diversity	SP	10.77	0.001**	0.8	0.91	.11
330	Diversity	SP	10.36	0.0013**	0.19	0.35	.16
199	Diversity	SP	5.47	0.0193*	0.7	0.8	.11
180	Emotionality	SP	4.66	0.0308*	0.89	0.8	.09
33	Enterprise	SP	14.22	0.0002**	0.37	0.57	.20
71	Enterprise	SP	13.05	0.0003**	0.74	0.55	.19
296	Enterprise	SP	9.23	0.0024**	0.8	0.65	.15
124	Enterprise	SP	8.08	0.0045**	0.24	0.38	.14
91	Enterprise	SP	6.44	0.0112*	0.75	0.63	.13
86	Enterprise	SP	6.27	0.0123*	0.56	0.69	.13
247	Enterprise	SP	5.18	0.0228*	0.77	0.66	.11
49	Enterprise	SP	5.04	0.0247*	0.52	0.63	.12
147	Extraversion vs Introversion	SP	4.75	0.0293*	0.8	0.88	.08
234	Extraversion vs Introversion	SP	4.13	0.0422*	0.42	0.31	.10
178	Leadership	SP	8.21	0.0042**	0.73	0.58	.15
294	Leadership	SP	7.27	0.007**	0.88	0.77	.12
50	Leadership	SP	5.58	0.0182*	0.72	0.6	.12
271	Leadership	SP	4.94	0.0262*	0.7	0.58	.12
106	Logical vs Affective Orientation	SP	28.32	0.000**	0.22	0.51	.28
227	Logical vs Affective Orientation	SP	27.75	0.000**	0.74	0.46	.28
168	Logical vs Affective Orientation	SP	4.17	0.0412*	0.87	0.78	.09
61	Novelty	SP	9.97	0.0016**	0.53	0.36	.17
27	Novelty	SP	5.25	0.022*	0.79	0.67	.11

6.8.3.3. Item bias across population group: NEO-PI-R

Table 6.38 presents the results obtained for the population group/NEO-PI-R item comparisons. A total of 59 items (24.5% of 240 items) show significant differences across population group. However only 5 items (2.1% of 240 items; items 33, 64, 112, 183 and 223) show significant differences with moderate effect sizes ($\geq$ .45). Items 33 and 183 occur on the Fantasy facet of the Openness to Experience domain. Item 33 reads as, "I try to keep my thoughts directed along realistic lines and avoid flights of fancy", while Item 183 reads as, "As a child I rarely enjoyed games of make believe". The non-White grouping was found to score higher on items 33 and 183. Item 64 contributes to the Trust facet of the Agreeableness domain and contains the phrase, "…most people will take advantage of you if you let them". Non-Whites were found to score higher than Whites on Item 64. Item 112 contributes to the Excitement-Seeking facet on the Extraversion domain and contains the phrase, "tend to avoid movies that are shocking or scary". White individuals were found to score higher than non-White individuals on this item. Item 223 reads as, "Odd things – like certain scents or names of distant places – can evoke strong moods in me". Item 223 contributes to the Feelings facet of the Openness to Experience domain. White individuals scored higher than non-White individuals on this item.

From Table 6.38, it is also evident that of the 61 items that demonstrate significant differences across population group, 8 items (3.3% of 240 items, 16.7% of domain) are from the Neuroticism domain, 14 items (5.8% of 240 items, 29.2% of domain) are from the Extraversion domain, 14 items (5.8% of 240 items, 29.2% of domain) from Openness to Experience, 10 items (4.2% of 240 items, 20.8% of domain) from Agreeableness and 13 items (5.4% of 240 items, 27.1% of domain) from Conscientiousness. The facets of Deliberation (C) and Activity (E) have 4 or more items ($\geq$ 50% of the facet) evidencing differences across population group.

Table 6.38: Item bias across population group in the NEO-PI-R

Item	Facet	Domain	*df*	*f*	*P*	Mean/*Mean rank* W	NW	Cohen's *d*
126	Angry Hostility	N	1,421	10.94	0.001**	1.77	1.45	.33
216	Angry Hostility	N	1,423	7.11	0.0079**	2.42	2.14	.26
61	Anxiety	N	1,420	5.69	0.0175*	1.52	1.76	.22
231	Impulsiveness	N	1,422	15.9	<0.0001**	1.78	2.19	.39
141	Impulsiveness	N	1,421	26.91	<0.0001**	1.42	1.91	.24
166	Self-Consciousness	N	1,423	13.95	0.0002**	2.66	2.31	.37
26	Vulnerability	N	1,422	5.74	0.017*	1.59	1.32	.24
236	Vulnerability	N	1,422	4.2	0.0411*	2.26	2.47	.20
47	Activity	E	1,416	16.57	<0.0001**	2.56	2.2	.40
197	Activity	E	1,421	15	0.0001**	2.5	2.13	.38
17	Activity	E	1,419	6.84	0.0092**	2.06	2.33	.25
77	Activity	E	1,422	4.6	0.0325*	1.8	2.01	.20
222	Assertiveness	E	1,423	4.34	0.0379*			.21
112	Excitement-Seeking	E	1,422	20.95	<0.0001**	1.7	1.12	.45
52	Excitement-Seeking	E	1,420	5.13	0.0241*	1.75	1.43	.22
172	Excitement-Seeking	E	1,419	4.21	0.0408*	2.34	2.61	.20
67	Gregariousness	E	1,422	4.57	0.033*	2.21	2.45	.22
157	Gregariousness	E	1,422	4.6	0.0326*	1.85	2.11	.21
217	Gregariousness	E	1,423	4.74	0.0301*	2.58	2.34	.21
207	Positive Emotions	E	1,421	12.04	0.0004**	1.45	1.87	.34
182	Warmth	E	1,422	6.02	0.0145*	3.09	2.87	.24
212	*Warmth*	*E*	*1*	*7.56*	*0.006***	*229.2*	*199.65*	*.14*
168	Actions	O	1,422	8.84	0.0031**	2.27	2.58	.29
18	Actions	O	1,418	5.08	0.0247*	2.38	2.6	.22
33	Fantasy	O	1,421	25.82	<0.0001**	1.54	2.08	.50
183	Fantasy	O	1,418	23	<0.0001**	0.88	1.38	.48
213	Fantasy	O	1,421	16.34	<0.0001**	1.24	1.65	.40
153	Fantasy	O	1,423	5.68	0.0176*	1.47	1.7	.23
223	Feelings	O	1,421	20.65	<0.0001**	2.92	2.42	.45
103	Feelings	O	1,420	15.17	0.0001**	1.17	1.56	.38
163	*Feelings*	*O*	*1*	*28.13*	*<.0001***	*180.17*	*238.46*	*.27*
173	Ideas	O	1,418	12.23	0.0005**	1.03	1.41	.34
203	Ideas	O	1,419	5.04	0.0253*	3.1	2.93	.22
88	Values	O	1,423	15.74	<0.0001**	1.84	2.32	.39
148	Values	O	1,422	15.33	0.0001**	1.71	2.15	.39
208	*Values*	*O*	*1*	*34.83*	*<.0001***	*175.41*	*242.9*	*.32*
194	Altruism	A	1,422	3.94	0.0477*	2.6	2.76	.20
169	Compliance	A	1,422	10.08	0.0016**	2.1	1.74	.31
19	Compliance	A	1,421	4.65	0.0317*	2.48	2.71	.21
199	*Compliance*	*A*	*1*	*5.56*	*0.0183**	*227.96*	*2.67*	*.13*
114	Modesty	A	1,423	9.95	0.0017**	2.87	3.1	.30
144	Modesty	A	1,419	8.91	0.003**	1.98	2.3	.30

219	Straightforwardness	A	1,410	6.81	0.0094**	1.82	2.57	.26
179	*Tender-Mindedness*	*A*	*1*	*6.64*	*0.01**	*196.7*	*224.72*	*.12*
64	Trust	A	1,423	48.32	<0.0001**	2.39	3.05	.67
124	*Trust*	*A*	*1*	*4.59*	*0.0322**	*199.76*	*223.91*	*.11*
140	Achievement Striving	C	1,420	4.67	0.0312*	1.28	1.5	.21
95	Competence	C	1,423	4.61	0.0323*	2.05	2.26	.21
240	Deliberation	C	1,422	15.16	0.0001**	2.34	2.7	.38
120	Deliberation	C	1,422	8.54	0.0037**	2.32	2.61	.29
60	Deliberation	C	1,422	5.87	0.0158*	2.89	3.08	.23
90	*Deliberation*	*C*	*1*	*6.97*	*0.0083***	*228.92*	*198.91*	*.15*
15	Dutifulness	C	1,422	10.96	0.001**	3.13	2.85	.33
45	Dutifulness	C	1,420	6.68	0.0101*	1.66	1.95	.25
70	Order	C	1,413	12.78	0.0004**	1.39	1.73	.35
100	Order	C	1,423	11.08	0.0009**	2.43	2.78	.32
40	Order	C	1,420	6.16	0.0134*	2.32	2.6	.24
85	Self-Discipline	C	1,422	9.26	0.0025**	3	2.76	.30
235	Self-Discipline	C	1,422	6.39	0.0118*	2.31	2.56	.24

***p < 0.05**

**** p < 0.01**

6.8.3.4. Item bias across population group: CPAI-2

Results for the association between population group and the items on the CPAI-2 are presented in Table 6.39. From Table 6.39 it is evident that 105 of the 341 items (30.8%) demonstrate a significant association with population group but none of the effect sizes exceed .45. All effect sizes are below .24 except for two items (items 164 and 166), which have effect sizes of .27. Item 164 contributes to the Divergent Thinking subscale of the Social Potency factor and reads as, “I seldom think from other people’s point of views in order to understand them”. Item 166 contributes to the Practical Mindedness subscale (Dependability factor) and reads as, “The only requirements I have for my clothes are that they are practical and comfortable”. Non-White individuals were found to score significantly higher than White individuals on both items.

Of the 105 significant items, 20 are from the Social Potency factor (5.9% of the 341 items, 25% of the factor), 28 are from the Dependability factor (8.2% of the 341 items, 27.7% of the factor), 19 from the Accommodation factor (5.6% of the 341 items, 38% of the factor), 25 from the Interpersonal Relatedness factor (7.3% of the 341 items, 37.3% of the factor), 5 from the Infrequency scale (1.5% of the 341 items, 31.3% of the factor), 7 from the Consistency scale (2.1% of the 341 items, 43.75% of the scale) and 1 from the Good Impression scale (.3% of the 341 items, 8.3% of the scale). At the subscale level, 4 subscales have 5 or more items ($\geq$ 50%), showing significant association with population

Table 6.39: Item bias across population group in the CPAI-2

Item	Subscale	Factor	*X*	*P*	X_w	X_{nw}	Effect size
239	Defensiveness	A	15.09	0.0001**	0.13	0.29	.16
268	Defensiveness	A	12.69	0.0004**	0.19	0.34	.15
176	Defensiveness	A	11.92	0.0006**	0.17	0.31	.15
79	Defensiveness	A	10.68	0.0011**	0.11	0.23	.12
286	Discipline	A	7.21	0.0073**	0.15	0.26	.11
152	Discipline	A	4.52	0.0334*	0.64	0.73	.10
43	Graciousness vs Meanness	A	15.2	0.0001**	0.38	0.56	.19
230	Graciousness vs Meanness	A	7.36	0.0067**	0.28	0.41	.13
170	Interpersonal Tolerance	A	6.54	0.0105*	0.21	0.32	.11
297	Interpersonal Tolerance	A	6.09	0.0136*	0.98	0.93	.05
225	Interpersonal Tolerance	A	4.9	0.0269*	0.07	0.13	.07
289	Interpersonal Tolerance	A	4.63	0.0314*	0.05	0.1	.06
275	Self vs Social Orientation	A	17.88	0.000**	0.25	0.44	.20
128	Self vs Social Orientation	A	7.43	0.0064**	0.79	0.68	.12
340	Self vs Social Orientation	A	6.3	0.0121*	0.59	0.47	.12
31	Veraciousness vs Slickness	A	30.87	0.000**	0.88	0.65	.24
302	Veraciousness vs Slickness	A	14.06	0.0002**	0.2	0.36	.17
209	Veraciousness vs Slickness	A	12.24	0.0005**	0.28	0.44	.17
14	Veraciousness vs Slickness	A	6.43	0.0112*	0.06	0.14	.08
42	Consistency	CON	22.8	0.000**	0.34	0.57	.23
159	Consistency	CON	19.9	0.000**	0.34	0.56	.22
256	Consistency	CON	8.06	0.0045**	0.01	0.06	.05
238	Consistency	CON	7.14	0.0075**	0.09	0.18	.09
22	Consistency	CON	6.79	0.0092**	0.1	0.18	.09
156	Consistency	CON	5.83	0.0158*	0.35	0.47	.12
280	Consistency	CON	4.99	0.0254*	0.4	0.51	.11
120	Emotionality	D	12.47	0.0004**	0.39	0.56	.17
65	Emotionality	D	7.55	0.006**	0.72	0.6	.13
110	Face	D	14.82	0.0001**	0.25	0.42	.18
70	Face	D	14.37	0.0002**	0.38	0.56	.18
277	Face	D	10.98	0.0009**	0.24	0.39	.15
181	Family Orientation	D	15.46	0.0001**	0.71	0.52	.19
232	Family Orientation	D	14.69	0.0001**	0.53	0.71	.18
226	Family Orientation	D	11.61	0.0007**	0.19	0.34	.15
96	Inferiority vs Self-Acceptance	D	13.13	0.0003**	0.16	0.31	.15
220	Inferiority vs Self-Acceptance	D	6.34	0.0118*	0.15	0.25	.10
13	Inferiority vs Self-Acceptance	D	5.81	0.016*	0.17	0.26	.10
240	Inferiority vs Self-Acceptance	D	5.68	0.0172*	0.07	0.15	.07
153	Inferiority vs Self-Acceptance	D	4.8	0.0285*	0.15	0.24	.09

80	Inferiority vs Self-Acceptance	D	4.4	0.0359*	0.29	0.39	.10
23	Internal vs External LOC	D	21.01	0.000**	0.37	0.59	.22
40	Internal vs External LOC	D	20.73	0.000**	0.31	0.53	.22
68	Internal vs External LOC	D	9.45	0.0021**	0.45	0.6	.15
32	Internal vs External LOC	D	6.18	0.0129*	0.17	0.27	.10
137	Internal vs External LOC	D	4.37	0.0365*	0.04	0.09	.05
320	Meticulousness	D	19.38	0.000**	0.31	0.52	.21
250	Meticulousness	D	8.47	0.0036**	0.55	0.69	.14
161	Meticulousness	D	7.02	0.0081**	0.14	0.24	.10
115	Optimism vs Pessimism	D	9.01	0.0027**	0.72	0.58	.14
215	Optimism vs Pessimism	D	7.94	0.0048**	0.45	0.58	.14
273	Optimism vs Pessimism	D	5.81	0.016*	0.47	0.59	.12
166	Practical Mindedness	D	30.16	0.000**	0.32	0.59	.27
243	Responsibility	D	8.91	0.0028**	0.64	0.5	.14
53	Responsibility	D	6.76	0.0093**	0.57	0.69	.12
109	Good Impression	GI	12.84	0.0003**	0.35	0.53	.17
211	Infrequency	INF	15.46	0.0001**	0.01	0.09	.08
241	Infrequency	INF	6.32	0.0119*	0.02	0.07	.05
253	Infrequency	INF	5.73	0.0166*	0.01	0.05	.04
142	Infrequency	INF	5.26	0.0218*	0.06	0.13	.07
201	Infrequency	INF	5.04	0.0248*	0.01	0.05	.04
140	Harmony	IR	22.74	0.000**	0.37	0.6	.23
47	Harmony	IR	9.64	0.0019**	0.01	0.07	.06
57	Harmony	IR	5.29	0.0214*	0.19	0.28	.10
267	Harmony	IR	5.08	0.0242*	0.15	0.23	.09
223	Relationship Orientation	IR	21.91	0.000**	0.25	0.47	.22
72	Relationship Orientation	IR	11.92	0.0006**	0.22	0.37	.15
187	Relationship Orientation	IR	7.6	0.0058**	0.8	0.9	.10
113	Relationship Orientation	IR	7.3	0.0069**	0.1	0.19	.09
301	Relationship Orientation	IR	6.44	0.0112*	0.53	0.65	.12
9	Relationship Orientation	IR	5.39	0.0202*	0.97	0.92	.05
78	Relationship Orientation	IR	5.18	0.0228*	0.84	0.75	.09
44	Social Sensitivity	IR	11.7	0.0006**	0.8	0.65	.15
339	Social Sensitivity	IR	11.13	0.0009**	0.85	0.71	.14
229	Thrift vs Extravagance	IR	28.14	0.000**	0.06	0.25	.19
56	Thrift vs Extravagance	IR	5.07	0.0244*	0.22	0.32	.10
244	Thrift vs Extravagance	IR	4.16	0.0415*	0.33	0.43	.10
300	Traditionalism vs Modernity	IR	23.93	0.000**	0.06	0.23	.17
185	Traditionalism vs Modernity	IR	18.15	0.000**	0.8	0.6	.20
262	Traditionalism vs Modernity	IR	16.99	0.000**	0.39	0.59	.20
258	Traditionalism vs Modernity	IR	13.5	0.0002**	0.29	0.47	.17
76	Traditionalism vs Modernity	IR	9.98	0.0016**	0.36	0.51	.15
218	Traditionalism vs Modernity	IR	8.37	0.0038**	0.04	0.11	.08
319	Traditionalism vs Modernity	IR	8.33	0.0039**	0.38	0.52	.14

145	Traditionalism vs Modernity	IR	7.6	0.0058**	0.15	0.26	.11
51	Traditionalism vs Modernity	IR	7.12	0.0076**	0.57	0.69	.13
202	Aesthetics	SP	27.85	0.000**	0.09	0.3	.21
311	Aesthetics	SP	4.16	0.0413*	0.64	0.54	.10
164	Divergent Thinking	SP	35.53	0.000**	0.17	0.44	.27
287	Divergent Thinking	SP	4.58	0.0323*	0.89	0.82	.08
231	Divergent Thinking	SP	4.1	0.0429*	0.13	0.2	.07
171	Diversity	SP	8.23	0.0041**	0.06	0.15	.09
270	Diversity	SP	8.13	0.0043**	0.06	0.14	.08
247	Enterprise	SP	9.57	0.002**	0.76	0.63	.14
124	Enterprise	SP	8.04	0.0046**	0.27	0.4	.13
249	Enterprise	SP	4.69	0.0303*	0.2	0.3	.09
234	Extraversion vs Introversion	SP	12.36	0.0004**	0.26	0.42	.16
318	Extraversion vs Introversion	SP	9.75	0.0018**	0.72	0.57	.15
26	Extraversion vs Introversion	SP	8.46	0.0036**	0.37	0.51	.14
204	Extraversion vs Introversion	SP	6.2	0.0128*	0.69	0.58	.12
50	Leadership	SP	12.78	0.0004**	0.73	0.56	.17
64	Leadership	SP	12.7	0.0004**	0.81	0.66	.16
106	Logical vs Affective Orientation	SP	11.9	0.0006**	0.33	0.5	.17
328	Logical vs Affective Orientation	SP	11.45	0.0007**	0.66	0.81	.14
338	Logical vs Affective Orientation	SP	8.14	0.0043**	0.24	0.36	.13
81	Novelty	SP	4.94	0.0263*	0.91	0.83	.07

group. The Dependability subscale of Internal versus External Locus of Control has 5 items, the Interpersonal Relatedness subscale of Traditionalism versus Modernity has 9 items and the Interpersonal Relatedness subscale of Relationship Orientation has 7 items that demonstrate significant associations with population group. The remaining subscales all have 4 or fewer items demonstrating significant associations across population group.

6.8.3.5. Item bias across home language: NEO-PI-R

Table 6.40 presents the results obtained on the home language NEO-PI-R item comparisons. In total, 62 items (25.8% of 240 items) demonstrate significant differences across home language. Only 5 items (2.1% of 240 items) demonstrate effect sizes exceeding .44, namely Items 64, 119, 144, 197 and 223. Item 64 contributes to the Trust facet of the Agreeableness domain and contains the phrase, "…most people will take advantage of you if you let them". English second language speakers were found to score higher than English first language speakers on Item 64. Item 119 reads as, "I have no sympathy for panhandlers," and contributes to the Tender-Mindedness facet on the Agreeableness domain. English first language speakers were found to score higher than English second language speakers on Item 119. Item 144 contributes to the Modesty facet

Table 6.40: Item bias across home language in the NEO-PI-R

Item	Facet	Domain	*df*	*F*	*P*	Mean/*Mean rank* E_1	E_2	Cohen's *d*
186	Angry Hostility	N	1,419	8.08	0.0047**	2.57	2.86	.30
216	Angry Hostility	N	1,423	5.56	0.0188*	2.35	2.08	.25
61	Anxiety	N	1,420	4.1	0.0436*	1.58	1.81	.22
121	Anxiety	N	1,409	13.75	0.0002**	1.72	2.15	.41
41	Depression	N	1,418	4.68	0.0311*	2.1	1.81	.23
161	Depression	N	1,420	18.3	<0.0001**	1.69	1.18	.35
141	Impulsiveness	N	1,421	13.66	0.0002**	1.56	1.95	.39
231	Impulsiveness	N	1,422	12.56	0.0004**	1.88	2.26	.38
136	Self-Consciousness	N	1,421	6.79	0.0095**	2.02	1.7	.27
166	Self-Consciousness	N	1,423	7.41	0.0068**	2.55	2.28	.28
146	Vulnerability	N	1,423	4.99	0.026*	2.45	2.19	.23
236	Vulnerability	N	1,422	3.72	0.0544*	2.31	2.52	.20
17	*Activity*	*E*	*1*	*6.18*	*0.0129**	*201.44*	*231.71*	*.14*
77	Activity	E	1,422	6.32	0.0123*	1.82	2.1	.27
197	Activity	E	1,421	27.38	<0.0001**	2.46	1.93	.55
162	*Assertiveness*	*E*	*1*	*6.15*	*0.0131**	*221.52*	*191.02*	*.16*
82	Excitement-Seeking	E	1,423	3.78	0.0525*	2.64	2.43	.20
142	Excitement-Seeking	E	1,419	5.17	0.0234*	2.49	2.25	.24
172	Excitement-Seeking	E	1,419	4.27	0.0394*	2.58	2.29	.22
37	Gregariousness	E	1,421	4.87	0.0279*	2.32	2.07	.23
157	Gregariousness	E	1,422	9.04	0.0028**	1.87	2.26	.31
18	Actions	O	1,418	4.87	0.0279*	3.42	2.66	.31
108	Actions	O	1,422	5.15	0.0238*	2.4	2.11	.24
33	Fantasy	O	1,421	7.3	0.0072**	1.74	2.05	.28
183	Fantasy	O	1,418	15.4	0.0001**	1.02	1.45	.41
213	Fantasy	O	1,421	8.66	0.0034**	1.36	1.66	.31
13	Feelings	O	1,417	3.75	0.0536*	2.81	2.6	.21
43	Feelings	O	1,422	8.55	0.0037**	0.92	1.22	.31
103	*Feelings*	*O*	*1*	*7.81*	*0.0052***	*201.06*	*234.2*	*.15*
163	*Feelings*	*O*	*1*	*26.47*	*<0.0001***	*193.04*	*253.79*	*.27*
223	Feelings	O	1,421	27.38	<0.0001**	2.83	2.21	.55
173	Ideas	O	1,418	9.11	0.0027**	1.13	1.48	.31
28	Values	O	1,422	3.94	0.0479*	0.77	.95	.20
148	Values	O	1,422	11.51	0.0008**	1.82	2.23	.36
208	*Values*	*O*	*1*	*40.59*	*.<0.0001***	*187.86*	*265.82*	*.37*
44	*Altruism*	*A*	*1*	*8.14*	*0.0043***	*220.71*	*187.42*	*.19*
74	Altruism	A	1,423	4	0.0461*	1.13	1.35	.21
19	Compliance	A	1,421	5.91	0.0154*	2.52	2.8	.25
79	Compliance	A	1,422	4.5	0.0345*	1.99	2.28	.23
169	*Compliance*	*A*	*1*	*8.98*	*0.0027***	*221.16*	*187*	*.18*
199	*Compliance*	*A*	*1*	*5.71*	*0.0168**	*222.38*	*192.72*	*.14*
84	*Modesty*	*A*	*1*	*4.44*	*0.035**	*202.81*	*228.93*	*.11*

114	Modesty	A	1,423	8.58	0.0036**	2.92	3.16	.32
144	Modesty	A	1,419	27.82	<0.0001**	1.97	2.56	.56
234	Modesty	A	1,421	4.75	0.0299*	1.83	1.59	.23
119	Tender-Mindedness	A	1,286	14.64	0.0002**	1.9	1.51	.48
179	Tender-Mindedness	A	1,421	13.13	0.0003**	3.18	3.51	.38
239	Tender-Mindedness	A	1,413	7.43	0.0067**	1.98	2.29	.30
64	Trust	A	1,423	19.98	<0.0001**	2.6	3.07	.47
140	Achievement Striving	C	1,420	5.37	0.021*	1.32	1.58	.25
170	Achievement Striving	C	1,423	4.01	0.0458*	2.91	3.09	.21
95	Competence	C	1,423	4.17	0.0417*	2.1	2.31	.21
60	Deliberation	C	1,422	7.87	0.0053**	2.92	3.16	.30
90	*Deliberation*	*C*	*1*	*5.65*	*0.0174**	*221.6*	*192.6*	*.14*
120	Deliberation	C	1,422	8.81	0.0032**	2.38	2.69	.31
210	Deliberation	C	1,421	9.3	0.0024**	2.56	2.88	.33
240	Deliberation	C	1,422	14.15	0.0002**	2.42	2.8	.40
195	Dutifulness	C	1,422	6.99	0.0085**	2.83	3.04	.27
40	Order	C	1,420	5.79	0.0165*	2.38	2.68	.26
70	Order	C	1,413	9.63	0.0021**	1.47	1.8	.34
100	Order	C	1,423	5.56	0.0188*	2.54	2.81	.25
235	Self-Discipline	C	1,422	6.1	0.0139*	2.36	2.63	.26

***p < 0.05**

**** p < 0.01**

of the Agreeableness domain and reads as, “I have a very high opinion of myself”. English second language speakers were found to score higher than English first language speakers on Item 144. Item 197 contributes to the Activity facet of the Extraversion domain and reads as, “My life is fast-paced”. English first language speakers were found to score higher than English second language speakers on Item 197. Item 223 reads as, “Odd things – like certain scents or names of distant places – can evoke strong moods in me”, and contributes to the Feelings facet of the Openness to Experience domain. English first language speakers were found to score higher than English second language speakers on Item 223.

Of the 62 items that exhibit significant differences across home language, 12 items are from the Neuroticism domain (5% of 240 items, 25% of domain), 9 items are from the Extraversion domain (3.8% of 240 items, 18.8% of domain), 14 items from the Openness to Experience domain (5.8% of 240 items, 29.2% of domain), 14 items from the Agreeableness domain (5.8% of 240 items, 29.2% of domain) and 13 items from the Conscientiousness domain (5.4% of 240 items, 27.1% of domain). The facets of Feelings (O), Compliance (A), Modesty (A) and Deliberation (C) have 4 or more items ($\geq$ 50% of the facet) evidencing significant differences across home language, as is evident in Table 6.40.

6.8.3.6 Item bias across home language: CPAI-2

Table 6.41 presents the results obtained for the Chi^2 tests on the CPAI-2 item responses and home language. From Table 6.41 it is evident that 148 of the 341 (43.4%) CPAI-2 items demonstrate significant associations with home language.

Of the 148 items, 70 items (20% of the 341 items) have effect sizes exceeding .20. Of these items, 46 (13.5% of the 341 items) have effect sizes in the range of .20 to .49 and 22 items (6.5% of the 341 items) have effect sizes in the range of .50 to .79. These are items 223, 224, 231, 234, 253, 255, 263, 270, 286, 288, 292, 299, 300, 313, 314, 315, 316, 326, 328, 331, 333 and 336.

Of the 22 items, 7 are from the Social Potency factor. Items 263 and 231 are from the Divergent Thinking subscale. Item 263 reads as, “I find it hard to think about a problem from many different angles”, while Item 231 reads as, “I do not like thinking about the meaning of life”. Items 224 and 270 contribute to the Diversity subscale. Item 224 reads as, “I have a lot of different interests”, while Item 270 reads as, “I am not very interested in things unrelated to my job”. Item 234 contributes to the Extraversion versus Introversion subscale and reads as, “At social occasions, I mostly sit aside by myself or just with another person, rather than join the crowd”. Items 336 and 328 are from the Logical versus Affective Orientation subscale. Item 336 is phrased as, “I often keep thinking about a problem until I get the right answer”, while Item 328 reads as, “When I come across new points of view, I first analyse how they are different from my own”.

Of the 22 items, 4 are from the Dependability factor. Items 288 and 331 are from the Meticulousness subscale. Item 288 is phrased as, “I can remember very clearly what I have lent to and borrowed from others”, whereas Item 331 is concerned with an inability “to find phone numbers that I have written down, and I always end up having to check with someone”. Item 313 contributes to the Inferiority versus Self-Acceptance subscale and reads as, “After being criticised by others, I would hide myself from everyone for a while”. Item 314 is from the Interpersonal Tolerance subscale and reads as, “I like discussions with people who have different points of views”.

Of the 22 items, 6 are from the Interpersonal Relatedness factor. Item 286 contributes to the Discipline subscale and reads as, “One can avoid making serious mistakes by always following tradition”. Item 333 is from the Harmony subscale and contains the phrase, “usually can maintain peace of mind”. Item 223 (Relationship Orientation) reads as, “When I accomplish something important, I try hard not to get too excited, because I know that

success does not happen". Items 255 and 315 are from the Social Sensitivity subscale. Item 255 is phrased as, "I actively try to understand other people's needs", while Item 315 reads as, "I will keep new information to myself and do not feel the need to share it with others". Item 300 contributes to the Traditionalism versus Modernity subscale and reads as, "A woman's chastity is more important than her life". English second language speakers were found to score significantly higher than English first language speakers on Items 223, 286, 300 and 315 but significantly lower on Items 333 and 255.

Of the 22 items, 3 are from the CPAI-2 Infrequency scale. Item 253 is phrased as, "Someone is controlling my mind", whereas Item 292 reads as, "I have controlled other people's minds, or my mind has been controlled by others, through electronic waves". Item 299 reads as, "I do not have difficulty keeping my balance when walking down the street".

In the remaining two items, Item 316 is from the Consistency scale and reads as, "I think I should admit it if I have done something wrong". Item 326 is from the Defensiveness subscale (Accommodation factor) and reads as, "I always bear in mind how others have offended me and cannot let go of it".

An examination of the factors and subscales reveals a spread between all the factors and subscales. There is no one factor or subscale that has an overrepresentation of items. Of the 148 items, 33 are from the Social Potency factor (9.7% of the 341 items, 41.2% of the factor), 49 are from the Dependability factor (14.4% of the 341 items, 48.5% of the factor), 16 are from the Accommodation factor (4.7% of the 341 items, 32% of the factor), 33 from the Interpersonal Relatedness factor (9.7% of the 341 items, 32% of the factor), 9 from the Infrequency scale (2.6% of the 341 items, 56.3% of the scale), 6 from the Consistency scale (1.8% of the 341 items, 37.5% of the scale) and 2 from the Good Impression scale (.6% of the 341 items, 16.7% of the scale). At the subscale level, 13 subscales have 5 or more items (50% or more) demonstrating significant associations with home language. The Social Potency subscales of Divergent Thinking, Logical versus Affective Orientation and Enterprise have 6 items each, the Dependability subscales of Optimism versus Pessimism and Meticulousness have 5 items each, the Dependability subscales of Responsibility and Internal versus External Locus of Control have 6 items each, the Dependability subscale of Inferiority versus Self-Acceptance has 7 items, the Interpersonal Relatedness subscale of Social Sensitivity has 7 items and the Interpersonal Relatedness subscale of Harmony has 8 items demonstrating significant associations with home language. The remaining subscales all have 4 or fewer items demonstrating significant associations across home language.

Table 6.41: Item bias across home language in the CPAI-2

Item	Subscale	Factor	X	P	Xe1	Xe2	Effect size
326	Defensiveness	A	122.47	0.000**	0.37	0.95	.57
268	Defensiveness	A	12.35	0.000**	0.21	0.08	.14
237	Defensiveness	A	10.84	0.000**	0.31	0.16	.15
191	Defensiveness	A	8.41	0.000**	0.37	0.52	.15
279	Graciousness vs Meanness	A	64.98	0.000**	0.14	0.50	.37
230	Graciousness vs Meanness	A	10.4	0.000**	0.31	0.17	.15
43	Graciousness vs Meanness	A	9.06	0.000**	0.43	0.59	.16
252	Graciousness vs Meanness	A	4.28	0.04*	0.14	0.07	.07
340	Self vs Social Orientation	A	23.54	0.000**	0.57	0.81	.24
275	Self vs Social Orientation	A	10.55	0.000**	0.31	0.16	.15
128	Self vs Social Orientation	A	8.19	0.000**	0.77	0.64	.13
35	Self vs Social Orientation	A	4.7	0.03*	0.78	0.68	.09
295	Veraciousness vs Slickness	A	26.24	0.000**	0.39	0.66	.27
31	Veraciousness vs Slickness	A	16.58	0.000**	0.81	0.63	.18
209	Veraciousness vs Slickness	A	9.13	0.000**	0.32	0.47	.15
14	Veraciousness vs Slickness	A	7.84	0.01*	0.08	0.17	.09
316	Consistency	CON	242.09	0.000**	0.9	0.14	.77
308	Consistency	CON	24.44	0.000**	0.47	0.72	.26
329	Consistency	CON	20.48	0.000**	0.16	0.35	.20
238	Consistency	CON	18.97	0.0000**	0.13	0.31	.18
159	Consistency	CON	7.5	0.01*	0.42	0.56	.14
42	Consistency	CON	6.43	0.01*	0.42	0.55	.13
65	Emotionality	D	24.72	0.0000**	0.73	0.49	.25
104	Emotionality	D	5.28	0.02*	0.56	0.44	.12
188	Emotionality	D	4.57	0.03*	0.86	0.77	.08
257	Face	D	17.58	0.000**	0.35	0.57	.22
242	Face	D	14.31	0.000**	0.27	0.46	.19
3	Face	D	11.95	0.000**	0.7	0.52	.17
110	Face	D	5.57	0.02*	0.31	0.42	.12
70	Face	D	4.45	0.03*	0.45	0.56	.11
232	Family Orientation	D	30.05	0.000**	0.61	0.32	.29
226	Family Orientation	D	28.5	0.000**	0.25	0.51	.26
25	Family Orientation	D	6.63	0.01*	0.88	0.78	.10
55	Family Orientation	D	5.63	0.02*	0.58	0.45	.12
313	Inferiority vs Self-Acceptance	D	111.04	0.000**	0.34	0.89	.55
265	Inferiority vs Self-Acceptance	D	84.4	0.000**	0.76	0.30	.47
259	Inferiority vs Self-Acceptance	D	45.54	0.000**	0.34	0.04	.31
284	Inferiority vs Self-Acceptance	D	22.36	0.000**	0.23	0.46	.23
133	Inferiority vs Self-Acceptance	D	8.02	0.000**	0.66	0.79	.14

96	Inferiority vs Self-Acceptance	D	7.57	0.01*	0.21	0.33	.12
278	Inferiority vs Self-Acceptance	D	5.84	0.02*	0.3	0.19	.11
297	Internal vs External LOC	D	74.76	0.000**	0.97	0.66	.30
40	Internal vs External LOC	D	15.83	0.000**	0.37	0.57	.21
23	Internal vs External LOC	D	6.93	0.01*	0.44	0.58	.14
314	Interpersonal Tolerance	D	256.42	0.000**	0.91	0.12	.79
303	Interpersonal Tolerance	D	38.36	0.000**	0.26	0.57	.31
225	Interpersonal Tolerance	D	37.52	0.000**	0.09	0.33	.24
289	Interpersonal Tolerance	D	29.23	0.000**	0.06	0.23	.18
193	Interpersonal Tolerance	D	5.4	0.02*	0.29	0.40	.11
170	Interpersonal Tolerance	D	4.49	0.03*	0.24	0.34	.10
288	Meticulousness	D	114.46	0.000**	0.69	0.13	.56
331	Meticulousness	D	99.67	0.000**	0.29	0.81	.52
250	Meticulousness	D	76.77	0.000**	0.58	0.13	.46
320	Meticulousness	D	48.65	0.000**	0.39	0.06	.33
45	Meticulousness	D	13.31	0.000**	0.63	0.44	.19
273	Optimism vs Pessimism	D	38.27	0.000**	0.5	0.82	.32
335	Optimism vs Pessimism	D	23.28	0.000**	0.63	0.86	.23
116	Optimism vs Pessimism	D	12.33	0.000**	0.73	0.88	.15
115	Optimism vs Pessimism	D	11.45	0.000**	0.69	0.52	.17
87	Optimism vs Pessimism	D	4.98	0.03*	0.64	0.53	.11
248	Practical Mindedness	D	27.02	0.000**	0.53	0.26	.27
166	Practical Mindedness	D	23.52	0.000**	0.39	0.64	.25
337	Practical Mindedness	D	20.13	0.000**	0.22	0.43	.21
327	Practical Mindedness	D	11.95	0.000**	0.95	0.84	.10
97	Practical Mindedness	D	4.2	0.04*	0.3	0.21	.10
274	Responsibility	D	56.52	0.000**	0.81	0.45	.36
322	Responsibility	D	15.5	0.000**	0.55	0.75	.20
310	Responsibility	D	14.75	0.000**	0.7	0.51	.19
243	Responsibility	D	11.4	0.000**	0.61	0.44	.18
53	Responsibility	D	7.54	0.01*	0.59	0.73	.14
293	Responsibility	D	4.06	0.04*	0.74	0.83	.09
291	Good Impression	GI	12.07	0.0000**	0.2	0.07	.13
98	Good Impression	GI	4.86	0.03*	0.87	0.79	.08
292	Infrequency	INF	249.31	0.000**	0.04	0.77	.73
253	Infrequency	INF	240.05	0.000**	0.02	0.70	.68
299	Infrequency	INF	206.62	0.000**	0.89	0.18	.71
321	Infrequency	INF	108.88	0.000**	0.07	0.52	.45
256	Infrequency	INF	105.01	0.000**	0.03	0.43	.39
241	Infrequency	INF	76.6	0.000**	0.03	0.34	.30
260	Infrequency	INF	49.91	0.000**	0.05	0.30	.25
269	Infrequency	INF	6.54	0.01*	0.06	0.13	.07
183	Infrequency	INF	5	0.03*	0.12	0.05	.07
286	Discipline	IR	143.29	0.000**	0.19	0.79	.61

228	Discipline	IR	29.59	0.000**	0.62	0.34	.28
254	Discipline	IR	16.44	0.000**	0.66	0.85	.19
285	Discipline	IR	5.54	0.02*	0.38	0.26	.12
333	Harmony	IR	130.4	0.000**	0.76	0.17	.59
317	Harmony	IR	75.29	0.000**	0.16	0.57	.41
261	Harmony	IR	41.52	0.000**	0.27	0.60	.33
267	Harmony	IR	25.28	0.000**	0.18	0.40	.23
57	Harmony	IR	11.45	0.000**	0.19	0.34	.15
130	Harmony	IR	9.38	0.000**	0.23	0.37	.14
140	Harmony	IR	5.59	0.02*	0.46	0.58	.12
47	Harmony	IR	4.1	0.04*	0.03	0.07	.04
223	Relationship Orientation	IR	102.02	0.000**	0.35	0.87	.53
301	Relationship Orientation	IR	18.53	0.000**	0.56	0.34	.22
78	Relationship Orientation	IR	4.78	0.03*	0.82	0.72	.09
255	Social Sensitivity	IR	239.06	0.000**	0.84	0.05	.79
315	Social Sensitivity	IR	183.66	0.000**	0.2	0.89	.70
339	Social Sensitivity	IR	66.65	0.000**	0.81	0.42	.39
282	Social Sensitivity	IR	36.36	0.000**	0.34	0.07	.27
246	Social Sensitivity	IR	14.83	0.000**	0.8	0.62	.18
332	Social Sensitivity	IR	5.83	0.02*	0.88	0.79	.09
44	Social Sensitivity	IR	4.86	0.03*	0.75	0.65	.10
244	Thrift vs Extravagance	IR	87.75	0.000**	0.36	0.85	.49
312	Thrift vs Extravagance	IR	72.89	0.000**	0.69	0.25	.44
229	Thrift vs Extravagance	IR	68.51	0.000**	0.08	0.42	.34
56	Thrift vs Extravagance	IR	8.39	0.000**	0.23	0.37	.13
300	Traditionalism vs Modernity	IR	118.74	0.000**	0.14	0.66	.52
262	Traditionalism vs Modernity	IR	33.97	0.000**	0.45	0.16	.29
185	Traditionalism vs Modernity	IR	24.59	0.000**	0.77	0.53	.24
76	Traditionalism vs Modernity	IR	7.92	0.000**	0.4	0.54	.15
319	Traditionalism vs Modernity	IR	5.05	0.02*	0.38	0.50	.12
155	Traditionalism vs Modernity	IR	4.85	0.03*	0.66	0.55	.11
145	Traditionalism vs Modernity	IR	4.39	0.04*	0.18	0.27	.09
202	Aesthetics	SP	11.87	0.000**	0.16	0.30	.14
263	Divergent Thinking	SP	170.76	0.000**	0.15	0.81	.65
231	Divergent Thinking	SP	104.68	0.000**	0.16	0.66	.50
235	Divergent Thinking	SP	58.26	0.000**	0.81	0.44	.37
323	Divergent Thinking	SP	26.34	0.000**	0.79	0.55	.24
287	Divergent Thinking	SP	16.22	0.000**	0.88	0.72	.16
164	Divergent Thinking	SP	15.72	0.000**	0.26	0.45	.19
224	Diversity	SP	227.67	0.000**	0.89	0.14	.75
270	Diversity	SP	146.65	0.000**	0.09	0.65	.56
199	Diversity	SP	5.49	0.02*	0.8	0.70	.10
249	Enterprise	SP	85.12	0.000**	0.25	0.72	.47
296	Enterprise	SP	21.98	0.000**	0.71	0.92	.20

247	Enterprise	SP	14.75	0.000**	0.72	0.53	.19
236	Enterprise	SP	6.8	0.01*	0.44	0.31	.13
124	Enterprise	SP	5.26	0.02*	0.3	0.42	.11
71	Enterprise	SP	4.38	0.04*	0.64	0.53	.11
234	Extraversion vs Introversion	SP	103.48	0.000**	0.31	0.84	.53
298	Extraversion vs Introversion	SP	9.84	0.000**	0.77	0.90	.13
8	Extraversion vs Introversion	SP	9.27	0.000**	0.87	0.75	.11
294	Leadership	SP	95.33	0.000**	0.79	0.30	.49
271	Leadership	SP	10.99	0.000**	0.6	0.76	.17
266	Leadership	SP	9.65	0.000**	0.39	0.23	.15
50	Leadership	SP	4.67	0.03*	0.67	0.56	.11
336	Logical vs Affective Orientation	SP	169.8	0.000**	0.86	0.21	.65
328	Logical vs Affective Orientation	SP	103.11	0.000**	0.69	0.16	.53
338	Logical vs Affective Orientation	SP	77.34	0.000**	0.25	0.70	.45
106	Logical vs Affective Orientation	SP	9.84	0.000**	0.37	0.53	.16
125	Logical vs Affective Orientation	SP	5.09	0.02*	0.61	0.72	.11
264	Logical vs Affective Orientation	SP	4.21	0.04*	0.72	0.81	.09
334	Novelty	SP	87.2	0.000**	0.19	0.65	.46
148	Novelty	SP	8.58	0.000**	0.7	0.84	.13
222	Novelty	SP	7.56	0.01*	0.86	0.75	.11
186	Novelty	SP	5.6	0.02*	0.84	0.74	.10

***p < 0.05**

**** p < 0.01**

6.8.4. Understanding of items in the NEO-PI-R and the CPAI-2

Table 6.42 presents the frequencies obtained in terms of the number of people who indicated that the items were fine in terms of understanding and the number of people who disagreed with this for both the NEO-PI-R and the CPAI-2. As evident in Table 6.42, 58.82% (*n* = 250) had some difficulty understanding the items on the NEO-PI-R while 41.18%

Table 6.42: Frequency results for understanding of items on the NEO-PI-R and the CPAI-2

Understanding		Frequency	%
NEO-PI-R	Yes	250	58.82
	No	175	41.18
CPAI-2	Yes	217	51.06
	No	208	48.94

(*n* = 175) reported no difficulty in understanding the items. For the CPAI-2, 51.06% (*n* = 217) of respondents thought that some items were problematic in terms of understanding. However, 48.94% (*n* = 208) of individuals reported no difficulty in understanding the items on the CPAI-2, as presented in Table 6.42.

To further examine the understanding of items, Chi^2 tests were used, as evident in Table 6.43. From Table 6.43 it is evident that a significant association was found to exist between gender and the understanding of items as well as population group and the understanding of items at the .05 level of significance for the NEO-PI-R. No significant association was found between home language and the understanding of items for the NEO-PI-R. Chi^2 results for the CPAI-2 are presented in Table 6.43. It is evident that there are no significant associations between gender, population group or home language and the understanding of items on the CPAI-2.

Table 6.43: Chi^2 results for gender, population group, home language and the understanding of items on the NEO-PI-R and the CPAI-2

		df	χ^2	*P*
NEO-PI-R	**Gender**	1	5.50	0.02*
	Population group	1	5.70	0.02*
	Language	1	.015	0.70
CPAI-2	**Gender**	1	0.8474	0.3573
	Population group	1	1.3540	0.244
	Language	1	1.3586	0.2438

***p < 0.05**

Table 6.44 presents the percentages obtained for both gender and population group. From Table 6.44 it is evident that 50% of males were of the opinion that they understood all the items on the NEO-PI-R while 50% of males were of the opinion that they did not. Of the female respondents, 37.62% were of the opinion that they understood all the items on the NEO-PI-R, while 62.38% did not. Across the gender groups, of all the individuals experiencing no difficulties with the NEO-PI-R items, 65.14% are female and 34.86% male. Across the gender groups, of all the individuals experiencing some difficulty understanding the NEO-PI-R items, 75.6% are female and 24.4% male.

Table 6.44: Proportions for gender and population group on the NEO-PI-R

NEO-PI-R	GENDER		POPULATION GROUP	
Understanding	**Male**	**Female**	**White**	**Non-white**
NO DIFFICULTY	61	114	67	108
Column %	50	37.62	34.89	46.35
Row %	34.86	65.14	38.29	61.71
SOME DIFFICULTY	61	189	125	125
Column %	50	62.38	65.11	53.65
Row %	24.40	75.6	50	50

In terms of population group, it is evident from Table 6.44 that 34.89% of White individuals found no difficulties with understanding the NEO-PI-R items and 65.11% of White individuals found some difficulties. In the non-White group, 46.35% found no difficulties with understanding the NEO-PI-R items and 53.65% individuals found some difficulties. Across the two groups, of all the individuals with no difficulties with the NEO-PI-R items, 38.29% were White and 61.71% non-White. Across the population groups, of all the individuals experiencing some difficulty understanding the NEO-PI-R items, 50% were White and 50% non-White.

6.8.5. Appropriateness of items in the NEO-PI-R and the CPAI-2

From Table 6.45 it is evident that only 14.82% (*n* = 63) of respondents thought all the items on the NEO-PI-R appropriate for the South African context. Of the respondents, 85.18% (*n* = 362) reported not all items being appropriate. For the CPAI-2, 24.71% (*n* = 105) of respondents thought the items appropriate, while 75.29% (*n* = 320) thought some items inappropriate, as is evident in Table 6.45.

Table 6.45: Frequency results for appropriateness of items on the NEO-PI-R and the CPAI-2

Appropriateness		Frequency	%
NEO-PI-R	Yes	362	85.18
	No	63	14.82
CPAI-2	Yes	320	75.29
	No	105	24.71

To further examine the understanding of items, Chi^2 tests were used, as evident in Table 6.46. From the results presented in Table 6.46 it is evident that there are no significant associations for gender, population group or home language and the identification of inappropriate items for both the NEO-PI-R and the CPAI-2.

Table 6.46: Chi^2 results for gender, population group, home language and the identification of inappropriate items on the NEO-PI-R

		df	X^2	*P*
NEO-PI-R	Gender	1	0.0007	0.9796
	Population group	1	0.0160	0.8993
	Language	1	0.3940	0.530
CPAI-2	Gender	1	0.2834	0.5945
	Population group	1	0.001	0.922
	Language	1	0.2102	0.65

6.8.6. Problematic items identified in the NEO-PI-R

In total, 88 of the 240 items (36.7%) were found to be problematic in the NEO-PI-R, as evident in Table 6.47. However, only 11 of those items (4.6% of the 240 items) were identified by 10 (2.4%) or more people in the sample as problematic. Of the sample, 30% (*n* = 122) found Item 119 to be problematic since the term “panhandlers” was not understood. Following this, 16.7% (*n* = 71) of the sample found Item 160 containing the phrases “fastidious or exacting” to be problematic; 15.8% (*n* = 67) of the sample found Item 20 containing the word “lackadaisical” to be problematic; 12.5% (*n* = 53) found Item 238 containing the phrase “new morality of permissiveness is no morality at all” to be problematic; 5.2% (*n* = 22) found Item 9 containing the word “crafty” to be problematic; 4.2% (*n* = 18) of the sample found Item 8 containing the words “aesthetic and artistic concerns” to be problematic; and 2.6% (*n* = 11) found items 105 and 121 to be problematic. Item 105 refers to cheating when playing solitaire and Item 121 contains the phrase “seldom apprehensive”. Of the sample, 2.4% (*n* = 10) found Items 219, 239 and 252 to be problematic. Item 219 refers to “shrewdness in handling people”. Item 239 contains the phrase “rather be known as ‘merciful’ than ‘just’”.

Item 52 refers to “vacationing in Las Vegas”. Of the 11 items 4 are from the Agreeableness domain, 3 are from the Conscientiousness domain, and 2 are from the Openness domain, with 1 each from the Neuroticism and Extraversion domains.

Table 6.47: Problematic items identified in the NEO-PI-R

Item	Facet	Domain	Problematic phrase/word	Freq	% of sample
119	Tender-Mindedness	A	Panhandlers	127	30
9	Straightforwardness	A	Crafty	22	5.2
219	Straightforwardness	A	Shrewdness in handling people	10	2.4
239	Tender-Mindedness	A	Rather be known as “merciful” than “just”	10	2.4
19	Compliance	A	Co-operate with others than compete with them	4	1
149	Tender-Mindedness	A	Human need should always take priority over economic considerations	4	1
4	Trust	A	Cynical and skeptical	3	0.7
14	Altruism	A	Selfish and egotistical	3	0.7
34	Trust	A	People are basically well-intentioned	3	0.7
44	Altruism	A	“Courteous”	3	0.7
84	Modesty	A	Sometimes does things for ”kicks” or “thrills”	3	0.7
89	Tender-Mindedness	A	Never do much for the poor or elderly	3	0.7
139	Compliance	A	When I’ve been insulted, I just try to forgive and forget	3	0.7
199	Compliance	A	Hard-headed	3	0.7
234	Modesty	A	Superior person	3	0.7
29	Tender-Mindedness	A	Political leaders need to be more aware of the human side of their policies	2	0.4
49	Compliance	A	“Sarcastic and cutting”	2	0.4
74	Altruism	A	Cold and calculating	2	0.4
144	Modesty	A	Seldom give in to my impulses	2	0.4
159	Straightforwardness	A	Trick people into doing what I want	2	0.4
189	Straightforwardness	A	“Bully or flatter people”	2	0.4
59	Tender-Mindedness	A	Hard-headed and tough-minded	1	0.2
134	Altruism	A	Not known for my generosity	1	0.2
160	Order	C	Fastidious or exacting	71	16.7
20	Achievement Striving	C	Lackadaisical	67	15.8
105	Dutifulness	C	Cheat when I play solitaire	11	2.6
5	Competence	C	Prudence	6	1.4
70	Order	C	A methodical person	6	1.4
190	Order	C	Compulsive about cleaning	3	0.7
15	Dutifulness	C	Tasks assigned to me conscientiously	2	0.4
80	Achievement Striving	C	Start a self-improvement program, let it slide	2	0.4
140	Achievement Striving	C	Driven to get ahead	1	0.2
170	Achievement Striving	C	Strive to achieve all I can	1	0.2
180	Deliberation	C	“Hasty”	1	0.2

52	Excitement-Seeking	E	“Vacationing in Las Vegas”	10	2.4
47	Activity	E	“Vigorously”	4	1.0
57	Positive Emotions	E	Experienced intense joy or happiness	4	1.0
147	Positive Emotions	E	Especially “light-hearted”	4	1.0
12	Assertiveness	E	Dominant, forceful and assertive	3	0.7
87	Positive Emotions	E	“Cheerful optimist”	3	0.7
27	Positive Emotions	E	Literally jumped for joy	1	0.2
92	Warmth	E	“Cold and distant”	1	0.2
107	Activity	E	Bursting with energy	1	0.2
117	Positive Emotions	E	Bubble with happiness	1	0.2
157	Gregariousness	E	Vacation at a popular beach than cabin in the woods	1	0.2
172	Excitement-Seeking	E	Love the excitement of roller coasters	1	0.2
197	Activity	E	“Fast-paced”	1	0.2
202	Excitement-Seeking	E	Attracted to bright colours and flashy styles	1	0.2
121	Anxiety	N	Seldom apprehensive	11	2.6
16	Self-Consciousness	N	Dread making a social blunder	7	1.7
101	Depression	N	Deep sense of guilt or sinfulness	4	1.0
36	Angry Hostility	N	Even-tempered person	3	0.7
96	Angry Hostility	N	Touchy or temperamental	3	0.7
171	Impulsiveness	N	Eat myself sick	3	0.7
41	Depression	N	Feel completely worthless	2	0.4
61	Anxiety	N	Rarely feel fearful or anxious	2	0.4
71	Depression	N	Seldom sad or depressed	2	0.4
81	Impulsiveness	N	Difficulty resisting temptation	2	0.4
91	Anxiety	N	Tense and jittery	2	0.4
106	Self-Consciousness	N	Ridicule or tease me	2	0.4
186	Angry Hostility	N	“Bitter and resentful”	2	0.4
1	Anxiety	N	Worrier	1	0.2
46	Self-Consciousness	N	Seldom feel self-conscious	1	0.2
51	Impulsiveness	N	“Resisting my cravings”	1	0.2
66	Angry Hostility	N	Hot-blooded and quick-tempered	1	0.2
191	Depression	N	“Bleak”	1	0.2
211	Anxiety	N	Frightened thoughts come to head	1	0.2
238	Values	O	The “new morality” of permissiveness is no morality at all	53	12.5
8	Aesthetics	O	Aesthetic and artistic concerns	18	4.2
188	Aesthetics	O	Reading poetry and language	5	1.0
68	Aesthetics	O	Watching ballet or modern dance	4	1.0

118	Values	O	Different ideas of right and wrong that people in other societies have may be valid for them	4	1.0
193	Feelings	O	“Empathise”	4	1.0
13	Feelings	O	Without strong emotions, life would be uninteresting	3	0.7
148	Values	O	Loyalty to one’s ideals and principals is more important than “open-mindedness”	3	0.7
173	Ideas	O	Little interest in speculating about the universe or the human condition	3	0.7
198	Actions	O	On a vacation, tried and true spot	3	0.7
33	Fantasy	O	Avoid flights of fancy	2	0.4
58	Values	O	Laws and policies should change to reflect the needs of a changing world	2	0.4
63	Fantasy	O	Active fantasy life	2	0.4
223	Feelings	O	Odd things – like scents or names – evoke strong moods in me	2	0.4
23	Ideas	O	Playing with theories or abstract ideas	1	0.2
98	Aesthetics	O	Intrigued by the patterns I find in art and nature	1	0.2
108	Actions	O	New and foreign foods	1	0.2
178	Values	O	Broad-minded and tolerant	1	0.2
183	Fantasy	O	Games of make believe	1	0.2
213	Fantasy	O	Letting my mind wander without control or guidance	1	0.2
218	Aesthetics	O	Reading poetry that emphasises feelings and images more than story lines	1	0.2

An examination of all the problematic items across domains indicates that the Agreeableness domain has the most items identified as problematic (*n* = 23 out of 48 items for the domain, 48% of items in the domain), followed by the Openness domain (*n* = 21 out of 48 items for the domain, 44% of items in the domain), then the Neuroticism domain (*n* = 19 out of 48 items for the domain, 40% of items in the domain), followed by the Extraversion domain (*n* = 14 out of 48 items for the domain, 29% of items in the domain), and finally Conscientiousness (*n* = 11 out of 48 items for the domain, 23% of items in the domain). At the facet level, Tender-Mindedness (domain A) is the most problematic facet, with six out of the eight items (75%) that make up the facet being identified as problematic. Positive Emotions (domain E), Aesthetics (domain O) and Values (domain O) each have five items out of eight (62.5%) for the facet being identified as problematic. The facets of Angry Hostility (domain N), Depression (domain N), Anxiety (domain N), Fantasy (domain O), Straightforwardness (domain A), Compliance (domain A), Altruism (domain A) and Achievement Striving (domain C) have four items out eight on the facet (50%) being identified as problematic. The remaining facets have one, two or three items out of eight being identified as problematic.

6.8.7. Problematic items identified in the CPAI-2

A total of 117 items of the 341 items on the CPAI-2 (34%) were identified as problematic, as evident in Table 6.48. Of these items, 17 (5% of 341 items) were identified as problematic by 10 (2.4% of the sample) or more people.

Of the individuals in the sample, 92 (21.7%) found Item 51 (Interpersonal Relatedness factor, Traditionalism versus Modernity subscale), which contains the phrase “filial piety”, to be problematic. Of the sample, 52 (12.2%) found Item 244 (Interpersonal Relatedness factor, Thrift versus Extravagance subscale), which contains the word “thrifty”, to be problematic. In all, 33 (7.8%) individuals found the word “cohabitation” in Item 185 (Interpersonal Relatedness factor, Traditionalism versus Modernity subscale) problematic, while 32 individuals (7.5%) found Item 300 (Interpersonal Relatedness factor, Traditionalism versus Modernity subscale), which refers to a woman’s chastity, to be problematic.

Of the individuals in the sample, 29 (6.8%) found Item 183 (Infrequency scale), which refers to “red spots on the neck”, to be problematic. In all, 25 (5.9%) of the sample found Item 276, which refers to “living like a hermit”, problematic. Item 276 contributes to the Self versus Social Orientation subscale from the Dependability factor. In total, 13 individuals (3.1%) found items 292 (Dependability factor, Inferiority subscale) and 54 (Interpersonal Relatedness factor, Traditionalism versus Modernity subscale) to be problematic. Item 292 makes reference to controlling people’s minds or having one’s mind controlled by someone using electronic waves. Item 54 refers to tolerating rebellious behaviour in children.

Of the respondents, 12 individuals (2.8%) found Items 323 and 34 problematic. Item 323 refers to having a “keen sense of new things”, and belongs to the Divergent Thinking subscale from the Social Potency factor. Item 34 refers to remembering how one spends money even if it is very little, and contributes to the Thrift versus Extravagance subscale on the Interpersonal Relatedness factor. In all, 11 individuals (2.6%) found items 40, 217 and 251 problematic. Item 40 is from the Internal versus External locus of Control subscale (Dependability factor) and refers to matrimony being pre-determined in heaven. Item 217 is from the Emotionality subscale of the Dependability factor and refers to being fickle and impulsive. Item 251 argues that “education is a sacred profession so teachers should not be concerned with remuneration”. Item 251 contributes to the Traditionalism versus Modernity subscale of the Interpersonal Relatedness factor.

Table 6.48: Problematic items identified in the CPAI-2

Item	Subscale	Factor	Problematic Phrase / Word	Freq	% of sample
276	Self vs Social Orientation	A	living like a hermit	25	5.9
79	Defensiveness	A	If it were not for my bad luck, I would have outdone many people	6	1.4
7	Veraciousness vs Slickness	A	take advantage of others' weaknesses to further my own goals	5	1.2
35	Self vs Social Orientation	A	eccentric and unusual	4	1.0
63	Graciousness vs Meanness	A	others are jealous of my good idea because it did not occur to them first	4	1.0
191	Defensiveness	A	those people who criticize me are making a big fuss over trivial matters; in fact, they have more problems than I do	4	1.0
239	Defensiveness	A	My abilities are much greater than those of other people but just never got a chance to demonstrate them	4	1.0
74	Veraciousness vs Slickness	A	good at putting on appearances, and therefore others cannot tell that I have not worked seriously	3	0.7
176	Defensiveness	A	I can do whatever others can do, and the only reason I have not done so is because I don't want to attract much attention	3	0.7
303	Interpersonal Tolerance	A	When people talk about my weaknesses or mistakes, I always get mad.	3	0.7
75	Graciousness vs Meanness	A	I seldom bear grudges	2	0.4
92	Graciousness vs Meanness	A	many people will resort to telling lies to get ahead of others.	2	0.4
107	Graciousness vs Meanness	A	When someone offends me, I will always bear that in mind.	2	0.4
136	Self vs Social Orientation	A	I like to do things that others find unconventional	2	0.4
230	Graciousness vs Meanness	A	Many people are honest only because they fear being exposed	2	0.4
268	Defensiveness	A	One day I will become famous overnight, and people who now look down on me will have to eat their words and try to make up	2	0.4
14	Veraciousness vs Slickness	A	In order to gain advantages, I would often abandon my principles	1	0.2
43	Graciousness vs Meanness	A	I am sure if I were to encounter a misfortune, some people would take pleasure in it	1	0.2
42	Consistency	C	I really admire those people who are good at getting themselves in the limelight	6	1.4
159	Consistency	C	I really admire those people who are good at getting themselves into the limelight.	6	1.4
238	Consistency	C	I strongly believe that life is cruel to me	5	1.2
308	Consistency	C	I do not cry easily	4	1.0
22	Consistency	C	I strongly believe that life is cruel to me	3	0.7
156	Consistency	C	I am very passive	3	0.7
38	Consistency	C	When people show me respect, I should show them more respect in return	2	0.4
292	Inferiority	D	I have controlled other people's minds, or my mind has been controlled by others, through electronic waves	13	3.1
40	Internal vs External LOC	D	Matrimony is pre-determined in heaven	11	2.6
217	Emotionality	D	I am fickle and easily become impulsive	11	2.6
299	Inferiority	D	I do not have difficulty keeping my balance when walking down the street	7	1.7
325	Family Orientation	D	Sometimes I hate my family members	7	1.7
89	Face	D	I am usually very particular about the way I dress because I do not want others to look down on me.	5	1.2
68	Internal vs External LOC	D	It is unlikely for a person to become a successful leader without being given the right opportunity	4	1.0
23	Internal vs External LOC	D	I believe that all things are predetermined in destiny	4	1.0

90	Internal vs External LOC	D	Whether someone can be successful depends on his/her talent and hard work rather than on luck and opportunity	4	1.0
273	Optimism vs Pessimism vs Pessimismvs Pessimismvs	D	I have my own understanding of life, and therefore I know life's meaning	4	1.0
120	Emotionality	D	I can be calm and composed all the time	3	0.7
132	Face	D	feel a loss of face when others turn down my favour	3	0.7
284	Inferiority	D	It seems that no one understands me	3	0.7
28	Optimism vs Pessimism vs Pessimismvs Pessimismvs	D	I would be depressed and in pain for no reason	2	0.4
96	Inferiority	D	I have suffered so many grievances but can turn to nowhere to complain	2	0.4
98	Family Orientation	D	If I have something to do and expect to be late coming home, I usually let my family know in advance	2	0.4
110	Face	D	Inviting someone out to dinner has to be done in style in order to keep up appearances	2	0.4
137	Internal vs External LOC	D	Only lucky people get a good job	2	0.4
151	Optimism vs Pessimism vs Pessimismvs Pessimismvs	D	very hurt by others' criticism or reproach	2	0.4
153	Inferiority	D	usually look down and dare not look people in the eye	2	0.4
158	Internal vs External LOC	D	I should always rely on my persistent hard work and not on luck	2	0.4
226	Family Orientation	D	Compared to others, our family is lacking in intimacy and compassion	2	0.4
36	Emotionality	D	I am quick-tempered	1	0.2
94	Inferiority	D	When I have to speak up, my mind would go blank, and I cannot think of anything	1	0.2
97	Practical mindedness	D	People who conform to rules and social norms are too simplistic in their thinking; talking to them bores me stiff	1	0.2
175	Practical mindedness	D	I often day-dream	1	0.2
183	Infrequency	INF	I often get red spots on my neck	29	6.8
201	Infrequency	INF	Somebody has poisoned my food	10	2.4
213	Infrequency	INF	I feel a shortness of breath even when I am sitting down	10	2.4
253	Infrequency	INF	Someone is controlling my mind	10	2.4
256	Infrequency	INF	Sometimes I think I am possessed by a ghost	10	2.4
102	Infrequency	INF	Sometimes I find myself attracted to other people's possessions like shoes, gloves, etc.; although they are of no use to me, I cannot resist touching or sometimes even stealing them	9	2.1
172	Infrequency	INF	Someone has wanted to harm me or kill me	8	1.9
241	Infrequency	INF	I have been possessed by spirits	8	1.9
321	Infrequency	INF	I felt that I have been directed to do something under hypnosis at least once	7	1.7
195	Infrequency	INF	My mother is (was) a good person	6	1.4
283	Infrequency	INF	People have told me that I sleep walk	5	1.2
144	Infrequency	INF	Everything tastes the same to me	4	1.0
260	Infrequency	INF	No one in this world cares about me	4	1.0
142	Infrequency	INF	There is not a single good person in this world	3	0.7
269	Infrequency	INF	I am convinced that someone is following me	3	0.7
329	Infrequency	INF	When I come across new points of view, I first analyse how they are different from my own	3	0.7

129	Infrequency	INF	Sometimes when I am with friends, we will take some stimulants to get high	1	0.2
51	Traditionalism vs Modernity	IR	I try my best to listen to my parents out of filial piety	92	21.7
244	Thrift vs Extravagance	IR	I am very thrifty even when I am using public property	52	12.2
185	Traditionalism vs Modernity	IR	Cohabitation is acceptable	33	7.8
300	Traditionalism vs Modernity	IR	A woman's chastity is more important than her life	32	7.5
54	Traditionalism vs Modernity	IR	Parents should tolerate their children's "rebellious" behavior	13	3.1
34	Thrift vs Extravagance	IR	I can remember how I spent my money even if it were a few dollars	12	2.8
251	Traditionalism vs Modernity	IR	Education is a sacred profession; therefore teachers should not mind too much about their pay	11	2.6
37	Harmony	IR	It is a virtue to tolerate everything	7	1.7
131	Discipline	IR	I am very demanding on myself; it would be great if everyone else was like that	7	1.7
72	Relationship Orientation	IR	I believe most famous people have real substance and seldom rely on others to blow their trumpets	6	1.4
152	Discipline	IR	I believe traditional ideas or concepts should not be torn down	6	1.4
17	Traditionalism vs Modernity	IR	Children do not have to follow their parents' wishes when choosing a partner for marriage	5	1.2
20	Harmony	IR	I try my best to maintain harmony in my family because I believe that if a family lives in harmony, all things will prosper	5	1.2
24	Thrift vs Extravagance	IR	I frequently buy snacks	4	1.0
77	Traditionalism vs Modernity	IR	It is acceptable for subordinates to voice their opinions if their superiors made a mistake	4	1.0
78	Relationship Orientation	IR	After I have been treated to a meal, I will try to return the favour as soon as possible	4	1.0
130	Harmony	IR	My mind is at peace, and I have few desires	4	1.0
187	Relationship Orientation	IR	When people show me respect, I should show them more respect in return	4	1.0
228	Discipline	IR	I have a much stricter sense of right or wrong than most people	4	1.0
229	Thrift vs Extravagance	IR	In order to save money, I take public transport whenever I go out	4	1.0
258	Traditionalism vs Modernity	IR	No matter who supports the family financially, the man is still the head of the household	4	1.0
282	Social Sensitivity	IR	Wherever I am, the atmosphere is always lively	4	1.0
76	Traditionalism vs Modernity	IR	Kids that deserve the most praise are those who obey the rules just as adults do	3	0.7
82	Relationship Orientation	IR	When dealing with organizations, things can work out more smoothly through the connections of friends working inside	3	0.7
85	Social sensitivity	IR	There is no barrier between me and other people	3	0.7
105	Relationship Orientation	IR	During the holiday seasons, I always visit relatives and friends for bonding or strengthening our relationships	3	0.7
212	Traditionalism vs Modernity	IR	Ancestral sacrifices, weddings, funerals, etc. should be conducted in keeping with their traditional forms and etiquette, and should not be modified casually	3	0.7
117	Relationship Orientation	IR	In order to avoid offending others, it is best not to show off too much	2	0.4
140	Harmony	IR	I follow the saying that "Those who are contented are always happy" as a principle of life	2	0.4
145	Traditionalism vs Modernity	IR	Students should concentrate on their studies and not get distracted by what is happening in the society	2	0.4
154	Discipline	IR	It would be great if everyone had a similar way of thinking or a similar value system	2	0.4
218	Traditionalism vs Modernity	IR	To maintain a pure and simple culture, eccentric clothes and hairstyles should be strictly banned	2	0.4

285	Discipline	IR	Rules and laws should be strictly enforced and should be without exception	2	0.4
301	Relationship Orientation	IR	Blood is thicker than water, and no matter what, one's feelings for one's family are always stronger than for outsiders	2	0.4
319	Traditionalism vs Modernity	IR	To avoid mistakes in life, the best thing to do is to listen to the elders' suggestions	2	0.4
286	Discipline	IR	One can avoid making serious mistakes by always following tradition	1	0.2
323	Divergent Thinking	SP	I have a keen sense of new things	12	2.8
198	Aesthetics	SP	I think erotic paintings or sculptures are also beautiful	8	1.9
311	Aesthetics	SP	I can feel the miracles of the universe when looking at the sky	8	1.9
10	Aesthetics	SP	I like drawing or doing calligraphy (the art of beautiful handwriting) in my spare time	7	1.7
106	Logical vs Affective Orientation	SP	I like reading romantic stories rather than detective stories	6	1.4
127	Logical vs Affective Orientation	SP	I enjoy brainteasers or games that require thinking	4	1.0
41	Aesthetics	SP	I think most poems are uninteresting and difficult to understand	3	0.7
83	Logical vs Affective Orientation	SP	I seldom find time to quiet down and seriously think about current life	3	0.7
18	Novelty	SP	I always look for inspiring experiences to stimulate my thinking	2	0.4
50	Leadership	SP	When several people are working together on something and there is no leader around, I will take over	2	0.4
125	Logical vs Affective Orientation	SP	In face of pressure, I would observe myself and try to analyse my psychological reactions	2	0.4
149	Aesthetics	SP	I like visiting art museums and galleries	2	0.4
330	Diversity	SP	I seldom do adventurous activities to avoid getting hurt	2	0.4

Items 201, 213, 253 and 256 were identified as problematic by 10 individuals (2.4%). All four of these items are from the Infrequency scale on the CPAI-2. Item 201 refers to someone poisoning one's food. Item 213 refers to having shortness of breath even when sitting down. Item 253 refers to someone controlling one's mind, and Item 256 refers to being possessed by a ghost.

From Table 6.48 It is evident that 17 of the 117 problematic items come from the Infrequency scale and the Infrequency scale has only 20 items. Of the 117 items, 7 also come from the Consistency scale, which consists of 9 pairs of items. Thus 24 of the 117 problematic items (20.5% of problematic items, 7% of total items on the CPAI-2) come from 2 of the validity scales.

Of the remaining 93 problematic items (27% of total items on the CPAI-2), 13 items are from the Social Potency factor, 26 items from the Dependability factor, 18 items from the Accommodation factor and 36 items from the Interpersonal Relatedness factor. Social Potency has a total of 80 items, hence 16% of the items on this factor being reported as problematic. Dependability has a total of 104 items, hence 25% of the items on this factor being reported as problematic. Accommodation has 50 items in total and therefore 36% of its items being reported as problematic, while Interpersonal Relatedness has 49% of its total of 73 items reported as problematic.

At the subscale level, Aesthetics (Factor SP, 5/10 items, 50%), Logical versus Affective Orientation (Factor SP, 5/10 items, 50%), Internal versus External Locus of Control (Factor D, 6/10 items, 60%), Defensiveness (Factor A, 5/10 items, 50%), Graciousness versus Meanness (Factor A, 6/10 items, 60%), Traditionalism versus Modernity (Factor IR, 13/15 items, 87%), Discipline (Factor IR, 6/11 items, 55%) and Relationship Orientation (Factor IR, 7/12 items, 58%) have 50% or more items identified as problematic. The remaining subscales have 30% or less of items identified as problematic, which translates into 1 to 4 items per subscale, where the subscales consist of between 10 and 14 items – with the only exception being Inferiority (Factor D), with 6 of its 18 items (33%) identified as problematic.

6.8.8. Thematic analysis of responses: NEO-PI-R

Three overarching themes were obtained from the responses received to two open-ended questions following the presentation of the NEO-PI-R in the questionnaire, namely linguistic difficulties, item construction issues, and the relevance of items. Subthemes were identified within each of the themes and these are reported together with the themes below.

6.8.8.1. Linguistic difficulties

From Table 6.49 It is evident that 45% of the sample (*n* = 191) encountered some linguistic difficulty with the NEO-PI-R. However an examination of the nature of the linguistic difficulty reveals that 10.8% (*n* = 46) of individuals only found Item 119 with the word “panhandlers” to be problematic. A further 6.8% (*n* = 29) of individuals reported linguistic difficulties only as they related to items containing the words “panhandler”, “fastidious”, “lackadaisical” and/or “permissiveness”.

In all, 27.3% (*n* = 116) reported more generalised linguistic difficulties on the NEO-PI-R. Individual 59 reported, “English is overqualified and there just was no need as I felt in order to answer honestly, understanding should come first…high jargon just too much”. Individual

225 reported, “They strong, big, very intellectual words. English is not my first language”, while Individual 428 wrote, “Never heard words before, English is difficult. English is my second language”. Individual 345 wrote, “Some terms were just not clear due to a lack of understanding of certain words” and Individual 128 reported, “English just too higher grade…appears to be a language test”.

Table 6.49: Themes and subthemes for NEO-PI-R substantiated responses

Theme	Frequency	% of sample
Linguistic difficulties	191	45
- *Panhandler item only*		
- *Panhandler, fastidious, lackadaisical, &/or permissiveness items only*	46 29	10.8 6.8
- *More general problems with understanding words/phrases*	116	27.3
Item construction	92	21.7
Items were double-barrelled/ambiguous	23	5.4
Items were repetitive	23	5.4
- *Positive comments, e.g. good check on reliability/validity*	8	1.9
- *Negative comments, e.g. being tricked*	12	2.8
Questionnaire too long – too many items	6	1.4
Static nature of questionnaire vs contextual behaviour in humans	22	5.2
Relevance of items	35	8.2
General comments	5	1.2
Items were too personal	5	1.2
Cultural relevance	8	1.9
Have not been/seldom been in situations suggested by items	17	4

6.8.8.2 Item construction

A second theme to emerge is related to item construction. Of the sample, 21.7% (*n* = 92) thought that there was some problem with the construction of the items and the questionnaire, as evident in Table 6.49. Of the sample, 5.4% (*n* = 23) were of the opinion that items are double-barrelled and/or ambiguous. Individual 122 reported that “all double negatives confusing and basically asks same questions over and over again in different ways and gets irritating”. Individual 288 wrote, “I like art but dislike poetry, they were associated in one question”. Individual 142 reported, “Ambiguous meanings, difficult to define a context, to refer to some I was unfamiliar with the way it was meant or word itself”.

Individual 425 wrote, “I thought some questions were ambiguous. For example (Q:217) - did you want to know whether I enjoy parties with lots of people, as opposed to fewer or whether I just enjoy parties in general? (Q:238) - I simply didn’t understand”.

In all, 5.4% (*n* = 23) were also of the opinion that items were repetitive. However, 1.9% (*n* = 8) of individuals saw this as a strength. Individual 285 wrote, “Repetition of identical questions, although those may be used as continuity indicators”, and Individual 112 wrote, “Most repeated in different forms just to test one’s authenticity and validity of answers, there’s a wide range covering many aspects of one’s life”. In total, 2.8% (*n* = 12) reported the repetition as being a negative feature of the NEO-PI-R, as evident in Individual 122’s comments above. Individual 213 also reported, “Many items repetitive which makes one feel you trying to be ‘caught out’”.

Related to the repetition but addressing a different issue is the subtheme relating to the length of the questionnaire. Even though only 1.4% (*n* = 6) of the sample referred to it in their responses, many more gave this feedback personally at various points during the research. Individual 3 wrote, “Far too many items. Too long. Cut down. Questions repeated”, while Individual 437 reported, “It was rather big and confusing”.

A final theme to emerge under item construction relates to the static nature of the items in the NEO-PI-R. Individual 8 wrote, “Different situations/settings I’d act differently in and without being able to substantiate answers in certain questions I’d just come across as contradictory”. Individual 142 reported, “Conflicting in sentence, i.e, two different meanings, only one I identified with, in certain contexts or situations one may behave in a particular way, difficult to make general judgement”, while Individual 220 wrote, “Can’t give a definite answer to these questions, answer differs depending on specific situation or instance you in...”. Individual 213 wrote, “…some hard to answer - your opinion changes depending on situation”. Individual 440 reported, “…Also different ‘personality’ in different situations e.g. - I get angry quickly with my family but not with friends or at work”.

6.8.8.3. Relevance of items

A third theme to emerge is the relevance of items. From Table 6.49 it is evident that 8.2% (*n* = 35) of individuals expressed some concern as to the relevance of the items in the NEO-PI-R. Of the respondents, 1.2% (*n* = 5) questioned the relevance of items more generally. Individual 401 wrote, “Some I didn’t know the meanings of, others were just plain irrelevant and some were ambiguous”, while Individual 34 wrote, “It has no relevance to me”. In all, 1.2% (*n* = 5) of individuals found the items too personal. Individual 35 reported, “They

appeared to be rather personal questions and all seemed to be questions on opinion. I feel most uncomfortable about those too personal…"

The lack of relevance to a South African culture in certain items was also reported by 1.9% (*n* = 8) of the sample. According to Individual 217, "Seems to be slang from somewhere that isn't used much in S.A". Individual 98 wrote, "Jumping for joy - not an expression of joy I find natural. Las Vegas seems like an arbitrary place". Individual 362 wrote, "Yes, although a lot of it does not apply to the Tswana culture, but Western culture". Finally 4% (*n* = 17) of individuals reported the items as being problematic in that they had not been or were seldom in the situations described in the items. Individual 366 wrote, "Some were about situations I have never been in before". Individual 6 reported, "Poetry; art questions: I don't deal with these things on a daily basis".

6.8.9. Thematic analysis of responses: CPAI-2

As with the NEO-PI-R, four overarching themes were obtained from the responses received to two open-ended questions following the presentation of the CPAI-2 in the questionnaire – namely, linguistic difficulties, item construction issues, the relevance of items and the dynamicity of human behaviour and actions. Subthemes were identified within each of the themes and these are reported together with the themes below.

6.8.9.1. Linguistic difficulties

From Table 6.50 it is evident that 39.8% of the sample (*n* = 169) encountered some linguistic difficulty with the CPAI-2. However, an examination of the nature of the linguistic difficulty reveals that 5.9% (*n* = 25) of individuals only found Item 51 with the words "filial piety" to be problematic. A further 3.5% (*n* = 15) of individuals reported linguistic difficulties only as they related to items containing the words "filial piety", "cohabitation" and/or "thrifty".

In all, 26.1% (*n* = 111) reported more generalised linguistic difficulties on the CPAI-2. Individual 8 referred to "…the big words", while Individual 106 wrote, "Difficult to understand due to the fact that I don't use those words or items in my vocabulary or in my day to day uses". Individual 225 wrote, "Very big words and I'm not an English 1st language speaker - difficult to understand some words".

Table 6.50: Themes and subthemes for CPAI-2 substantiated responses

Theme	Frequency	% of sample
Linguistic difficulties	169	39.8
- *Filial piety item only*	25	5.9
- *Cohabitation item only*	8	1.9
- *Thrifty item only*	10	2.4
- *Filial piety, thrifty, &/or cohabitation items only*	15	3.5
- *More general problems with understanding words/phrases*	111	26.1
Item construction	176	41.4
Items were double-barrelled/ambiguous	17	4
Items were repetitive	37	8.7
- *Positive comments, e.g. good check on reliability/validity*	7	1.6
- *Negative comments, e.g. being tricked*	30	7.1
Questionnaire too long – too many items	7	1.6
Item content and phrasing inappropriate	32	7.5
- *Statement true, reason false*	15	3.5
- *Testing for psychiatric symptoms not personality*	17	4
True/false forced choice format inappropriate	31	7.3
Static nature of questionnaire vs contextual behaviour in humans	22	5.2
Relevance of items	92	21.7
Personal relevance of items	53	12.5
- Items were too personal	9	2.1
- Items not relevant to me – Have not been/seldom been in situations suggested by items	44	10.4
Cultural relevance of items	39	9.2
- *Items not relevant in a SA context*	15	3.5
- *Item responses and familiarity are dependant on cultural influences*	24	5.7
- *Positive comments*	4	0.9
- *Negative comments*	20	4.7

6.8.9.2. Item construction

A second theme to emerge centres around item construction issues, as evident in Table 6.50. In total, 41.4% (*n* = 176) of individuals in the sample expressed some concern relating to item construction. In all, 4% (*n* = 17) expressed their concern that items were double-barrelled or ambiguous. Individual 17 wrote, “Some questions were ambiguous as they

would ask two different questions in one. Examples of this are questions: 131, 251, 301. I didn't understand question 198 as I found it ambiguous, what do they mean by erotic? Erotic can be different for different people".

Of the sample, 8.7% (*n* = 37) expressed concern that many items were repeated. However, some saw this as a positive aspect (1.6%, *n* = 7) of the CPAI-2 as evidenced by Individual 44 who wrote, "Repeats questions or asks the same questions in different ways thus testing consistency, thus revealing the true characteristics of one's personality". Individual 106 reported, "Found questions broad but repetitive, although asked differently in order to see if one was consistent and to get quality of personality in forms of depth". There were more individuals though who regarded the repetition of items negatively (7.1%, *n* = 30). Individual 36 reported, "Several items were repeated, too much repetition makes one lose interest", while Individual 338 wrote, "The repetition of questions was annoying and inappropriate as it was a waste of ink and paper to keep asking the exact same questions". A related theme to the repetition of items is that the questionnaire had far too many items and was too long (1.6%, *n* = 7). Individual 157 reported, "Too many repeated making the questionnaire take too long".

A further subtheme to emerge relates to the item content and phrasing, as evident in Table 6.50. Of the sample, 7.5% (*n* = 32) found this to be problematic. In all, 3.5% (*n* = 15) found the phrasing problematic since one may agree with one part of the statement but not the second part. Individual 220 wrote, "Answers differ in different situations and the answer to the 1st part of some questions might/does differ from the 2nd part, e.g., 206 'when in school' - maybe I never went school but was still interested in art and music, would answer be true or false?" Individual 350 reported, "Quite a few questions state one thing before the comma (which may be true) and another thing after (which may be false) therefore it does not show a true reflection of the person". Of the sample, 4% (*n* = 17) found the content of the items problematic and were of the opinion that the items were assessing psychiatric symptoms. Individual 27 wrote, "It does, but the questions about aliens and possession indicate psychosis rather than personality", while Individual 46 reported, "The item on being controlled by a ghost is unrealistic and could be a question for mentally handicapped people". Individual 236 reported, "Question on possession by ghosts/spirits, although do believe. In question on doing things under hypnosis and being controlled by others minds through electronic means - psychiatric or normal personality questionnaire". Individual 207 wrote, "A lot appear 'culture specific' or refer to 'seemingly' irrelevant issues like physical symptomology, also lots of items i.e. characteristics we deem as 'crazy' e.g., controlled by mind-waves etc.".

The dichotomous response format used in the CPAI-2 was found to be problematic by 7.3% (*n* = 31) of the sample. Individual 8 reported, “I feel that some questions I feel neutral about or would act differently in different situations and yet one was forced to pick 1, I think the 1-5 was more effective”. Individual 119 wrote, “True/false dichotomy: some parts would be more appropriate on a rating scale”, while Individual 273 reported, “Many of the questions are neither 'true' or 'false' in my case, but fall somewhere in between”. Individual 267 was of the opinion that it is, “difficult to just have true/false answers, there needs to be a grey area like a scale, some answers aren’t yes/no - you can be indifferent or not feel passionately about it for it to be fully false/true”.

A final subtheme to emerge under item construction is that of the static nature of the items. Of the sample, 5.2% (*n* = 22) found the static nature of the questionnaire frustrating. Individual 259 wrote, “I just battled giving 1 answer for some questions as the answer depends on the situation I’m in or on the emotions I’m feeling during that situation”. Individual 396 reported, “The word 'always' was used in many questions. It depends on given situations to behave in a particular way. I prefer the word 'seldom'“. Individual 394 wrote,

> I am not so sure because in many of the questions they might be telling you not just a persons attitude on something, but the answer is actually all down to whether someone has even been in a particular situation before and there is no way of you distinguishing this. Another problem is a fair amount of the questions refer to a work situation and because the study is directed at Wits students it is quite problematic. Some of the questions apply to us but others don’t because we have never been in a similar situation before.

6.8.9.3. Relevance of items

From Table 6.50 a third theme relating to the relevance of items is evident. In all, 21.7% (*n* = 92) found the items to be problematic either in terms of relevance to themselves (personal relevance) or to the culture/s within which they function (cultural relevance).

Of the sample, 12.5% (*n* = 53) found the CPAI-2 problematic in terms of relevance of the items for their lives. Of the 12.5%, 2.1% (*n* = 9) found the items on the CPAI-2 to be “too personal” (Individual 113). Individual 289 wrote, “It asked questions that were personal”. Of the sample, 10.41% (*n* = 44) found the items irrelevant since they had not experienced the situations described by the items. Individual 6 reported, “I’ve never been in a situation like that before so I don’t know how I’d react. They're not part of my lifestyle/personality”.

Individual 65 wrote, “Requires a 3rd answer - depends on situation”. Individual 227 wrote, “Questions about business/corporate/organisational issues - inappropriate for me as I’ve rarely experienced the described scenarios”. Individual 400 reported, “I’m not sure how ghosts, my balance, the universe, miracles and hypnosis are related to my personality”.

Of the sample, 9.2% (*n* = 39) expressed concern around the cultural relevance of the items. Of these, 3.5% (*n* = 15) were of the opinion that the items were not relevant to the South African context. Individual 9 wrote, “It is created in America - 34-dollars. How does it (the entire survey) relate to South Africa?” Individual 299 wrote,

> I cannot see how taking a public transport has to do with personality more than affordability. This item is problematic because it assumes that we all have cars, which is untrue especially in South Africa with previous inequality, current poverty, unemployment, etc. Generally some items did not apply to me. The question about family photos does not reflect me as a person but rather if my family could afford or believed in photos.

Individual 310 wrote, “See items problematic in S.A. (e.g.) - someone trying to harm or kill you - do crime instances count?” Individual 401 reported, “It was possibly asking questions more pertinent to Chinese culture though”. Individual 334 wrote, “No. It appeared to be looking at whether or not the test would be valid in a S.A population. It appeared to have a collectivist view of personality (focusing on the family) rather than an individualistic approach”.

In all, 5.7% (*n* = 24) of the 9.2% (*n* = 39) indicated that cultural influences would impact on item responses. Individual 218 wrote, “It did in a way but it felt repetitive and superficial when compared to the 1st test, not all items were appropriate to me as I’m not set on a religious or cultural way”. Individual 154 wrote, “Some depend on way one was brought up, some on one’s faith”. In all, .9% (*n* = 4) saw this as a positive aspect. According to Individual 83, “More than mere personality - also looked at different aspects of enculturation, eye contact, elders, tradition, etc. (very useful)”. In total, 4.7% (*n* = 20) regarded the cultural aspects of the CPAI-2 as being a negative aspect. Individual 203 wrote, “Questions about mind control etc. seemed erroneous, very culturally based in some areas, e.g. family and tradition, may not be suitable to South Africans”. Individual 214 reported, “Q:300 inappropriate - in a feminist approach I believe perspectives of women on matters such as equality and autonomy are worthy of respect and should be taken seriously in a manner that doesn’t subordinate interests of women”. Individual 413 reported, “All the questions relating to family were too narrow and blind to the social situations currently of broken families”, while

Individual 418 wrote, “I found the questions about the supernatural and possession rather odd and out of place but I understand it is important for certain cultures and religious beliefs so I do not overall find them inappropriate”.

6.9. CONCLUSION

This chapter has provided all results relevant to the study, beginning with descriptive statistics for the sample, and then presenting the descriptive statistics for the two instruments, the NEO-PI-R and the CPAI-2. Following this, results pertaining to the reliability, validity and the examination of construct, method and item bias for each of the two instruments were presented.

The descriptive statistics for the sample were adequate after the groupings were collapsed for the gender, population group and home language variables. The descriptive statistics for the two instruments were also adequate, with the majority of the scales being normally distributed.

The descriptive statistics results were followed by a report on results relating to the internal consistency and test-retest reliability of the two instruments. Internal consistency reliability was found to be appropriate for the five domains of the NEO-PI-R but problematic for two of the four factors on the CPAI-2. Facet reliability coefficients on the NEO-PI-R were also found to be appropriate for all of the facets, with the exception of Impulsivity, Actions and Tender-Mindedness. Test-retest reliability results were calculated on a sample of 10 students and must therefore be interpreted with caution. With the exception of the Extraversion domain, all of the other four domains on the NEO-PI-R appear to have good test-retest reliability. Three facets on Extraversion, three facets on Openness to Experience and one facet on Conscientiousness demonstrated test-retest reliability coefficients below .60. Test-retest reliability coefficients were also poor for the Dependability and Interpersonal Relatedness factor scales as well as for 18 of the CPAI-2 subscales.

The face validity of both instruments was adequate. Construct validity results using factor analysis with varimax and Procrustes rotation demonstrated appropriate construct validity for the NEO-PI-R, with only the Actions facet not loading as it should. Construct validity for the CPAI-2, as assessed with factor analysis and varimax rotation, was poor, with the subscales not loading as indicated in the model. Statistically a five factor solution was supported for the CPAI-2. However Procrustes results indicated a sufficient degree of congruence between

the factor matrix in the current study and that of the CPAI-2 developers (Cheung et al., 2008).

The chapter concluded with the bias results, which were presented in the three broad categories of construct, method and item bias. In general, the construct bias results indicate that the Impulsiveness, Excitement-Seeking, Actions, Fantasy, Activity, Values, Straightforwardness and Tender-Mindedness facets on the NEO-PI-R exhibit construct bias, while the Logical versus Affective Orientation, Face, Internal versus External Locus of Control (LOC), Family Orientation, Veraciousness versus Slickness, Relationship Orientation, Social Sensitivity and Thrift versus Extravagance subscales on the CPAI-2 demonstrate evidence of construct bias. Some evidence for method bias across home language in the NEO-PI-R and across population group in the CPAI-2 was found. However, the effect sizes for these differences were small. Both the quantitative and qualitative results indicate the presence of item bias in both instruments. What follows in Chapter 7 is a discussion of the results presented in this chapter.

CHAPTER 7: DISCUSSION

7.1. INTRODUCTION

This chapter provides a discussion of all results obtained in this study in accordance with the manner in which they were reported in Chapter 6, since this structure mirrors the aims of the study. Thus the descriptive statistics for the sample are initially discussed. This is followed by some discussion of the descriptive statistics of the NEO-PI-R and the CPAI-2. Following this the results pertaining to the internal consistency reliability and test-retest reliability of both instruments are discussed. Results pertaining to the face validity and construct validity of both instruments are then discussed. Following this, all results pertaining to issues of bias are discussed. The chapter concludes with an overall discussion of the results, grounding them in the arguments introduced in Chapters 1 to 4. Implications of these results for psychometric research in South Africa, the etic-emic debate, the universality of the FFM, and the debates on national identity and acculturation are also addressed.

7.2. DESCRIPTIVE STATISTICS: DEMOGRAPHIC INFORMATION

It is important that the descriptive statistics of the sample be discussed at the outset since a number of results reported hereafter need to be interpreted with caution based on the nature and size of the sample in this study.

The total sample size for this study was 425. This is a fairly large sample size and was adequate for the statistical analyses conducted on the entire sample. However, in the bias analyses the sample needed to be examined in terms of sub-groupings. From Tables 5.1 and 5.2 in Chapter 5, and Table 6.1 in Chapter 6, it is evident that gender groupings, population group groupings and home language groupings were unequal, with a predominance of a particular group in each category. Also, the sizes of the sub-groupings for population group and home language were too small for the analyses to be conducted. Hence I collapsed the groupings (and discussed the justification for this at length in previous chapters). What is of importance for this chapter though is that despite the collapsed groupings the sample size in the home language variable for the English second language group was 132, which is below the recommended 150 for factor analysis. Also, the number of males in the study was 122 – again below the recommended 150 (Guadagnoli & Velicer, 1988). However the sample sizes were above 100, which is also often cited as a benchmark for factor analysis (Kline, 1994).

In terms of home language, the fact that the majority of the sample spoke English as a first language is an advantage since it suggests that problems identified because of poor language proficiency could be eliminated to an extent. Furthermore Table 5.1 indicates that English second language speakers rated themselves as fairly proficient in the language, both in terms of reading ability and comprehension. This should allow for the examination of true differences using home language as a variable. Thus language differences might imply actual differences rather than artifactual ones.

If one considers the gender distribution in the sample it is evident that the majority of the sample were female (71.29%). Although an attempt was made to obtain a more equivalent split this was beyond my control. Due to problems with obtaining permission (as discussed in Chapter 5), I could not approach classes and students that would have led to a more representative sample. I had to rely on Psychology students since they were easily accessible, and at the University of the Witwatersrand Psychology students tend to be female. Furthermore, students were reticent with regard to completing the questionnaire due to its length. Hence obtaining a bigger and more representative sample was not possible within the time frame within which this study needed to be undertaken. There was also limited funding available for the study.

Consequently, the size and composition of the sample limits the generalisability of the results. According to the most recent mid-year population estimates (Statistics South Africa, 2009), approximately 52% of the South African population are female. African individuals constitute 79.3% of the population, Coloured individuals 9%, Indian/Asian individuals 2.6% and White individuals 9.1%. In total non-White individuals constitute 90.9% of the population but were only represented in 55.53% of this sample. This gross inequality is not only due to the difficulties discussed in obtaining a sample but is reflective of the broader inequalities that persist in South Africa despite being 16 years into a democratic society. These inequalities filter down to access to higher education. Education is still a privilege for many of the Black individuals in South Africa. While universities are seeking to redress this problem, the sample in this study reflects that there is still a long way to go before equality is restored in South Africa. However, the composition of this sample indicates a marked change from the situation pre-1994, when very few Indian and Coloured and even fewer African individuals had access to higher education.

With this in mind one is likely to question the value of this study based on the sample used. In this regard it should be noted that studies of the type undertaken here are vital for

transformation in South Africa. They have much to contribute towards equality and opportunity. Furthermore, studies of this nature are important for personality psychology locally and internationally. An examination of literature in the field indicates that most studies begin with samples of students and in many cases Psychology students. Thus this research does have value and is a necessary exploration, which will lay the foundation for future research using larger and more representative samples.

7.3. DESCRIPTIVE STATISTICS: NEO-PI-R

Descriptive statistics in the form of means, standard deviations, minimum and maximum values and skewness coefficients were examined for the domains and facets of the NEO-PI-R. As is evident from Table 6.2, all the scales were normally distributed. The means, standard deviations, and minimum and maximum values were within the ranges specified in Costa and McCrae (1992). Table 7.1 presents the means and standard deviations obtained in the normative university sample (Costa & McCrae, 1992). A comparison of the values in Tables 6.2 and 7.1 shows a difference of two points at most in mean scores between the South African (M_{SA}) and American (M_{US}) samples on the facet scales. Facet standard deviations for both samples are generally similar. South African students tend to be approximately two-fifths of a standard deviation higher on Depression and Aesthetics and half a standard deviation higher on Ideas, as is evident in Table 7.1. Thus South African students tend to be slightly more prone to feelings of hopelessness, loneliness, guilt and sadness but at the same time they tend to be slightly more appreciative of art and beauty than their American counterparts. South African students are also more likely to be open-minded and willing to consider new and unconventional ideas than their American counterparts.

At the domain level, at most a difference of two points was noted between the South African and the American samples on Neuroticism, Agreeableness and Conscientiousness, as is evident in Tables 6.2 and 7.1. A 3.97 difference in means was noted for Extraversion and a 5.91 difference in means for Openness to Experience. South Africans were found to score higher on all the domains with the exception of Extraversion. Based on these results it is evident that South African students in this study are a fifth of a standard deviation lower than American students on Extraversion and a third of a standard deviation higher on Openness to Experience. South African students also have higher standard deviations than their American counterparts but this differs by at most 1.8 on Extraversion, 1.2 on Agreeableness and less than 1 on the remaining three domains. Thus South African and American students

Table 7.1: Means and standard deviations for the NEO-PI-R (Form S, College age)

NEO-PI-R	M	SD	Diff (M_{SA} - M_{US})
Neuroticism	96.30	21.90	1.57
Anxiety	17.50	5.00	0.53
Angry Hostility	16.00	5.10	-0.99
Depression	15.30	5.70	1.62
Self-Consciousness	16.40	4.70	0.53
Impulsiveness	18.40	4.30	-0.18
Vulnerability	12.80	4.40	-0.01
Extraversion	121.20	18.20	-3.97
Warmth	23.20	4.30	-0.27
Gregariousness	19.20	5.10	-1.58
Assertiveness	17.00	5.10	-0.22
Activity	18.80	3.80	-0.89
Excitement-Seeking	21.50	4.00	-1.89
Positive Emotions	21.50	4.10	0.85
Openness to Experience	116.80	17.80	5.91
Fantasy	20.10	4.80	0.97
Aesthetics	18.60	5.60	2.32
Feelings	22.40	4.30	0.48
Actions	15.80	3.50	-0.09
Ideas	19.10	5.00	2.55
Values	20.80	3.70	-0.27
Agreeableness	113.50	16.60	2.24
Trust	18.70	4.40	-1.67
Straightforwardness	18.30	4.80	0.87
Altruism	23.20	3.60	-0.02
Compliance	15.60	4.40	0.9
Modesty	18.00	4.50	0.61
Tender-Mindedness	19.80	3.30	1.53
Conscientiousness	114.50	21.10	0.90
Competence	21.10	4.00	-0.58
Order	17.80	4.90	0.49
Dutifulness	21.20	4.10	0.54
Achievement Striving	18.90	4.90	0.47
Self-Discipline	18.90	5.10	-0.87
Deliberation	16.60	4.50	0.86

Note. Adapted from “Revised Neo Personality Inventory (NEO-PI-R) and Neo Five-Factor Inventory (NEO-FFI) Professional Manual,” by P. T. Costa, Jr. and R. R. McCrae, 1992 (p. 77). Copyright by Psychological Assessment Resources, Odessa, FL. Adapted with permission of the authors.

do not seem to differ much with regard to their tendencies to experience negative affect, their tendencies towards sympathy, co-operativeness and helpfulness towards others and the degree to which they are persevering, responsible and organised. However South Africans do tend to be slightly less sociable, active and assertive than their American counterparts. They do exhibit more tendencies towards open-minded, creative, unconventional and novel thinking.

McCrae et al. (2005b), in their study of 51 cultures, report that 15 of the 19 Asian and African cultures were among the 20 cultures with the lowest variability. McCrae et al. (2005b) argue that East Asians are more prone to dialectical reasoning and this may have contributed to their endorsing more extreme responses at both the high and low ends of the scale, yielding average-level total scores and reducing the variability of the scale. McCrae et al. (2005b) also espouse the argument that members of collectivist cultures (including Asians and Africans) may vary less in personality traits because their behaviour is largely shaped by interpersonal relationships. In the current study, however, there were no notable differences between the American and South African student samples. The differences mentioned were at best defined by a third or half a standard deviation difference. It would be premature to accept the interpretation of these differences as significant without first considering the other analyses.

7.4. DESCRIPTIVE STATISTICS: CPAI-2

Descriptive statistics in the form of means, standard deviations, minimum and maximum values and skewness coefficients for the CPAI-2 are presented in Table 6.3. From Table 6.3 it is evident that all of the scales, with the exception of Diversity and Divergent Thinking, were normally distributed. Means, standard deviations and minimum and maximum values were generally within the ranges proposed by Cheung et al. (2008). An examination of the results of this study in relation to those obtained by Cheung et al. (2008) reveals that South African students are approximately a third of a standard deviation higher on Logical versus Affective Orientation, Extraversion versus Introversion, Enterprise and Emotionality, and approximately a third of a standard deviation lower on Responsibility, Practical Mindedness, Defensiveness, Graciousness versus Meanness, Veraciousness versus Slickness, and Relationship Orientation (see Table 7.2). South African students are also approximately half to two-thirds of a standard deviation higher on Novelty, Leadership and Self versus Social Orientation, and half to two-thirds of a standard deviation lower on Optimism versus

Table 7.2: Means and standard deviations for the CPAI-2

CPAI-2	M	SD	Diff (M_{SA} - M_C)
Social Potency	N/A	N/A	
Novelty	5.96	2.40	1.41
Diversity	6.26	2.36	2.28
Divergent Thinking	6.05	2.27	1.84
Leadership	4.85	2.59	1.61
Logical vs Affective Orientation	6.45	2.14	0.61
Aesthetics	5.79	2.26	0.34
Extraversion vs Introversion	5.55	2.55	1.01
Enterprise	5.26	2.29	0.56
Dependability	N/A	N/A	
Responsibility	6.01	2.48	-0.86
Emotionality	3.84	2.29	0.74
Inferiority vs Self-Acceptance	5.18	3.77	-0.63
Practical Mindedness	8.24	2.11	-0.99
Optimism vs Pessimism	6.55	2.19	-1.16
Meticulousness	5.88	2.26	-0.10
Face	5.11	2.32	0.23
Internal vs External LOC	5.12	2.26	1.99
Family Orientation	6.71	2.22	-1.56
Accommodation	N/A	N/A	
Defensiveness	3.14	2.28	-0.69
Graciousness vs Meanness	6.92	2.23	-0.63
Interpersonal Tolerance	6.45	2.34	1.98
Self vs Social Orientation	4.58	2.15	1.05
Veraciousness vs Slickness	7.57	2.19	-0.80
Interpersonal Relatedness	N/A	N/A	
Traditionalism vs Modernity	6.78	2.87	-1.86
Relationship Orientation	8.71	1.81	-0.76
Social Sensitivity	6.85	1.97	1.46
Discipline	5.67	2.17	-0.26
Harmony	9.23	1.88	1.13
Thrift vs Extravagance	4.96	1.83	0.26

Note. N/A – These values are not available (F. M. Cheung, personal communication, January 5, 2010).
Adapted from "Relevance of Openness as a Personality Dimension in Chinese Culture: Aspects of its Cultural Relevance," by F. M. Cheung, S. X. Cheung, J. X. Zhang, K. Leung, F. T. L. Leong and K. H. Yeh (2008). *Journal of Cross-Cultural Psychology, 39*, p. 90. Copyright by SAGE Publications. Adapted with permission of the authors.

Pessimism and Traditionalism versus Modernity. South African students are .70 to .96 of a standard deviation higher on Diversity, Divergent Thinking, Internal versus External Locus of Control, Interpersonal Tolerance and Social Sensitivity and .70 of a standard deviation lower on Family Orientation. Thus South African students tend to be more willing to handle new tasks, to use lateral thinking and exhibit intellectual curiosity, to be active doers and attribute the success of events to internal factors, to be co-operative and accepting of others and to exhibit empathy and understanding than their Chinese counterparts. South African students tend to be less concerned with maintaining harmonious relationships with family and tend to be less reliant on family ties for economic and social support than their Chinese counterparts. To a lesser degree, South African students enjoy trying new things and facing new challenges, enjoy imagination and fantasy and exhibit more independence and organisational ability, more logical and objective thinking, greater sociability, innovativeness, impulsiveness, confidence and independence, but are generally disheartened about the past and the future and are less likely to be reliable and serious about their work, less likely to be pragmatic, jealous of others or cover up a sense of inferiority, less likely to be tolerant, magnaminous and forgiving, and less likely to adhere to cultural norms, be conservative or adhere to superstition than their Chinese counterparts. These interpretations are made on differences observed on facet scale mean differences. Factor scale mean differences were not available (F. M. Cheung, personal communication, January 5, 2010). Also, it should be noted that the sample on whom the normative statistics reported in Table 7.2 were calculated were Chinese adults who completed the CPAI-2 in Chinese (F. M. Cheung, personal communication, January 5, 2010). Furthermore, as with the descriptive statistics interpretations of the NEO-PI-R, it would be premature to accept the interpretation of these differences as significant without considering the other analyses first.

7.5. INTERNAL CONSISTENCY RELIABILITY: NEO-PI-R

Internal consistency reliability coefficients for this study as reported in Table 6.4 were in accordance with those reported for the normative sample in Costa and McCrae (1992 – see Table 3.1), as well as those reported for Western and some Eastern nations in McCrae et al. (2005a – see Table 3.2). Domain internal consistency reliability coefficients showed no appreciable differences to those found in other samples and cultures. At the facet level, Impulsiveness had a reliability coefficient of .59 (normative sample = .70) and Tender-Mindedness .50 (normative sample = .56). Other appreciable differences were with Straightforwardness, which had a coefficient of .60 (normative sample = .71), Altruism .66 (normative sample = .75), Modesty .75 (normative sample = .67) and Achievement Striving .79 (normative sample = .67).

It is evident that the internal consistency results parallel those found in many nations (see Table 3.2) and in the case of Modesty and Achievement Striving demonstrate better results. Lower reliability coefficients were found for Impulsiveness, Tender-Mindedness, Straightforwardness and Altruism but, with the exception of Tender-Mindedness, these were all within the .60 cut-off suggested by Nunnally and Bernstein (1994). Tender-Mindedness appears to have a low alpha coefficient generally, with the normative sample having a coefficient of .56. In the African context it is also consistently low (see Piedmont et al., 2002; Quy, 2007; Rothman & Coetzee, 2003; Teferi, 2004). Since internal consistency reliability is concerned with the inter-item consistency of scales, it can be argued, based on the evidence from the current and other studies, that the Tender-Mindedness facet may have some poor items. However, the validity and bias evidence needs to be examined to determine whether the problem lies with the items or the construct itself.

Overall, contrary to the literature (see McCrae et al., 2005a; Piedmont et al., 2002; Rossier et al., 2005; Rothman & Coetzer, 2003; Teferi, 2004; Zhang & Akande, 2002), that suggests that alpha coefficients would be lower in African samples, the current study suggests that the internal consistency reliability of the NEO-PI-R is equivalent to that found in the U.S.A. and other Western and some Eastern (e.g. Hong Kong, Japan, South Korea, Turkey) countries. This result supports the etic argument, which focuses on employing tests developed out of the country in which they are being used. It suggests, contrary to other African and South African studies, that the NEO-PI-R is reliable for use in South Africa.

This finding does not negate those of other African studies (McCrae et al., 2005a; Quy, 2007). Rather it brings to the fore the arguments that within South Africa there is a distinct split – between those who have access to resources and those who do not. This population split is frequently described in the literature and is said to pervade all aspects of South African life, from politics and economics through to education (see Devey, Skinner & Valodia, 2006; Skinner & Valodia, 2006). Usually in psychological literature reference is made to urban versus rural samples (Foxcroft, 2002; Foxcroft & Davies, 2008). This is erroneous, as the divide is much deeper than geographical location. South Africa is seen to have a “second economy”, which parallels the “first economy” and functions independently of formal market and banking systems (Mbeki, 2003; Presidency, 2007). Those individuals trapped within this second economy have very little class mobility and, as argued by Philip and Hassen (2008), are unable to escape the circle of poverty and inequality that entraps them. South Africa has the world’s highest Gini coefficient, of .70, and this is linked primarily to the huge divide that exists between those who do and do not have access to resources

(Leibrandt, Woolard, Finn & Argent, 2010). I would therefore argue at this point that the internal consistency reliability results found for the NEO-PI-R on the student sample in this study represent a sector of the population who have access to resources and are very much part of the first economy. My argument deserves further research though as I did not collect any socio-economic indicators from my sample and it could very well be possible that some students present at university may have benefited from programmes put into place post-1994 to redress inequalities of access to higher education (see Jansen et al., 2007). Following from this, it might appear that I am arguing in favour of two distinct systems. However this is not the case. In accordance with the arguments presented by Philip and Hassen (2008) and Skinner and Valodia (2006), I adopt a more nuanced view of the first and second economies and am of the opinion that the "first economy" operates in such a way in South Africa that it undermines the growth of the "second economy", leaving little space for class mobility and equality.

Furthermore it can be argued, in line with Van Dyk and De Kock (2004), that student samples tend to be more individualistic in nature and, by virtue of acculturation into a predominantly Western environment, these students are more comfortable with questionnaires like the NEO-PI-R as well as items like those in the NEO-PI-R. However these arguments need to be examined together with the validity and bias results to determine whether they are supported or not.

7.6. INTERNAL CONSISTENCY RELIABILITY: CPAI-2

Internal consistency reliability coefficients obtained for the CPAI-2 scales in the current study (see Table 6.4) exceeded the .60 cut-off (Nunnally & Bernstein, 1994) and were comparable to those found in the normative sample for the most part (see Table 3.4). For the factor scales, higher reliability coefficients were found for the Social Potency and Interpersonal Relatedness factors when compared to those of the normative sample. Accommodation had a coefficient of .76 in the normative sample and in the current sample. Dependability had a lower internal consistency reliability coefficient than the normative sample. Poor reliability coefficients were found for the Logical versus Affective Orientation subscale (.41), the Practical Mindedness subscale (.37), the Relationship Orientation subscale (.39), the Social Sensitivity subscale (.45) and the Thrift versus Extravagance subscale (.37). With the exception of the Social Sensitivity subscale, which had an alpha coefficient of .62 in the normative sample, all four of the other subscales demonstrated lower reliabilities in the normative sample as well. Generally most reliability coefficients in the normative sample exceed .60 but these four scales had reliabilities of .58 for Logical versus Affective

Orientation, .51 for Practical Mindedness, .52 for Relationship Orientation and .57 for Thrift versus Extravagance. Given these results and considering that internal consistency reliability deals with inter-item consistency, I am inclined to argue that difficulties may exist with the items that constitute these scales and this needs to be explored. Item bias was explored in this study and will be discussed further on in this chapter. It is also possible that these results are reflective of difficulties at the level of the construct but these can only be determined by exploring the construct validity of the CPAI-2.

From these reliability results it is difficult to make any claims about the utility of the CPAI-2 in the South African context. The findings indicate differential utility but even this is not clear-cut. For example, three of the five Interpersonal Relatedness subscales had poor reliability coefficients but the overall Interpersonal Relatedness factor had a reliability coefficient of .74. Hence further examination of the subscale and factor structures of this etic instrument is necessary.

7.7. TEST-RETEST RELIABILITY: NEO-PI-R

Test-retest reliability coefficients over a short interval (three weeks) for the domains of Neuroticism, Openness to Experience, Agreeableness and Conscientiousness were adequate (> .81), as is evident in Table 6.5. However Extraversion had a poor test-retest coefficient of .43. All the facets, with the exception of the Extraversion facets of Positive Emotions (.21), Warmth, (.43) and Assertiveness (.48), the Openness facets of Aesthetics (.16), Feelings (.45) and Fantasy (.51) and the Conscientiousness facet of Self-Discipline (.35), had test-retest coefficients exceeding .60 (see Table 6.5). While the test-retest reliabilities for the four domains and most of the facets were in an acceptable range, the coefficient for Extraversion is a cause for concern. The NEO-PI-R is used in stability studies within personality studies, hence it is important that the measure have good test-retest reliability. The findings of this study suggest difficulties in this regard.

However, one needs to take into account that the sample for the test-retest segment of the study consisted of only 10 students. It is likely that the students were not motivated and/or committed to completing the questionnaire twice, given the feedback that was obtained on prior attempts to collect test-retest reliability data. Given this, these conclusions need to be interpreted with caution and further research over longer intervals with bigger and more representative samples is recommended.

7.8. TEST-RETEST RELIABILITY: CPAI-2

From Table 6.5 it is evident that the test-retest reliability coefficients for three of the four factors was on the cut-off of .60 suggested by Nunnally and Bernstein (1994). Only Social Potency had an adequate test-retest coefficient of .76. Subscale test-retest reliability coefficients ranged from .05 to .88. Social Potency had a median test-retest reliability coefficient of .60, Dependability had a median test-retest coefficient of .53, Accommodation .70 and Interpersonal Relatedness .55. Thus the short-term test-retest reliability over a 3-week interval for the CPAI-2 was fair at best. As with the NEO-PI-R, if personality stability is being determined, the CPAI-2 as it stands would be a poor instrument to use.

However, as was the case with the NEO-PI-R, it needs to be noted that the sample for the test-retest segment of the study consisted of only 10 students who in all likelihood had little motivation and/or commitment with regard to the study. Given this, these results need to be interpreted with caution and once again further research over longer intervals with bigger and more representative samples is recommended.

7.9. FACE VALIDITY: NEO-PI-R AND CPAI-2

Table 6.6 presents the frequencies pertaining to whether the NEO-PI-R and CPAI-2 appeared to be measuring personality or not. From Table 6.6 it is evident that the majority of the sample (97.18% for the NEO-PI-R; 93.41% for the CPAI-2) were of the opinion that the questionnaires measure something akin to personality. Substantiations indicate that all individuals who reported that the questionnaires measured personality and who chose to substantiate did so in a sensible manner coherent with lay definitions of personality or aspects of personality. Substantiations from the small proportion who reported that the questionnaires did not appear to be measuring personality indicated reasoning that was more congruent with linguistic and cultural issues than with the actual overall appearance of the questionnaires. Hence it is possible to conclude that both the NEO-PI-R and the CPAI-2 have sufficient face validity in this South African sample.

7.10. CONSTRUCT VALIDITY: NEO-PI-R

Construct validity of the NEO-PI-R was examined using exploratory factor analysis with varimax rotation. Five factors were retained based on both theoretical and empirical (see Table 6.7) grounds, as discussed in Chapter 6. From Table 6.8 it is evident that the five factors loaded as postulated by Costa and McCrae (1992). There were some cross-loadings but, as indicated by Costa and McCrae (1992), these cross-loadings will occur since aspects

of personality are related, but the higher loading will always be seen on the factor on which the facet should load theoretically; the cross-loadings in the current study were consistent with this argument. With the exception of the Actions (Openness domain), the facets maintained their loadings in the relevant domain. The Actions facet had its highest loading of -.38 on Factor 2, the Neuroticism factor. The second highest loading (.34) was on the Openness to Experience factor.

From these results it is evident that the structure of the NEO-PI-R – and by implication the FFM – holds in this South African sample. Contrary to research that indicated that African and South African samples do not replicate the five factor structure adequately (see Matsimbi, 1997; McCrae et al., 2005a; Piedmont et al., 2002; Teferi, 2004), this study demonstrated that a five factor solution is clearly recoverable. This is supported by the results obtained on the Procrustes solution. All domain scales had congruence coefficients exceeding .96. Facet scales also had all congruence coefficients exceeding .94 and significant at the .01 level of significance, except for the Openness to Experience facets of Fantasy and Actions and the Agreeableness facet of Trust. These three facets had congruence coefficients exceeding .91 and were significant at the .05 level of significance. Thus there was sufficient agreement with the normative sample to support evidence for the utility of the NEO-PI-R – and by extension the FFM – in a sample of South African university students.

These results concur with those found by Heuchert et al. (2000). All 30 facet scores in the study of Heuchert et al. (2000) had a loading of at least .40 on the hypothesised domain. Only two facet scores showed secondary loadings at or above .40 on another domain in addition to the hypothesised domain. Angry Hostility loaded negatively and Warmth loaded positively on the Agreeableness domain. Congruence coefficients were also in line with those found in Heuchert et al. (2000). This adds further evidence that the NEO-PI-R and the FFM are applicable in the South African context. However, Heuchert et al. (2000) do indicate that the factor structure changed when it was examined across the population groups but, as argued in Chapter 4, differences across internal groupings are not the concern of construct validity but are more the concern of bias examination.

Two points to note though are a) the problematic nature of the Actions (Openness to Experience) facet, and b) the order of the factor loadings. Openness to Actions is characterised by the willingness to try different activities, go to new places or try new foods (Costa & McCrae, 1992). According to Costa and MCrae (1992), high scorers on this scale prefer novelty and variety while low scorers prefer familiarity and routine and find change

difficult. It is evident from the reliability analysis that Actions had a moderate reliability coefficient in the normative sample (α = .58) as well as in the current study (α = .55). Given this, one has to question whether there are more implicit problems with the scale and its items. Certainly the definitions are clear enough but perhaps the items do not come across clearly or individuals cannot identify with the situations that the items depict.

The second point refers to the order of factor loadings. McCrae and Costa (1992) suggest that the factors load with Neuroticism on Factor 1, Extraversion on Factor 2, Openness to Experience on Factor 3, Agreeableness on Factor 4 and Conscientiousness on Factor 5. In total the five factor solution explains 56.73% of the shared variance. In the five factor solution for the current study, Factor 1 emerged as a Conscientiousness factor and explained 17.86% of the variance. Factor 2 was defined by loadings on the Neuroticism facet and explained 12.78% of the variance. Factor 3 was the Agreeableness factor and explained 11.07% of the variance. Factor 4 was the Extraversion factor and explained 9.19% of the variance, while Factor 5 was the Openness factor and explained 5,83% of the variance. Given the loadings and the percentage of variance explained by each of the domains, it is possible that certain factors may contribute more towards personality, life and culture in this South African student sample. However this claim requires more empirical research. Also, I did not have access to the percentage of variance explained by each of the factors in the normative sample and therefore comparisons were not possible. Despite this, the NEO-PI-R does appear to have adequate construct validity in the South African context with this particular sample of students. As with the reliability results, this finding does not negate those of other African and South African studies. Instead it highlights the important arguments around urbanised versus non-urbanised populations as well as the arguments around acculturated samples. This finding supports the utility of an etic instrument, the NEO-PI-R, in a sample of urbanised and quite possibly acculturated South African students.

7.11. CONSTRUCT VALIDITY: CPAI-2

Construct validity of the CPAI-2 was explored using exploratory factor analysis with varimax rotation. From the empirical evidence (see Table 6.9) presented, a five factor solution seems optimal. However the model proposed by Cheung et al. (2008) suggests four factors. Furthermore, in order to use Procrustes rotation and determine the level of agreement between the factor structure found in this study and that of Cheung et al. (2008) I needed to explore a four factor solution. Hence, to examine the construct validity of the CPAI-2, a five factor solution and a four factor solution were explored.

7.11.1. CPAI-2: Five factor solution

Results for the five factor solution are presented in Table 6.10. The loadings obtained on Factor 1 were congruent with those obtained by Cheung et al. (2008) and therefore representative of the Social Potency/Expansiveness factor found in Cheung et al. (2008). Factor 1 appears to be congruent with the Openness to Experience and Extraversion factors in the FFM.

Factor 2 did not concur with any of those proposed by Cheung et al. (2008). An examination of the loadings suggests a factor that is more congruent with the Neuroticism factor of the FFM. The smaller loadings on Factor 2 also suggest a combination with some aspects of Extraversion and Openness to Experience.

The loadings on Factor 3 were congruent with the Accommodation factor proposed by Cheung et al. (2008) with the exception of the Family Orientation loading. From the scale loadings, particularly with the Harmony subscale loading on this factor, Factor 3 would seem to resemble the Agreeableness factor of the FFM.

Factor 4 loadings were not representative of any of the four factors postulated by Cheung et al. (2008). Looking at the pattern of loadings I would suggest a congruence with the Conscientiousness factor of the FFM. It would also appear that Factor 4 has an Introversion dimension, while Factor 1 incorporates an Extraversion dimension.

The loadings on Factor 5 were somewhat congruent with the Interpersonal Relatedness dimension proposed by Cheung et al. (2008). It seems more appropriate for the factor to be described by its original name, the Chinese Tradition factor. However, the fact that this factor is found in a South African sample suggests it is not unique to Chinese tradition. From the scales that loaded on this factor, I would argue that it may represent the interdependent, collectivist, communal dimension frequently cited as characteristic of Asian and African cultures (see Laungani, 1999; Mwamwenda, 2004; Naidoo et al., 2008; Okeke et al., 1999; Vogt & Laher, 2009). Surprisingly, the Family Orientation subscale did not load on this factor. However, Inferiority versus Self-Acceptance loaded at .35, Defensiveness at .32 and Self versus Social Orientation at -.36.

In summary, the five factor solution for the CPAI-2 indicates that three of the four factors postulated by Cheung et al. (2008) were recoverable, namely Social Potency/ Expansiveness, Accommodation and Interpersonal Relatedness. With the exception of

Social Potency, the factors did not reflect loadings that were wholly congruent with those found by Cheung et al. (2008). The Dependability factor did not replicate clearly with the Dependability subscales, loading differentially on Factors 2, 3, 4 and 5.

I would have expected Dependability to load on Factor 2, but if the Dependability subscales are examined it is possible to see that they appear to be composed of subscales contributing to three different factors. The Emotionality, Inferiority versus Self-Acceptance and Optimism versus Pessimism subscales appear to be congruent with the Neuroticism construct in the FFM. The Responsibility, Practical Mindedness and Meticulousness subscales appear to articulate with the Conscientiousness domain in the FFM. The remaining subscales of Face, Family Orientation and Internal versus External Locus of Control seem to fit better with the Interpersonal Relatedness factor in the model proposed by Cheung et al. (2008). It may be argued that the Internal versus External Locus of Control construct should stand on its own but in the five factor solution for the CPAI-2 it did load with Interpersonal Relatedness. Thus it is not surprising that the Dependability subscales loaded across four factors and that Dependability, as conceptualised by Cheung et al. (2008), was not replicated in the current study. Instead the Dependability subscale loadings were consistent with the arguments made above.

An examination of the literature on the CPAI and the CPAI-2 does indicate some difficulties with the scales that load on Dependability, with Face being the most problematic subscale (see Cheung et al., 2006; Cheung et al., 2003; Cheung et al., 2008). Thus the results of this study suggest further exploration and possibly reconceptualisation of the Dependability factor.

Although the five factors of the FFM are recoverable in the CPAI-2 five factor solution, the loadings did not represent a clear Extraversion dimension or Neuroticism dimension. This finding has important implications for the universality of the FFM, as it demonstrates the replicability of the model in an instrument derived within a Chinese culture using the Chinese lexicon; but the fact that the model was not wholly replicated suggests that either the CPAI-2 has failed to fully cover all aspects of personality or that perhaps the FFM needs to be rethought in terms of the structure and the constructs that constitute the personality structure. Certainly the support for an Interpersonal Relatedness factor alerts one to a possible limitation of the FFM and, as argued in Chapter 2, this dimension forms a vital part of personality and needs to be addressed in the FFM. On the other hand, the replicability of most of the model adds to an already burgeoning body of evidence in favour of the universality of the FFM (see McCrae et al, 2005a). The findings would also support the FFT,

which argues for a biological basis for personality traits (Basic Tendencies) that get expressed as Characteristic Adaptations.

7.11.2. CPAI-2: Four factor solution

An exploratory factor analysis with varimax rotation was conducted with the extraction of four factors, to determine if the model postulated by Cheung et al. (2008) would hold in a South African student sample. The results for the four factor solution are presented in Table 6.11. Since five of the Dependability subscales loaded on Factor 1, it suggests that this factor represents the Dependability dimension proposed by Cheung et al. (2008). However a number of other subscales from other factors also loaded on this factor – most notably Enterprise, Relationship Orientation and Thrift versus Extravagance. Also, four of the nine Dependability scales loaded on other factors. Thus it is quite difficult to determine a label for Factor 1. It appears to incorporate the Neuroticism domain of the FFM and, with the exception of the Face, Relationship Orientation and Thrift versus Extravagance loadings, seems to be similar to Factor 2 in the five factor solution.

Factor 2 resembles the Social Potency/Expansiveness factor structure presented in Cheung et al. (2008). Cheung et al. (2008) argue that this factor best represents the Openness dimension of the FFM as it is expressed in China.

Factor 3, with the exception of the Harmony loading, was congruent with the Accommodation factor presented in Cheung et al. (2008). This factor also appears to be congruent with the Agreeableness dimension of the FFM.

The loadings on Factor 4 were divided between the Dependability and Interpersonal Relatedness factors of the CPAI-2 and do not correspond to either of them. With the exception of Traditionalism versus Modernity, the other four loadings suggested that Factor 4 might be congruent with the Conscientiousness factor of the FFM.

Thus the four factor solution replicated only two of the four factors postulated by Cheung et al. (2008). These results are not congruent with those found by Cheung et al. (2006) on a Singaporean sample. Generally the four factor structure was replicated in the Singaporean Chinese and Singaporean Malay groups. The only scales to exhibit difficulties were Thrift versus Extravagance, which loaded at .35 in the Singaporean Chinese sample, and Internal versus External Locus of Control, which cross-loaded on Dependability (.34) and Accommodation (.37) in the Singaporean Malay sample. The four factor structure did not

replicate as well in the Singaporean Indian group. Four Dependability scales (Family Orientation, Responsibility, Meticulousness and Practical Mindedness) loaded on the Interpersonal Relatedness factor (Cheung et al., 2006).

The results obtained in the current study are also not congruent with those found on the English version of the CPAI with Chinese, Caucasian and Singaporean samples. In Cheung et al. (2003), the four factor structure was replicated in a Singaporean sample, with only Face and Veraciousness versus Slickness loading on other factors, but both scales had secondary loadings congruent with the normative structure. In the Caucasian sample, all the CPAI scales loaded as expected, with the exception of Face and Defensiveness (Cheung et al., 2003).

Given the varimax results obtained in the current study, it became apparent that the model on which the CPAI-2 is based was not replicable in this sample. The Dependability factor was also highly problematic. Hence a Procrustes rotation was conducted (see Table 6.11). From the Procrustes solution it is evident that for the most part the scales loaded as they should. Congruence coefficients for the factor scales ranged between .93 and .97. All congruence coefficients for the CPAI-2 subscales, with the exception of Extraversion versus Introversion, Meticulousness, Face, Self versus Social Orientation, Veraciousness versus Slickness, Relationship Orientation, Social Sensitivity and Thrift versus Extravagance, were above .94 and significant at the .01 level of significance. All the subscales mentioned in the previous sentence – with the exception of Social Sensitivity – had congruence coefficients above .88 and were significant at the .05 level of significance. Even though Social Sensitivity had a nonsignificant congruence coefficient, it had a congruence coefficient of .86, which according to McCrae et al. (2005a) is adequate.

Thus the results from the Procrustes rotation indicate that it is possible for there to be significant agreement between the Chinese normative factor structure and the South African factor structure. At least 19 of the 28 subscales have congruence coefficients exceeding .94 and the remaining 8 subscales have congruence coefficients exceeding .86. However this finding does not devalue that of the five and four factor solutions explored, and further research is warranted.

One more point of note with regard to the four factor structure is that the percentage of variance explained and the order of factors found in this study differ from those found in other studies. Cheung et al. (2008) found that the four factor solution explained 48.4% of the variance, with Social Potency explaining 15%, Dependability 14.6%, Accommodation 10%

and Interpersonal Relatedness 8.9% in the normative Chinese sample. With the Singaporean sample the Chinese and Malay groups explained 51% of variance on average, with Social Potency explaining 15.6%, Dependability 15%, Accommodation 11.3% and Interpersonal Relatedness 9.4% (Cheung et al., 2006). With the Singaporean Indian sample the four factor solution explained 54.3% of the variance, with Social Potency explaining 15.2%, Dependability 14.5%, Accommodation 12.5% and Interpersonal Relatedness 12.1% (Cheung et al., 2006). For the Caucasian sample the total variance explained was 54.6%, with Dependability explaining 21.9%, Interpersonal Relatedness 11.5%, Social Potency 11.7% and Accommodation 9.5% (Cheung et al., 2003). The four factor solution in the current study explained 49.40% of the variance. Factor 1 (Dependability?) in the four factor solution explained 22.63% of the variance, Factor 2 (Social Potency) 9.66%, Factor 3 (Accommodation) 9.32% and Factor 4 (Dependability/Interpersonal Relatedness?) 7.79%.

The total percentage of variance explained in the current study appears to be within the range of that obtained in other studies (Cheung et al., 2003; Cheung et al., 2006). However, the distribution of variance across the factors was vastly different. The first factor explained proportionately more variance than the other three factors in this study. It also explained proportionately more variance than in any of the other studies. The nature of Factor 1 is also unclear in the current study, as indicated earlier. It is therefore difficult to determine why the disproportionate distribution of variance occurs but this is something for future studies with the CPAI-2 to note, particularly in the South African context.

Despite the Procrustes rotation demonstrating a level of fit between the four factor solution as postulated by Cheung et al. (2008) and that obtained on the current sample, the varimax rotated matrix together with the percentage of variance explained and the order and nature of the factors indicates that the four factors were not replicated in the South African context. At best Social Potency and Accommodation were replicated. The loadings of Dependability and Interpersonal Relatedness make it difficult to define them within the South African context. The four factors were also not well defined within the FFM. While the Openness to Experience, Agreeableness and Conscientiousness factors from the FFM were recoverable, Extraversion and Neuroticism were not. Therefore the four factor solution postulated by Cheung et al. (2008) cannot be adequately replicated in this South African sample.

An examination of the empirically recommended five factor solution for the CPAI-2 yielded better results. Three CPAI-2 factors proved to be replicable (Social Potency, Accommodation and Interpersonal Relatedness). Only Dependability appeared problematic. The five factor solution also demonstrated a better fit with the FFM, with Openness to

Experience, Agreeableness and Conscientiousness factors being clearly discernible and an Emotional Stability factor possibly discernible. Extraversion was split between two factors though, with one representing Extraversion and the other Introversion. Extraversion loaded with the potential Emotional Stability factor and Introversion with the Conscientiousness factor. Thus the five factor solution was more optimal, presenting evidence in favour of the FFM and the FFT.

7.12. CONSTRUCT VALIDITY: NEO-PI-R AND CPAI-2

In Chapter 3, I argued for the value of examining a joint factor analysis of the NEO-PI-R and the CPAI-2. These arguments are reinforced in the light of the results found for the four factor solution and five factor solution obtained on the CPAI-2. It was evident from the results that a five factor solution might better represent the data obtained on the CPAI-2 for the current sample. Furthermore, there appeared to be an overlap between the five factors of the FFM and the five factor solution of the CPAI-2. Thus the examination of a joint factor analysis using a five factor solution would be useful. However, empirical investigation suggests that the most optimal solution would include eight factors, and Cheung et al. (2003) and Cheung et al. (2008) make a convincing argument for six factors. Hence eight, six and five factor solutions were explored using exploratory factor analysis with varimax rotation.

The eight factor solution explained 58.14% of the total variance in the model. The six factor solution explained 52.97% while the five factor solution explained 49.26% of the total variance in the model. From Table 6.13 it is evident that Factor 1 accounted for 18.35% of the variance explained. Factor 2 accounted for 9.57% of the variance explained while Factor 3 accounted for 8.51%. Factor 4 accounted for 7.44%, Factor 5 5.39%, Factor 6 3.71%, Factor 7 2.74% and Factor 8 2.43%. Cheung et al. (2001), in a joint factor analysis of the CPAI and the NEO-PI-R, found that Factor 1 explained 16.1% of the variance, Factor 2 9.7%, Factor 3 9.5%, Factor 4 7%, Factor 5 4.2% and Factor 6 3.5%. In total, 50% of the variance was explained (Cheung et al., 2001). In 2003, Cheung et al. (2001) conducted a joint factor analysis of the NEO-PI-R and the NEO-FFI and found that a six factor solution explained 59% of the variance, with Factor 1 explaining 12.7%, Factor 2 9.7%, Factor 3 6.3%, Factor 4 7%, Factor 5 4.2% and Factor 6 3.5%. While the results in the current study are congruent with those of Cheung et al. (2001) in terms of the variability explained, there is a difference between the variance explained by Cheung et al. (2003) and Cheung et al. (2006). In the study conducted in 2003 by Cheung et al., the six factor solution explained 6% more variance than the current study, while the six factor solution in Cheung et al. (2008)

explained 4.3% less variance than the current study. These differences do not appear to be substantial but further research is warranted.

There is also some variation in the percentage of variance explained by each factor, suggesting the differential importance of these factors within each of the samples studied. Again, however, these differences are not as substantial as the ones noted with the factor analysis of the CPAI-2 in the current study but they are of interest and do warrant further research. Also of interest is the order of factor loadings in the current study in comparison with the other three studies (Cheung et al., 2001; Cheung et al., 2003; Cheung et al., 2006). With the exception of Cheung et al. (2003), Neuroticism loaded as the first factor in all of the studies but there are no other similarities in the order of factor loadings, suggesting the differential importance of the factors across cultures.

The eight factor solution is presented in Table 6.13. From the factor loadings it is evident that Factor 1 is best represented as the Neuroticism dimension, as proposed by the FFM. Factor 2 is best characterised as the Conscientiousness factor. Factor 3 represents the Extraversion dimension of the FFM, while Factor 4 represents the Agreeableness domain. Factor 5 is representative of the Openness to Experience domain. Factor 6 does not correspond to any of the factors in the FFM but it had four of the five Accommodation subscales loading on it. However, together with the other loadings (Values from the Openness domain (-ve), Inferiority versus Self-Acceptance (+ve) and Internal versus External Locus of Control (-ve) from the Dependability domain and Traditionalism versus Modernity (+ve) and Discipline (+ve) from the Interpersonal Relatedness domain) it did not come across clearly as an Accommodation factor. Accommodation quite often also loads with the FFM Agreeableness factor and in some ways some of the characteristics of conformity, adherence to traditional values and discipline might explain the loadings. However, agreeable individuals do not necessarily have an external locus of control nor an inferior sense of self. Hence Factor 6 was not clearly defined. Factor 7 appeared to be characteristic of the Openness dimension as indicated in Cheung et al. (2008) but the scale loadings were not wholly in line with those proposed by Cheung and colleagues. By virtue of the loadings on Leadership and Logical versus Affective Orientation it might be a possibility that Factor 7 is more representative of an Openness/Intellect dimension. Factor 8 appeared to represent an Agreeableness factor but an Agreeableness factor situated in a collectivist culture since the focus is on compliant behaviour, maintenance of family ties and societal and familial harmony. Thus Factors 6 and 8 both appeared to be measuring some dimension of Agreeableness but Factor 6 represents Agreeableness as it pertains to the Accommodation factor identified by Cheung et al. (2008), and Factor 8 represents

Agreeableness as it pertains to the Interpersonal Relatedness factor identified by Cheung et al. (2008).

Results for the six factor joint NEO-PI-R and CPAI-2 analysis are presented in Table 6.15. Factor 1 in the six factor solution is best described as the Neuroticism factor, as postulated in the FFM. The loading of Family Orientation on Factor 1 is puzzling though. The loadings on Factor 2 suggest that this factor is representative of the Conscientiousness domain of the FFM, while Factor 3 represents the Openness to Experience domain. It is interesting that all the Openness to Experience facets loaded together on Factor 3 except for Values, which loaded on Factor 6. Factor 4 represents the Extraversion dimension. Loadings on Factor 5 are characteristic of the Agreeableness factor of the FFM. Factor 6 appears to be characteristic of the Interpersonal Relatedness factor identified by Cheung et al. (2001), Cheung et al. (2003) and Cheung et al. (2008). However, loadings on the CPAI-2 Dependability subscales of Inferiority versus Self-Acceptance, Face and Internal versus External Locus of Control, and the CPAI-2 Accommodation facets of Defensiveness, Graciousness versus Meanness, Interpersonal Tolerance and Veraciousness versus Slickness suggested that Interpersonal Relatedness is reflected differently in a South African sample. As argued earlier, the loadings of the scales demonstrate that many of the traditional Chinese subscales load on this factor (e.g. Face, Traditionalism versus Modernity, Defensiveness – Ah Q, Relationship Orientation – Ren Qing), hence the sixth factor may be more appropriately referred to as the Chinese Tradition factor. However there are other more general scales that loaded on this dimension as well, for example, Values from the NEO-PI-R Openness to Experience domain, Internal versus External locus of Control, Discipline and Inferiority versus Self-Acceptance. Hence, as already argued, this sixth factor is probably best referred to as some function of Individualism versus Collectivism.

Table 6.15 presents the results for the five factor solution. Factor 1 in the joint five factor solution is best characterised as the Neuroticism factor of the FFM, while Factor 2 represents the Conscientiousness factor. Factor 3 represents the Openness to Experience dimension of the FFM, while Factor 4 represents the Extraversion dimension. Factor 5 represents the Agreeableness domain. From the results of the joint factor analyses it is evident that although an eight factor solution is empirically viable, it does not contribute much theoretically. The five and six factor solutions are more informative. The five factors as postulated by the FFM are generally replicable in all three solutions. The four factors as postulated by Cheung et al. (2008) tend to be subsumed with the five factors of the FFM in both the eight and five factor solutions. In the six factor solution an Interpersonal

Relatedness factor is discernible but not in the same sense as it appears to be understood in Cheung et al. (2003) and Cheung et al. (2008). It appears to be broader and more defined in terms of the individualistic versus collectivist dimensions discussed in the literature (see Green et al., 2005; Laungani, 1999; Mwamwenda, 2004; Naidoo et al., 2008; Okeke et al., 1999; Vogt & Laher, 2009). Social Potency appeared to correlate well with Openness to Experience and this concurs with the findings of Cheung et al. (2008). Accommodation tends to concur with the Agreeableness dimension. However Dependability was not clearly discernible, with the subscales loading on many and varied factors. It would seem that in the South African sample, the CPAI-2 subscales have validity but not in terms of the factors in which they are arranged. A realignment of factors appears to be necessary, particularly with regard to the Dependability factor.

At the facet and subscale levels, there appear to have been difficulties with some of the scales across the analyses. In the NEO-PI-R, the Impulsiveness facet had consistently small loadings but still loads on the appropriate factor along with all the other Neuroticism factors, except in the five factor joint solution, where it loaded at .30 on Neuroticism and -.34 on Conscientiousness. The NEO-PI-R Openness to Experience facet of Actions was also consistently problematic, failing to load on the Openness dimension above .40 on all three solutions. Except for the eight factor solution, Actions did load above .30 on the Openness to Experience factor. Actions and Impulsiveness are consistently identified as problematic in local and international literature (see McAdams & Walden, 2010; Quy, 2007; Teferi, 2004). The Openness to Experience facet of Actions assesses a willingness to try different activities, go to new places or try different foods, while the Impulsiveness facet deals with the inability to control cravings and urges. Low scorers on Impulsiveness find it easier to resist temptation, and have a higher tolerance for frustration (Costa & McCrae, 1992). In both cases, given the findings around the problematic nature of the constructs, I would suggest that the operationalisation of the constructs be explored and items changed if necessary. It does seem that most people, regardless of culture or background, are experiencing some difficulties with these constructs and therefore further research is merited.

The Openness to Experience facet of Values loaded positively on the Openness factor in the five factor solution but negatively on the Interpersonal Relatedness factor in the five factor solution and the Accommodation factor in the eight factor solution along with the CPAI-2 subscale of Traditionalism versus Modernity. The Openness to Experience facet of Values, according to Costa and McCrae (1992), means the readiness to re-examine social, political and religious values. Closed individuals tend to accept authority and honour tradition and are therefore conservative regardless of political party affiliation. It is evident from this

description then why Values loaded negatively with Interpersonal Relatedness scales, specifically that of Traditionalism versus Modernity.

There are also consistent differences with the loadings on the Family Orientation, Relationship Orientation and Thrift versus Extravagance subscales of the CPAI-2. These were differentially loaded on the three solutions and did not load above the .40 cut-off. However Relationship Orientation and Thrift versus Extravagance loaded on the Interpersonal Relatedness factor in the six factor solution. This does suggest then that these may be unique characteristics not subsumed in the FFM and supports the arguments presented by Cheung and colleagues (Cheung et al., 2001; Cheung et al., 2003; Cheung et al., 2008). It would seem that a similar logic could be applied to the Family Orientation subscale but the loadings for this subscale are extremely diverse across the three solutions, which is quite surprising.

Considering these results in relation to previous studies (Cheung et al., 2001; Cheung et al., 2003; Cheung et al., 2008) it is evident that, for the most part, the scales from both instruments loaded in a similar pattern on the five and six factor solutions to how they loaded in the current study. In Cheung et al. (2001) some differences are noted with the scales that loaded on the Interpersonal Relatedness factor. Impulsiveness and Angry Hostility from the NEO-PI-R Neuroticism domain and Excitement-Seeking from the NEO-PI-R Extraversion domain did not load with their respective factors. However the Cheung et al. (2001) study was conducted with the CPAI and cannot be wholly compared to the results obtained in the current study.

With all three previous studies, a common difficulty was noted with the Family Orientation scale, which either did not load on the Dependability factor at all or did load but with a loading that corresponded to the $\pm$ .40 cut-off. Relationship Orientation did not load above the .40 benchmark in the five factor solution in Cheung et al. (2008), and Thrift versus Extravagance and Social Sensitivity had their highest loadings on the Interpersonal Relatedness factor in the six factor solution (Cheung et al., 2008) but both loadings were below .40. Thus from the results of the current study and those of other studies, the Interpersonal Relatedness scales do appear to have merit but need to be researched further and the Family Orientation scale (currently located within the Dependability factor) specifically needs more research.

A final point of interest is the negative loading on the Internal versus External Locus of Control subscale in the eight and six factor solutions respectively. Internal versus External

Locus of Control appeared to be loading in the direction of an external locus of control whenever it loaded with the Interpersonal Relatedness dimensions in the current study and in previous studies. Given my arguments earlier on the Interpersonal Relatedness dimension representing the individualism/collectivism distinction, it would seem that collectivist dimensions are associated with an external locus of control. Individuals with an external locus of control tend to stress the importance of external conditions, are resigned to destiny and believe in chance, fate or luck, subscribing to the belief that the success or failure of an event depends on external factors (Costa & McCrae, 1992). Given this, it is self-evident why an external locus of control would be associated with collectivist cultures. Collectivist societies emphasise people's interdependence within the group, group goals are given priority and people's behaviour is largely regulated by group norms rather than personal attitudes. Therefore, people in a collectivist society are mainly interested in maintaining relationships with others and avoiding conflict (Green et al., 2005; Triandis, 2001). The fact that individuals with an external locus of control also tend to subscribe to fate and are resigned to destiny highlights another aspect of personality that is strongly linked to collectivist cultures, namely, spirituality. However it is evident that this dimension does not appear at all in either of the instruments.

Thus the results on construct validity show support for the FFM and suggest that the NEO-PI-R is appropriate for use in samples similar to the student sample used in the current study, that is, samples that are urbanised, educated and fluent in English. The results also indicate that the CPAI-2, as it stands at present, is inappropriate for the South African context. It lacks construct validity, particularly in terms of its Dependability factor. These conclusions were borne out in both individual and joint factor analyses of the instrument. Furthermore, the construct validity results suggest that some etic instruments – like the NEO-PI-R – are applicable with limitations in the South African context and others – like the CPAI-2 – are not. These two instruments were chosen since both are etic to South Africa but each was developed in a different culture, with the NEO-PI-R being developed in a primarily individualist, Western culture and the CPAI-2 in a primarily collectivist, Eastern culture. Despite the arguments for South Africa subscribing to a collectivist culture with Ubuntu, the NEO-PI-R – and by extension the FFM – were found to have more applicability than the CPAI-2. As discussed earlier, it needs to be noted that the students may represent a more acculturated sample. However, as indicated in previous chapters, South Africa is a land of diversity and therefore cannot be described as having either an individualist or a collectivist culture. Rather, the sub-groups within South Africa need to be explored to determine if the pattern established with the reliability and validity results hold. Hence, I explored whether bias would be operational in terms of the various groupings within South Africa.

7.13. CONSTRUCT BIAS IN THE NEO-PI-R AND CPAI-2

Bias was examined across three levels in this study, namely construct, method and item bias. Results obtained for construct bias are discussed in this section and method and item bias are discussed in the following two sections. For each variable – gender, population group and home language – construct bias was examined using ANOVAs, reliability coefficients and exploratory factor analysis. Varimax rotations were conducted for each grouping on each variable and these solutions were used to conduct a Procrustes rotation to explore construct bias across the three variables.

The varimax rotated solutions on the NEO-PI-R for all the groups across the three variables indicate that the five factors loaded in a manner congruent with the FFM but the order of factor loadings differed. For the CPAI-2, as discussed in Chapter 6, interpreting the varimax solutions and the resultant Procrustes matrices found for each of the variables would not be viable since, as indicated in the section on construct validity, the loadings of the CPAI-2 facets were problematic in the current sample. Hence for each of the three variables only the congruence coefficients are discussed.

7.13.1. Construct bias across gender in the NEO-PI-R and the CPAI-2

ANOVA results examining gender differences across the NEO-PI-R domains and scales are presented in Table 6.16. From the results presented in Table 6.16 it is evident that significant differences with moderate effect sizes were found for the Neuroticism facets of Anxiety and Vulnerability as well as the Agreeableness facet of Compliance. These results suggest that females are more likely to exhibit higher tendencies towards experiencing negative affect, to be more fearful, apprehensive, nervous, tense and vulnerable, to have an active concern for the welfare of others, and to demonstrate humility, and are less likely to be able to cope with stress than males. Significant differences with small to moderate effect sizes were found for Neuroticism and the Neuroticism facets of Depression and Self-Consciousness, the Extraversion facets of Warmth, Assertiveness and Positive Emotions, the Openness to Experience facets of Aesthetics, Feelings and Ideas, Agreeableness and the Agreeableness facets of Straightforwardness, Altruism, and Modesty and the Conscientiousness facet of Dutifulness. To a lesser extent, females were found to be more likely to experience feelings of guilt, sadness, hopelessness and inferiority, more likely to be sensitive to ridicule, exhibit more interpersonal intimacy, cheerfulness, warmth, co-operativeness, compliance and optimism, have a deeper appreciation for art and beauty, be more in touch with their own

feelings, be more frank, sincere and ingenuous, and exhibit more organisational skills, diligence and purposefulness than males. Also to a lesser extent, females were less likely to be dominant, forceful or socially ascendant and less likely to be open to new and unconventional ideas. Significant differences were also found on Tender-Mindedness and Achievement Striving, with females scoring higher on both, but the effect sizes for this difference were too small to merit further discussion.

From the reliability analysis in Table 6.17 it is evident that the only scale to demonstrate appreciable differences between males and females was Tender-Mindedness, with the male group demonstrating a higher reliability coefficient than the female group. However, in the current study and in other studies (see Costa & McCrae, 1992; Horn, 2000; Quy, 2007; Teferi, 2004) Tender-Mindedness was found to be problematic in the reliability analysis for the entire sample, with an alpha coefficient of .50. Thus this result needs to be interpreted with caution.

From the varimax rotated solutions presented in Table 6.18 for gender and the NEO-PI-R, it is evident that the five factors loaded in a manner congruent with the FFM for both males and females. However the order of the factor loadings differed between males and females, with males having Agreeableness loading on Factor 3 and Extraversion on Factor 4 and females having Extraversion on Factor 3 and Agreeableness on Factor 4. The order of these factor loadings should not be of concern though, particularly since in each case there is not much difference in the percentage of variance explained by the factors. Factor 3 explained 10.68% and Factor 4 explained 8.48% of the variance in the model for males. For females, Factor 3 explained 10.39% and Factor 4 explained 9.74% of the variance. In total the five factor varimax solution for males explained 58.95% of the variance and for females 56.79%. While interesting, the differences are not large enough to warrant comment, more so because of the huge discrepancy in sample size and the lack of a representative sample. Future research using larger and more representative samples would be able to explore this in further depth.

From the Procrustes rotation (see Table 6.18), it is evident that, as with the varimax rotations, the five factors loaded as expected. A significant degree of agreement was obtained between males and females as defined by congruence coefficients above .85 (Haven & Ten Berge, 1977), except for the Neuroticism facet of Impulsiveness (.82), the Extraversion facet of Excitement-Seeking (.70), and the Openness to Experience facets of Actions (.47) and Values (.81). Impulsiveness and Actions were found to be problematic in

this and other studies (see McAdams & Walden, 2010; Quy, 2007; Teferi, 2004). Therefore this result should be interpreted with caution.

ANOVA results examining construct bias across gender in the CPAI-2 are presented in Table 6.19. From the results presented in Table 6.19 it is evident that significant differences with moderate effect sizes were found for the Enterprise subscale (Social Potency) and the Veracious versus Slickness subscale (Accommodation), suggesting that in this sample females were more likely to be trustworthy and reliable and to put group interest over self interest but less likely to take risks, or be innovative and adventurous. Significant differences with small to moderate effect sizes were found for the Social Potency factor as well as the Social Potency subscales of Novelty, Leadership and Logical versus Affective Orientation, the Dependability subscales of Emotionality, Practical Mindedness, Optimism versus Pessimism, and Internal versus External Locus of Control, the Accommodation factor and Accommodation subscales of Graciousness versus Meanness and Self versus Social Orientation, the Interpersonal Relatedness factor and the Interpersonal Relatedness subscales of Social Sensitivity and Harmony. Thus to a lesser extent females were found more likely than males to be anxious and emotional, pragmatic, accommodating, tolerant and broad-minded in dealing with others, more co-operative, easy-going and open-minded, more empathic and understanding and more likely to save rather than waste, and focus on substance rather than form. Also to a lesser extent females were less likely than males to try new things and enjoy challenges, to be independent and assume leadership positions, to be logical and control emotions in decision-making, to be active, lively, carefree or maverick, and to be active doers who believe that the success of events depends on internal factors.

The results comparing the reliability coefficients for males and females on the CPAI-2 are presented in Table 6.20. It is evident that males had higher reliability coefficients than females on the Practical Mindedness, Social Sensitivity and Thrift versus Extravagance subscales and a lower reliability coefficient on the Traditionalism versus Modernity subscale. However, 8 of the 32 scales exhibited reliability coefficients below .60 for both groups. These are: Logical versus Affective Orientation, Practical Mindedness, Internal versus External Locus of Control, Self versus Social Orientation, Relationship Orientation, Social Sensitivity, Harmony and Thrift versus Extravagance. With the exception of the Traditionalism versus Modernity subscale, all of the other scales mentioned above exhibited reliability coefficients under .60 for the entire sample, suggesting that these scales may be generally problematic in this sample of South African students.

From the results of the Procrustes rotation (see Table 6.21) it is evident that all scales of the CPAI-2 had congruence coefficients exceeding .85, except for the Social Potency subscale of Aesthetics (.83), the Accommodation subscale of Self versus Social Orientation (-.21), and the Interpersonal Relatedness subscales of Traditionalism versus Modernity (.62), Social Sensitivity (.65) and Thrift versus Extravagance (.69).

The results from both the NEO-PI-R and CPAI-2 ANOVAs concur with those found in previous research (Costa et al., 2001; Feingold, 1994; McCrae et al., 2005a; Zhang & Akande, 2002). Females were generally higher on Neuroticism as well as Agreeableness. At the facet/subscale level differences were, for the most part, in line with those proposed by Costa et al. (2001) and McCrae et al. (2005a) in terms of defining feminine and masculine characteristics within each domain. Thus, for Extraversion, Costa et al. (2001) propose Feminine-Extraversion/Introversion to be composed of Warmth + Gregariousness - Assertiveness - Excitement-Seeking + Positive Emotions. The results of the current study support this in terms of the significant differences found on the NEO-PI-R for Warmth, Assertiveness and Positive Emotions and on the CPAI-2 for Social Sensitivity with small to moderate effect sizes. However no significant differences were found between gender and Gregariousness or Excitement-Seeking. Findings were similar with the Feminine-Openness/Closedness domain. Females scored significantly higher than males on Aesthetics and Feelings and significantly lower on Ideas, and the CPAI-2 Novelty subscale concurred with Costa et al. (2001) but effect sizes were small to moderate. Females are also expected to score significantly higher on Actions but this does not occur in this study. For Feminine-Conscientiousness/Unconscientiousness, females are expected to score higher on the Dutifulness, Order and Compliance facets (McCrae et al., 2005). In the current study females only scored significantly higher on the Order facet but the effect size was small. Thus while support was found for the facets comprising the feminine dimensions proposed by Costa et al. (2001) and McCrae et al. (2005a), this support was not conclusive, more so since the effect sizes are in the small to moderate range.

Both Costa et al. (2001) and McCrae et al. (2005) found no or minimal gender differences in African and Asian cultures. Costa et al. (2001) argue that this may be due to the individualistic versus collectivist cultural influences, where gender differences are less relevant in collectivist cultures. The findings of the current study partially concur with those of Costa et al. (2001) and McCrae et al. (2005) and partially with those of African studies as explored in Costa et al. (2001) and McCrae et al. (2005) as well as Teferi (2004) and Zhang and Akande (2002). Earlier in the discussion, I argued that the sample in this study, by virtue

of being all university students, represents a more acculturated sample. This would serve as a valid explanation for the pattern of gender differences found in this study.

The aim of this study was to establish whether gender bias existed in the NEO-PI-R and the CPAI-2. Overall the results of both the reliability analysis and the Procrustes rotation suggest that sufficient agreement can be reached on most scales for both instruments to be used. On the basis of the ANOVA results systematic differences were found between males and females with regard to certain domains, facets, factors and subscales. These differences were significant enough, particularly on the Neuroticism and Agreeableness domains and facets, which demonstrate effect sizes above .35 (Hyde, 2005), to conclude that a gender bias may exist. However, two issues need to be raised, with the first concerning whether these gender differences – which appear to be common across cultures and are consistently found – can be classified as a bias.

There is a body of literature devoted to examining gender differences in personality and various theories are proposed to explain the differences ranging from evolutionary perspectives to social learning theories; with the underlying assumption of all of these theories is that there are fundamental, systematic differences between males and females (see Costa et al., 2001; Friedman & Schustack, 2009; Hyde, 2005; Larsen & Buss, 2008). Given this, one is inclined to question whether the psychometric examination of gender bias in personality instruments is of value, since it is almost a universal finding that males and females will differ on certain characteristics (see Costa et al., 2001; Friedman & Schustack, 2009; Hyde, 2005). The second issue follows on from the first and is possibly the more important one. Either way – whether we examine gender bias in psychometric studies of personality or whether we assume that some differences are universal – we need to address these differences or control for them when we utilise these instruments. For example, if a male and female both apply for the same executive position but it is evident that females generally score lower on Assertiveness, for a female to get the position she would have to score much higher than females and males alike. To control for this, gender norms become salient and the results of both the current study and previous research indicate that this is warranted. There is no guarantee though that the gender norms created on a standardisation sample in America can be applied in South Africa. It is evident from the results of the current study that at the domain level there is sufficient agreement between results found internationally and those in South Africa, but at the facet/subscale level there are certain differences. Furthermore, Costa et al. (2001) allude to differences in personality expression across gender in individualist versus collectivist cultures but the results of the current study demonstrate that dividing cultures into those that can be described as

individualistic and those that are collectivist is not so clear-cut, especially in the South African context. Aside from the cultural diversity present in South Africa, acculturation also plays a huge role. Acculturation might also be a more academic or socially acceptable way of defining the broader and more pervasive economic divide that exists in South Africa – and this contention deserves further exploration.

To address the two issues raised, it would still be of value to examine bias across gender, even though generally common differences occur between males and females, since the expression of these differences at facet/subscale level may differ from culture to culture. Thus the examination of bias will allow one to determine the exact nature of the difference and allow one to control for it either by developing local norms, using the norms provided in the test manual if applicable or applying differential selection techniques if applicable. The examination of bias needs to be carried out routinely and the response to bias then would be situational, depending on why the need to examine bias arose in the first place.

In this study gender bias was examined as part of a broader consideration of the utility of the NEO-PI-R and the CPAI-2 in the South African context. As such the results show evidence of bias that is congruent with findings of other studies, suggesting that both instruments have utility in the South African context despite the gender differences. This is further supported by the results on the Procrustes rotation for both instruments, which demonstrated a sufficient degree of fit between males and females on most facets/subscales. Impulsiveness (Neuroticism domain), Actions (Openness to Experience domain) and Thrift versus Extravagance (Interpersonal Relatedness subscale) are among the scales that demonstrated a lack of fit but these scales, as evidenced by discussions in the previous sections, were generally problematic in the current study, showing poor reliability and poor construct validity. Other scales demonstrating a lack of fit between males and females were Excitement-Seeking (Extraversion domain), Values (Openness to Experience domain), Aesthetics (Social Potency factor), Self versus Social Orientation (Accommodation factor), Social Sensitivity and Traditionalism versus Modernity from the CPAI-2 Interpersonal Relatedness factor. This finding suggests that although common ground may be found for males and females on all of the other facets/subscales, these particular scales were not able to find sufficient agreement in this sample. With the exception of Social Sensitivity and Self versus Social Orientation these scales did not demonstrate significant differences on the ANOVAs. However, since differences in these dimensions have been found in previous studies, particularly as they pertain to Excitement-Seeking and Aesthetics (Costa et al., 2001; McCrae et al., 2005a), further research is warranted.

7.13.2. Construct bias across population group in the NEO-PI-R and the CPAI-2

Table 6.22 presents the ANOVA results obtained for examining construct bias across population group in the NEO-PI-R. The only difference between White and non-White individuals with a moderate effect size was that of Feelings, and the differences with moderate to small effect sizes were the domain of Openness to Experience and the facet of Fantasy. Thus in this sample White individuals were found more likely to be curious about their inner and outer worlds and more open to experiencing positive and negative emotions more keenly than non-White individuals. White individuals were more likely to have an active fantasy life and a vivid imagination. A significant difference with a small effect size was also found for the Ideas subscale of the Openness to Experience domain. To a lesser extent White individuals tended to be more willing to entertain novel ideas and unconventional values. Thus there were significant differences between White and non-White individuals on four out of the six Openness facets as well as in the overall Openness to Experience domain in the NEO-PI-R.

From Table 6.22 it is also evident that significant differences with small effect sizes were found for the Neuroticism facet of Impulsiveness, the Extraversion facets of Warmth and Activity, the Agreeableness facets of Trust and Compliance and the Conscientiousness facet of Deliberation. These results suggest that White individuals are less likely to be able to control cravings and urges, to demonstrate compliant behaviour, to be cynical and sceptical or to be cautious and deliberate before acting. White individuals were more likely to exhibit affection, friendship and interpersonal intimacy and to lead fast-paced lives. However, due to the effect sizes for these differences, these conclusions are highly tentative. Significant differences are also found on the Neuroticism domain and the Neuroticism facet of Anxiety but the effect sizes for these differences are too small to warrant consideration.

The White group was found to have better internal consistency reliability coefficients on the Neuroticism facets of Angry Hostility and Impulsiveness, the Openness to Experience facets of Actions and Values and the Agreeableness facet of Tender-Mindedness, as evident in Table 6.23.

Table 6.24 presents the results obtained from the varimax rotations of the White and non-White groupings as well as the results from the Procrustes rotation with the White varimax rotated solution as the target matrix. From the results it is evident that the five factors were recoverable in both groups. However, the order of the factors and the percentage of variance explained by the factors differed. In the White factor solution, the first factor was defined by

loadings on the Conscientiousness domain, the second factor had loadings on the Neuroticism domain, the third factor had loadings on the Extraversion domain, the fourth factor was characterised by loadings on the Agreeableness domain and the fifth factor had loadings on the Openness to Experience domain. In the non-White factor solution, the first factor was defined by loadings on the Agreeableness domain, the second factor had loadings on the Conscientiousness domain, the third factor had loadings on the Neuroticism domain, the fourth factor was characterised by loadings on the Extraversion domain and the fifth factor had loadings on the Openness to Experience domain. Agreeableness superceded Conscientiousness to take the place of Factor 1 in the non-White solution. If Agreeableness loadings had not assumed the position of Factor 1, the pattern for loadings may have looked similar. As it appears now, the only similarity is that both groups had Openness to Experience facet loadings occupying Factor 5. As noted in Table 6.24, the percentage of variance explained by each of the factors differed – but not by much – in the Neuroticism, Extraversion and Openness to Experience domains. However, the percentage of variance differed by a fair amount on Conscientiousness and Agreeableness, with Agreeableness explaining more variance and Conscientiousness less variance in the non-White solution. From the congruence coefficients presented in Table 6.24 it is possible to conclude that all of the domains and facets had adequate congruence coefficients ($\geq$ .85), with the exception of the Actions facet (.77) on the Openness to Experience domain.

Table 6.25 presents the ANOVA results for examining bias across population group on the CPAI-2. The only difference with a moderate effect size was that of Internal versus External Locus of Control, with White individuals demonstrating more of an Internal Locus of Control and non-White individuals demonstrating more of an External Locus of Control. All other differences corresponded to small effect sizes making them neglible. Of these, the difference of particular interest is the higher score on Traditionalism versus Modernity for the non-White group, which indicates that this group was more likely to be conservative, obedient to authority and protect old customs. However the non-White group scored significantly lower on the Family Orientation scale, suggesting less of a reliance on family ties for economic and social support and a tendency to have distant relationships with family members.

Other significant differences were found on the Social Potency factor and the Social Potency subscales of Divergent Thinking, Aesthetics and Extraversion versus Introversion, the Dependability subscales of Emotionality and Practical Mindedness, the Accommodation subscales of Defensiveness, Graciousness versus Meanness and Veraciousness versus Slickness, and the Interpersonal Relatedness subscale of Social Sensitivity, as evident in Table 6.25. Thus White individuals were more likely to try out new ways of handling things,

tended to be less appreciative of art and beauty, and were more extraverted and sociable individuals who experience greater anxiety and lower frustration tolerance than non-White individuals. White individuals also tended to be less pragmatic and more concerned with appearances but less likely to use defence mechanisms such as self-protective rationalisation, externalisation of blame and belittling of others. White individuals were more tolerant, broad-minded, empathic, understanding and accepting in their dealings with others and tended to be more faithful to facts and to uphold principles. A significant difference was found on the Accommodation subscale of Interpersonal Tolerance but the effect size was extremely small. From Table 6.26 it is evident that the White grouping obtained a lower internal consistency reliability coefficient on the Social Potency subscale of Diversity, and higher coefficients on the Accommodation subscales of Graciousness versus Meanness and Self versus Social Orientation.

From the Procrustes rotation in Table 6.27 it is evident that despite the difficulties with varimax rotated solutions and the resultant Procrustes matrix, it is possible to see that a sufficient degree of agreement was found between the White and non-White matrices, with only Family Orientation (.81) exhibiting a congruence coefficient less than .85.

The ANOVA results from both the NEO-PI-R and the CPAI-2 in this study concur with those found by Allik and McCrae (2004) in that non-Whites were found to have lower scores than White South Africans on Extraversion and Openness to Experience. However Allik and McCrae (2004) also found that Black South Africans were higher in Agreeableness. The results from the ANOVAs in the current study suggest that non-White individuals were higher on some aspects of Agreeableness and lower on others. Thus non-White individuals had higher scores on the Compliance and Deliberation facets of the NEO-PI-R and the Defensiveness subscale of the CPAI-2, and lower scores on the Trust facet of the NEO-PI-R and the Graciousness versus Meanness and Veraciousness versus Slickness subscales of the CPAI-2. This pattern of scores suggests that non-White individuals were lower on Agreeableness. This result concurs with that of Zhang and Akande (2002), who found that Black students were higher in Neuroticism but lower in Agreeableness and Extraversion. However, in the current study, White students were found to be higher on Neuroticism. These results are most similar to those of Heuchert et al. (2000), who found that Black students were significantly lower than White students on Extraversion, Openness to Experience and Agreeableness.

Examination of internal consistency reliability coefficients for both instruments demonstrates that, with the exception of a few scales, there were no appreciable differences between the

groups. The differences on Impulsiveness, Actions, Values and Tender-Mindedness from the NEO-PI-R and Diversity, Self versus Social Orientation and Graciousness versus Meanness from the CPAI-2, suggest difficulties with the inter-item consistency between the two groups. Impulsiveness, Actions and Tender-Mindedness were found to be problematic in the overall analysis of the data. Hence it is uncertain as to whether the reliability results across population group for these facets would yield valuable information. It is my contention that these coefficients should at this point not be interpreted. The results for the Values, Diversity, Self versus Social Orientation and Graciousness versus Meanness subscales are interesting in that although reliability speaks only to inter-item consistency and not to content, the scales found to contribute to the Agreeableness/Accommodation dimension as well as the Interpersonal Relatedness dimension were evidencing differences between the White and non-White groupings. These differences can, in line with previous arguments, be seen to reflect the individualistic versus collectivist dimension that exists between the White and non-White groupings. Furthermore, since coefficients were generally higher in the White sample, it is possible that the items are more familiar or better understood by these individuals. However this contention is better explored in conjunction with some form of item analysis. This study explored item bias and this issue is commented on further on in the chapter, in the item bias section. It would also be interesting to explore whether the home language results parallel those found in the population groups as home language is often seen as a proxy for population group in South Africa.

Also of interest with the reliability coefficients is the generally poor reliability (< .60) in both groups for the Social Potency subscale of Logical versus Affective Orientation, the Dependability subscales of Practical Mindedness and Internal versus External Locus of Control, the Accommodation subscale of Self versus Social Orientation and the Interpersonal Relatedness subscales of Relationship Orientation, Social Sensitivity, Harmony and Thrift versus Extravagance. These subscales were found to have equally low internal consistency reliability coefficients across both gender groupings as well. This provides further evidence that the items in these scales are not necessarily appropriate in this sample of South African students. An examination of item bias results and further research are warranted.

In terms of factor structure the results of this study indicate that the five factor structure was recoverable across both groups, with only the order of factor loadings and the percentage of variance across factors differing in the NEO-PI-R varimax solutions. Also, sufficient agreement was found between the White and non-White factor structures based on the results from the Procrustes rotation and congruence coefficients. Only the Actions facet from

the Openness to Experience domain demonstrated low congruence but, as discussed previously, the Actions facet was generally problematic in this study. The results on the CPAI-2 also demonstrated a pattern of loadings for both groups that is similar to the FFM, as found in the construct validity section of the current study. Congruence coefficients on the CPAI-2, with the exception of the Family Orientation subscale, were all above .85. However, as indicated in the earlier discussion, Family Orientation, like Actions on the NEO-PI-R, appeared to be a problematic scale in this sample. These results are very different to others found in the South African context, where the five factors were generally recoverable in White samples but not in non-White samples (Heaven et al., 1994; Heuchert et al., 2000; Taylor, 2000; Zhang & Akande, 2002). However, it should be noted that Heaven et al. (1994), Taylor (2000) and Zhang and Akande (2002) all used oblimin rotation and only Heuchert et al. (2000) used varimax rotation.

Allik and McCrae (2004) argue that the differences found between White and non-White individuals may not be differences in personality but rather differences in how these personality traits are expressed in individuals from individualistic versus collectivist cultures. This may be a possibility particularly with regard to Openness to Experience and Extraversion. The significant difference between White and non-White individuals on Internal versus External locus of Control – with White individuals demonstrating more of an Internal Locus of Control and non-White individuals demonstrating more of an External Locus of Control – and the difference on Traditionalism versus Modernity – with the non-White group being more likely to be conservative, obedient to authority and protective of old customs – provide support for this argument. However, it is unclear whether, as Allik and McCrae (2004) argue, this is a cultural phenomenon or whether it operates at an individual level and as such suggests the need for a potential sixth factor of personality.

Of further interest is the pattern of low scores on Extraversion, Openness to Experience and Agreeableness, which Heuchert et al. (2000) argue is potentially a result of factors like political oppression and poverty. Certainly the differences on the Agreeableness facets of the NEO-PI-R – with non-White individuals demonstrating significantly lower scores on Trust and significantly higher scores on Compliance and Deliberation – suggest a psyche that could very well have been shaped by apartheid. However, South Africa is 16 years post-transformation and the majority of the sample used in this study (mean age = 21 years) were raised in the period post-1990 in a political climate of reconciliation and change. Hence these individuals were not as affected by apartheid as previous generations. On the other hand, it can be argued that over 40 years of oppression sanctioned by law and over a century of oppression generally leaves an indelible mark that is transmitted across

generations. However, the fact that from 1994 to the present the five factor pattern has become more recoverable in student samples suggests that these effects are gradually becoming more negligible but it also alerts one to the possibilities of greater acculturation occurring.

In line with the arguments presented earlier in the chapter, South Africa is no longer isolated from the world. It is very much part of a digitised, globalised society but it is still a vastly unequal society, with the majority of the country still not having access to resources, opportunities, employment and education. Arguments for a first and second economy in South Africa hold. According to Leibrandt et al. (2010), the Gini coefficient increased from .66 to .70 in the period from 1993 to 2008. Although it is still the non-White group that are the majority victims of this lack of opportunity, there is a growing middle and upper class among the this group. Van der Berg, Burger and Louw (2010) and Seekings and Natrass (2006) argue that the increase in the Gini coefficient is explained primarily by this growing class divide particularly amongst the indigenous African population in South Africa. Based on both my teaching experience and observations by myself and other colleagues on campus, I would be justified in arguing that the sample in this study comes primarily from this group. By virtue of receiving a Western education and continual exposure to Western media and technology it can be argued that this group represents a more acculturated group. Hence the five factors are more recoverable in this sample of students than in previous, less acculturated samples. Consequently, arguments for the five factor model not being wholly recoverable might still hold. Further research with other, larger and more representative South African samples is required. From the arguments presented, it is also evident that the inclusion of socio-economic indicators in future research could yield useful results.

As with gender, while reflections on the underlying arguments on population group differences are useful, they do not provide any guidelines for issues of bias. It is clear from the results of this study and previous studies that systematic differences occur between White and non-White individuals on both the NEO-PI-R and the CPAI-2 (Cheung et al., 2008; Heaven et al., 1994; Heuchert et al., 2000; Matsimbi, 1997; Taylor, 2000). However, as was argued with regard to gender, this does not mean that the instruments do not have utility in the South African context. Unlike gender, there are no population group norms available. These can be developed for South Africa if necessary but whether this would be viable or feasible is debatable, given the number of different groupings present in the country. It can be argued that when the NEO-PI-R or CPAI-2 is being used for job selection and recruitment, for example, it is being used on literate, fairly acculturated samples, so it should be adequate. On the other hand, this study demonstrates differences in an

acculturated sample. The approach in South Africa for this is the use of multimethod assessment that incorporates a range of selection tools, of which psychometric tests form only a part.

Since evidence of systematic differences across population group have been found, further research is warranted to determine if these differences hold in other, more representative South African samples, young and old, acculturated and not acculturated, with or without access to resources. Furthermore, research studies employing these two instruments as operationalisations of the personality construct should take cognisance of these systematic differences before interpreting results.

7.13.3. Construct bias across home language in the NEO-PI-R and the CPAI-2

Results for examining construct bias across home language in the NEO-PI-R are presented in Table 6.28. From Table 6.28 it is evident that all the significant differences have effect sizes that were small to moderate at best. For the Anxiety and Impulsivity facets, the Cliff's *d* effect size was below the cut-off for a small effect size, suggesting a negligible difference between English first and English second language speakers on these constructs.

English first language speakers were significantly higher on Openness to Experience, Fantasy, Feelings and Values. This suggests that English first language speakers are more likely to be curious about their inner and outer worlds, more open to experiencing positive and negative emotions more keenly, more likely to have an active fantasy life and a vivid imagination and more willing to entertain unconventional values than English second language speakers. English first language speakers were also found to be more likely to lead fast-paced lives and less likely to be compliant, cynical and sceptical or to be cautious and deliberate before acting, as well as less likely to be moved by others' needs and to emphasise the human side of social policies (see Table 6.28).

From Table 6.29 it is evident that English first language speakers demonstrated higher coefficients on all of the NEO-PI-R scales, with 15 of the 35 scales on the NEO-PI-R demonstrating differences exceeding .10. These are Anxiety, Depression, Impulsiveness, Vulnerability, Warmth, Excitement-Seeking, Positive Emotions, Actions, Values, Straightforwardness, Altruism, Modesty, Tender-Mindedness, Competence and Self-Discipline. The Actions and Tender-Mindedness facets demonstrated poor reliability coefficients (> .60 for both cases) across both groupings.

Results from the varimax rotated solutions for English first and English second language speakers on the NEO-PI-R are presented in Table 6.30. The five factors of the FFM were recoverable in both varimax matrices but the order of loadings and the percentage of variance explained differed between the two groups. English first language speakers had the factors loading according to the order of Conscientiousness on the first factor, Neuroticism on the second factor, Extraversion on the third factor, Agreeableness on the fourth factor and Openness to Experience on the fifth factor. In the English second language group Conscientiousness facets loaded on Factor 1, Agreeableness facets on Factor 2, Neuroticism on Factor 3, Openness to Experience on Factor 4 and Extraversion on Factor 5. Thus only Conscientiousness loaded on the first factor for both groups but a 3.47% difference was found in terms of the variance explained by the Conscientiousness facets between the two groups. The variance explained for Neuroticism and Openness was generally similar despite the fact that they did not load on the same factor but a 5.48% difference was found for the percentage of variance explained for Extraversion and a 4.47% difference was found for the percentage of variance explained for Agreeableness between the two groups. The results of the Procrustes rotation for home language on the NEO-PI-R indicate that the five factors loaded as expected. All the congruence coefficients for both domain and facet scales exceeded .85 (see Table 6.30).

Small to moderate effect sizes were found for the ANOVA differences of home language on the factors and scales of the CPAI-2, as indicated in Table 6.31. The CPAI-2 Interpersonal Relatedness subscale of Traditionalism versus Modernity was the only subscale that demonstrated a significant difference with a moderate effect size across home language, suggesting that English first language speakers are less likely to be concerned with traditions and customs, to be conservative and to be obedient to authority than English second language speakers.

Other significant differences across home language on the CPAI-2 were found for the Social Potency subscale of Aesthetics, the Dependability subscales of Responsibility, Emotionality, Practical Mindedness and Internal versus External Locus of Control, and the Accommodation factor and Accommodation subscales of Defensiveness, Self versus Social Orientation and Veraciousness versus Slickness, as presented in Table 6.31. From these differences it is evident that English first language speakers were found more likely to demonstrate an appreciation for art and beauty, more likely to demonstrate an Internal Locus of Control, and more likely to experience greater anxiety and lower frustration tolerance than English second language speakers. English first language speakers also tended to be less pragmatic and responsible and more concerned with appearances, but less likely to use

defence mechanisms such as self-protective rationalisation, externalisation of blame and belittling of others. They tended to be more tolerant, broad-minded, empathic, understanding and accepting in their dealings with others, were usually faithful to facts and upheld principles and are generally confident, carefree and maverick. The difference for the Accommodation subscale of Interpersonal Tolerance, although significant, had a Cliff's *d* effect size of .11, which is smaller than the cut-off for a small effect size, suggesting that this difference was negligible.

In terms of internal consistency reliability, the English first language group obtained higher coefficients on the Dependability subscale of Optimism versus Pessimism, the Accommodation subscale of Veraciousness versus Slickness and the Interpersonal Relatedness subscale of Thrift versus Extravagance (see Table 6.32). As with the gender and population groups, it is interesting to note that 8 of the 32 scales of the CPAI-2 demonstrated low reliability coefficients (> .60) for both groupings. These are: Logical versus Affective Orientation, Practical Mindedness, Internal versus External Locus of Control, Self versus Social Orientation, Relationship Orientation, Social Sensitivity, Harmony and Thrift versus Extravagance. From the congruence coefficients presented in Table 6.33 it is evident that all of the factors and subscales of the CPAI-2, with the exception of Aesthetics (Social Potency) and Thrift versus Extravagance (Interpersonal Relatedness), hade congruence coefficients at or above .85.

Not many studies have been conducted in South Africa or internationally that examined specifically home language as a variable. From the studies reported in Chapter 3 it is evident that some systematic differences are found between English- or Afrikaans-speaking groups and those who speak an indigenous African language (see Abrahams, 1996; Abrahams & Mauer, 1999a; 1999b; Heaven & Pretorius, 1998; Van Eeden & Prinsloo, 1997). In the current study, however, significant differences with small to moderate effect sizes were noted. From the ANOVA results on both the NEO-PI-R and the CPAI-2, it it evident that English second language speakers were lower on Openness to Experience, were more traditional and protective of old customs and had more of an external Locus of Control. From the CPAI-2 results, English second language speakers tended to be lower on Neuroticism and Agreeableness and higher on Conscientiousness but these conclusions are based on one or two subscale differences only with small effect sizes and would therefore need to be better researched before they are interpreted.

It is interesting to note the similarities between English second language speakers and the non-White group in terms of the Openness to Experience, Aesthetics, Internal versus

External Locus of Control and the Traditionalism dimensions. The similarities between the English second language group and the non-White group also leads me to question whether both variables are effective indicators of cultural groupings in South Africa or whether they are different expressions of the same variable. Given the arguments presented in Chapter 4 for examining population group and home language alike, as well as the emerging evidence for acculturation as a potential construct of interest, I think retaining both variables is necessary in studies of this nature.

The similarities between the non-White group and the English second language group lend further support to the arguments for a different expression of personality in a collectivist culture, particularly as it pertains to the Openness dimension. The groupings that comprise the English second language group tend to subscribe more to a collectivist than an individualistic dimension. These findings also provide evidence for the argument that similarities appear to exist between African and Asian expressions of personality.

However, the results from the reliability analyses undermine this somewhat. The results of the reliability coefficients for the NEO-PI-R (presented in Table 6.32) suggest that language may be playing a considerable role in terms of the inter-item consistency, since in all cases English first language speakers obtained better reliability coefficients, and in 15 of the scales appreciable differences were noted. These 15 scales were not confined to a specific domain. Rather, the facets with poor reliability coefficients were found across the five factors. Tender-Mindedness and Actions were found to have low coefficients (> .60) but, as discussed earlier, these facets were found to be problematic in the overall sample statistics for both groups as well.

The results of the reliability coefficients for the CPAI-2 indicated appreciable differences between the two home language groupings on three scales only. However, eight scales were found to be problematic across both groupings, suggesting that, for the CPAI-2, problems in inter-item consistency across the eight scales need to be explored further. An examination of the problematic scales indicates that these are the same scales identified as problematic across gender and population group. Two more of the unique subscales of the CPAI-2, Face and Family Orientation, also produced low reliabilities across both groupings, with one grouping demonstrating a coefficient at or slightly above .60 and the other just below .60. This consistent finding suggests that these scales are inappropriate for use in this South African student sample. These scales also demonstrated poor reliability across the entire sample. Hence it can be concluded that the eight scales identified as problematic across all three variable groupings may show evidence of construct bias but of primary

concern is the lack of internal consistency reliability. Although some of these scales also evidenced problems with construct validity, it is premature at this stage to argue that these constructs have little utility in the South African context. Further research is warranted to determine the utility of these scales with a bigger and more representative South African sample. Since at least three of these scales are original developments within the architecture of personality and are quite closely tied to the Individualism/Collectivism constructs, they also merit further examination.

The results of the factor analysis for the NEO-PI-R indicate that the five factors were generally recoverable in the varimax solutions of both home language groups but the order of loadings and the percentage of variance explained differed. The Procrustes rotation and congruence coefficients also indicated agreement across the groups for all domains and facets in both the NEO-PI-R and CPAI-2, with only Aesthetics (Social Potency) and Thrift versus Extravagance (Interpersonal Relatedness) demonstrating congruence coefficients below .85. These results suggest the equivalent utility of the scales despite the ANOVA differences for both groups.

As with gender and population group, the results for home language indicate systematic differences but these were primarily on the Openness dimension and were not so substantial as to lead one to conclude that bias was operational. However, they were substantial enough to warrant further research. The reliability results do raise concern since they suggest, in the case of the NEO-PI-R, a language bias might be operational. The reliability results for the CPAI-2 suggest that the difficulties are not so much related to bias as associated with problematic constructs or problematic operationalisations of the constructs. The item bias results should serve to clarify further this issue.

7.14. METHOD BIAS IN THE NEO-PI-R AND THE CPAI-2

Method bias was examined in the NEO-PI-R by considering whether the groupings in each of the three variables (gender, population group, home language) would endorse extreme responses differentially. No significant differences were found for gender or population group but a significant difference with a small effect size was found for home language, with English second language speakers being more likely than English first language speakers to endorse extreme responses (see Table 6.34). Research has demonstrated that individuals in African and Asian cultures are more prone to such response biases (see Hui & Triandis, 1989; Hamamura et al., 2008; McCrae et al., 2005a; 2005b; McCrae et al., 2008b). However, in this case the difference is not evident between the population groups, where the

non-White group can be seen to be equivalent to a combined Asian/African group and the White group may be seen to be cognisant of a Euro-American group. Rather, the difference is observed between an English first language and an English second language group, suggesting that the tendency to endorse extreme responses in this study is a function of language ability, with those who are not as proficient in English endorsing more extreme responses. If one was uncertain about the meaning of an item or a word on an item one might be inclined to choose the neutral option or an option closer to the middle; but in this case the opposite appears to have happened, with English second language speakers endorsing more extreme responses. On the other hand, this study did find that the results for the non-White group and the English second language group were quite similar. Thus it is questionable whether there is any value in including both variables or not. Given the results found here, it is clear that exploring both variables in the South African context is useful.

For the CPAI-2, method bias is determined by examining differences in social desirability across the three variables (gender, population group, home language) using the CPAI-2 Social Desirability scale. The only significant difference found was on population group, with White individuals scoring significantly higher than non-White individuals on the Social Desirability scale, as evident in Table 6.35. However this difference had a small effect size. This contradicts the findings of Bernardi (2006), who reports that social desirability response bias decreases as a country's level of Individualism increases. Furthermore women, according to Bernardi (2006), are more likely to exhibit social desirability response bias. Thus the current study would need to have found that non-White individuals scored higher on the Social Desirability scale if Bernardi's (2006) findings were to hold in this context.

Bernardi's (2006) study was conducted with samples from 12 countries, namely, Australia, Canada, China, Colombia, Ecuador, Hong Kong, Ireland, Japan, Nepal, Spain, South Africa and the United States. Bernardi (2006) does not provide the demographic breakdown of each of the samples. Rather, he divides them into cultural areas of More Developed Latin, Less Developed Latin, More Developed Asian, Asian Colonial and Anglo. He includes South Africa in the Anglo group, along with Australia, Canada, Ireland and the United States. Without the demographic breakdown it is difficult to decide whether this was appropriate or not but in Bernardi's (2006) study South Africa was clustered more towards the Individualism dimension and, given the arguments presented in this study, this may have been erroneous.

Given that the significant differences observed for both the NEO-PI-R and the CPAI-2 demonstrated small effect sizes, it is possible that method bias was not operational in this study. However, I must acknowledge that this aspect of bias was not examined as

thoroughly as construct or item bias. This was primarily due to constraints with regard to scope of study, length of questionnaire and funding. Also, when I commenced with this project I had not yet encountered the more recent of literature on response biases and social desirability, which would possibly have allowed me to work more creatively to include a more intense examination of method bias. Finally, in relation to the NEO-PI-R, the three questions which appear post the instrument were not included since at the time of printing I did not have access to the original material with the answer sheet and questions. Primarily because of funding difficulties, the original material for the NEO-PI-R was only obtained after printing. As indicated in the Methods chapter, all dues for rhe reproduction and use of the NEO-PI-R were paid to Psychological Assessment Resources. This is an area that certainly merits further research both locally and internationally.

7.15. ITEM BIAS IN THE NEO-PI-R

Item bias in the NEO-PI-R was examined in several ways. Firstly ANOVAs were conducted for each item across the three variables (gender, population group, home language) to determine if there were significant differences between the groups on item responses. Secondly the questionnaires were examined for crossed out or underlined items and the open-ended questions included after the NEO-PI-R were analysed to determine the frequency of people who identified the NEO-PI-R items as problematic in terms of understanding and appropriateness. These responses were also analysed to determine which items were identified as problematic and finally thematic analysis was conducted on the responses that individuals supplied to substantiate their responses as to whether the items were problematic or not. These results are discussed below.

7.15.1. Item bias across gender

An examination of the biased items across gender (see Table 6.36) indicates that only 6 items (2.5% of the 240 items) had significant differences with effect sizes in the moderate range (> .45). The differences found on these items between males and females are in line with those indicated in the literature as well as those found at the scale level in this study. Thus the majority of items which exhibited gender bias came from the Neuroticism and Agreeableness domains. There appears to be consensus in the literature that, with the NEO-PI-R domains, consistent differences with at least moderate effect sizes are found on the Neuroticism and Agreeableness domains, with females scoring higher than males on both domains (see Costa et al., 2001; McCrae et al., 2005a; Zhang & Akande, 2002). At the facet level, it is interesting to note that the facets that presented with four or more items

evidencing significant mean differences are not the same facets highlighted in the literature as demonstrating gender differences. Tender-Mindedness and Assertiveness have generally been found to differ across genders (Feingold, 1994; Teferi, 2004). In the current study this pattern is noted at scale level but with small effect sizes. Of the six facets with four or more problematic items, two were from the Agreeableness domain (Modesty and Straightforwardness) and three were from the Neuroticism domain (Depression, Vulnerability and Anxiety). This again lends support to the consistent difference on Neuroticism and Agreeableness cited in the literature. The last facet to exhibit 50% or more items differing across gender is that of Dutifulness (C). McCrae et al. (2005a) identify Dutifulness as a facet that differs across gender and include it in their calculation of Feminine Conscientiousness/Unconscientiousness.

An examination of the six items exhibiting significant gender differences with moderate effect sizes reveals two items from the Agreeableness facet of Modesty, two from the Neuroticism domain (one from Vulnerability and one from Self-Consciousness) and two from Openness to Experience (one from Feelings and one from Aesthetics). This pattern is congruent with the trends found in the current study and in the literature in relation to Neuroticism and Agreeableness (Costa et al., 2001; Feingold, 1994; McCrae et al., 2005a; Teferi, 2004). An examination of the content of the items reveals content that is generally congruent with societal expectations of gender differences. Thus males scored higher on bragging about accomplishments, having a higher opinion of themselves, finding ballet/modern dance boring, and not being affected by ridicule. Males scored lower on items relating to falling to pieces under stress and finding it easy to empathise with what others are feeling. Given the trend found in this study and across the literature, I am inclined to argue that the Neuroticism and Agreeableness differences are more than just biases that exist. Rather they seem indicative of deeper, more entrenched, differences between the genders. On the other hand, it can be argued that there are different societal expectations for males and females, which are perpetuated across the generations. Hence the observed differences may not be encoded in our genetic make-up, but may rather be due to consistent socialisation factors. Research has investigated this nature-nurture debate, with some studies supporting a more genetic, biological explanation (Buss, 2003) and others supporting a more social, environmentally-based explanation (Brannon, 2008; Friedman & Schustack, 2009). There are also studies that argue for a more nuanced and integrated explanation (Eagly & Carli, 2007). The current study contributes to this body of literature by confirming that systematic differences between the genders exist. However, it did not aim to explore or contribute to the debate on the underlying aetiology of these differences. At best, the contributions made are

personal speculations. Further research in the South African context with a more representative sample in terms of the gender divide is required.

This study sought to comment on bias, that is, systematic differences across the gender groupings. Evidence for this was found in two domains, namely Neuroticism and Agreeableness, which supports trends in the literature (Costa et al., 2001; Feingold, 1994; McCrae et al., 2005a; Zhang & Akande, 2002). Evidence was found for six items specifically and an argument can be put forward that these six items need to be revised. McCrae, Costa and Martin (2005) developed a revised version of the NEO-PI-R, the NEO-PI-3, in which 37 items were changed primarily to cater for reading level. An examination of the 37 items indicates that none of the 6 items found to exhibit significant gender differences were among these. Also none of the 6 items were among those identified as problematic by Zhang and Akande (2002). It is recommended that future research be conducted on bigger and more representative samples in the South African context to determine if these 6 items still present with significant gender differences.

7.15.2. Item bias across population group

An examination of the biased items across population group (see Table 6.38) indicates that most of the items (14 of 48 items) were from the Extraversion and Openness to Experience domains. This was followed by Conscientiousness, with 13 problematic items. While Conscientiousness has at times been identified as problematic in South African studies (Heaven et al., 1994; Heuchert et al., 2000), the Extraversion and Openness to Experience differences tend to be more consistently reported in the literature (Allik & McCrae, 2004; Heaven et al., 1994; Heuchert et al., 2000; Taylor, 2000). At the facet level, there were only two facets to have more than 50% of items demonstrating significant differences across the population groups, namely Deliberation (C) and Activity (E).

Five items were found to have significant differences across the population groups with effect sizes in the moderate range (> .45). Most of the items (three) were from the Openness to Experience domain (two from the Fantasy facet, one from the Feelings facet). Only one item each was from the Agreeableness (Trust) and Extraversion (Excitement-Seeking) domains. These results were generally in keeping with the broader trends observed in this study and in the literature (Allik & McCrae, 2004; Heaven et al., 1994; Heuchert et al., 2000; Taylor, 2000) with regard to Extraversion and Openness to Experience. In terms of the content of the five problematic items, non-White individuals tended to avoid flights of fancy, tended not to enjoy games of make believe and tended to perceive people to be generally

not trustworthy. Non-White individuals were also more likely to watch scary or shocking movies but less likely to have strong moods evoked by certain scents or names of distant places. Examination of this item content concurs with the argument proposed by Taylor (2000) with regard to the Fantasy facet, where Black individuals suggest that having an active fantasy life suggested that one is lazy or lacks sufficient contact with reality. Furthermore, the arguments made more generally in terms of the Openness to Experience domain are also applicable in that Openness may manifest differently in cultures that are more collectivist (Cheung et al., 2008). This would explain the differences observed at item level with Openness to Experience being the domain to have the most items exhibiting significant differences. A similar explanation can be put forward for Extraversion. As with gender, I am inclined to question whether these significant differences are more than just an indication of systematic differences. They have implications for the nature-nurture debate, particularly when arguments are made based on individualistic versus collectivist cultures. The differences on Openness to Experience and Extraversion together with those found on the Trust item and three of the problematic Deliberation facet items also concurred with the arguments proposed by Heuchert et al. (2000). They argue that political oppression, poverty and reduced educational opportunities influence the expression of personality traits such that individuals do become more mistrustful and tend to inhibit their thoughts and feelings more.

At the psychometric level, as with gender, it is suggested that the NEO-PI-R items be reexamined, particularly the five that demonstrated significant differences with moderate effect sizes. Looking at the item revisions on the NEO-PI-3, it is evident that none of the 37 revised items (see McCrae et al., 2004) corresponded to the 5 that demonstrated significant differences across population group. There were also no commonalities between the items found to be problematic by Zhang and Akande (2002) and the 5 items. The same arguments presented for gender apply here, in that the immediate recommendation would be to encourage the revision of these items for a South African context. However, as indicated, this needs to be explored with larger and more representative samples first.

7.15.3. Item bias across home language

An exploration of mean differences across home language groupings for the NEO-PI-R domains and facets indicates that the Openness to Experience and Agreeableness domains had the most items (14 items each) exhibiting significant differences. This is followed by Conscientiousness with 13 items and Neuroticism with 12 items. This result is fairly good given the findings of previous research in the South African context (see Abrahams, 1996; Heaven & Pretorius, 1998; Horn, 2000; Van Eeden & Prinsloo, 1997), which suggested

much larger problems with English second language speakers. Furthermore, this result mirrors that found with population group in that Openness to Experience was among the two domains with the most number of items showing a significant difference. This lends greater support to the arguments on personality differing in individualistic versus collectivist cultures (see Cheung et al., 2008) as well as cultures where English is the second language.

Two Agreeableness facets (Compliance and Modesty), one Openness to Experience facet (Feelings) and one Conscientiousness facet (Deliberation) had four or more items exhibiting significant differences across the home language groupings. This result mirrors that found for population group and the NEO-PI-R only in so far as the Deliberation items are concerned. Items 60, 90 and 120 were common for the home language and population group differences. They also evidenced the same direction of difference, with non-White, English second language speakers scoring higher on Items 60 and 120 and lower on Item 90. Item 90 is the reverse of Items 60 and 120. All three items deal with decision-making, particularly with thinking things through before making a decision. The reason for this finding is not clear-cut. I would offer two explanations. Firstly, the remnants of apartheid could have produced a constant deliberative mindset in the non-White population. The possibility that one might get intimidated or arrested if one said or did the wrong thing may have led to non-Whites automatically being cautious with speech and decision-making. A second explanation comes from my experience of being part of a collectivist culture where decisions are not made immediately. They are carefully thought through and discussed with the appropriate elders.

The Agreeableness facet results reflect the results found for the domain. However, this does not concur with results at the scale level nor is it a consistent trend in the literature (Abrahams, 1996; Heaven & Pretorius, 1998; Horn, 2000; Van Eeden & Prinsloo, 1997). It is important to note though that the South African studies reviewed focused only on scale level analysis. There may be certain items on the Agreeableness domain and facet scales that were problematic for South African samples but which were too few to affect the overall reliability and validity of the construct, and hence they were not detected.

There were 5 items (2.1% of the 240 items) that had significant differences with effect sizes in the moderate range (> .45) and 3 of those were from the Agreeableness domain, with 1 from the Trust facet, 1 from the Tender-Mindedness facet and 1 from the Modesty facet. The Tender-Mindedness item contains the word “panhandlers” and this has consistently been shown to be problematic internationally (McCrae et al., 2004) and locally (see Franklin-Ross, 2009; Horn, 2000; Quy, 2007; Taylor, 2000). This was the only item also identified as

problematic and changed in the NEO-PI-3. The word “panhandlers” was changed to “beggars”. There was no correspondence between these five items and those found to be problematic by Zhang and Akande (2002).

From the five items, the item from the Modesty facet reads as, “I have a very high opinion of myself”, and English second language speakers scored higher on this item. However, this cannot be interpreted as English second language speakers demonstrating less humility. It is likely that English second language speakers may interpret the statement literally without picking up on the subtly nuanced meaning of having a “very high opinion” of oneself. Hence they would have responded at a more concrete rather than abstract level (Taylor, 2000).

The Trust item was the same as the one identified in the population group differences. Of the remaining two items, one was from the Feelings facet of Openness to Experience and was the same item – addressing evoking strong moods – as the item identified across population groups. The fact that the Trust and the Feelings item differences were consistent across language and population group suggests that to an extent the variables of language and population group are mutually related and do overlap as representations of cultural groups in South Africa. The other results found in the home language analyses are different to those across population group and therefore provide a valid argument for considering both variables in studies of this nature.

The last of the five items was from the Activity facet of the Extraversion domain and reads as, “My life is fast-paced”. As with the Modesty item, it is quite likely that English second language speakers failed to adequately understand the term “fast-paced”. The possibility exists that the item is interpreted literally using a more concrete interpretation of the term, as suggested by Taylor (2000).

From the discussion on item bias across gender, population group and home language it is evident that the most items exhibiting bias were found across gender (30.4% of the 240 items) followed by home language (25.8% of the 240 items) and lastly population group (24.5% of the 240 items). Table 7.3 provides a summary of the percentage of items found to be problematic across the three variables (gender, population group, home language) for the five domains across the domain level and across the entire questionnaire. For gender it is evident that Neuroticism was the most problematic domain, followed by Agreeableness, and these results mirror the pattern found at scale level in the current study as well as in other studies (see Costa et al., 2001; Feingold, 1994; McCrae et al., 2005a; Zhang & Akande, 2002). For population group, Openness to Experience and Extraversion were the most

problematic and these mirror the trends found in this study at scale level in terms of Openness to Experience and those of other studies that report difficulties at scale level with both Openness to Experience and Extraversion in an African context (see Heaven et al., 1994; Heuchert et al., 2000; Piedmont et al., 2002; Teferi, 2004; Zhang & Akande, 2002). For home language, Openness to Experience and Agreeableness had the most items demonstrating bias. This corresponds to the scale level results in this study for the Openness to Experience domain but not for the Agreeableness domain.

Table 7.3: Percentage of NEO-PI-R items identified as problematic from ANOVA results

Variable	Neuroticism	Extraversion	Openness	Agreeableness	Conscientiousness
Gender	7.9	5.0	5.4	7.5	4.6
	39.5	**25.0**	**27**	**37.5**	**22.9**
Population	3.3	5.8	5.8	4.2	5.4
group	**16.7**	**29.2**	**29.2**	**20.8**	**27.1**
Home	5.0	3.8	5.8	5.8	5.4
language	**25.0**	**18.8**	**29.2**	**29.2**	**27.1**

Note. Values in ordinary typeface indicate percentage in relation to the 240 items in the NEO-PI-R. Values in bold indicate percentage in relation to the 48 items in the domain.

From Table 7.3 it is also evident that differences on Neuroticism and Agreeableness items were most prevalent across gender while differences on Extraversion were most prevalent across population group with gender following close behind. There were no appreciable differences on Openness to Experience items across the three variables. There were no differences between population group and home language on the Conscientiousness items, with both variables having 27.1% of items demonstrating significant differences. Gender had fewer items demonstrating significant differences on Conscientiousness when compared to population group and language. This pattern of differences mirrors the literature, as discussed in the previous paragraph. However the fact that Openness to Experience did not differ much across the three variables lends further support to the arguments that Openness to Experience as measured in the NEO-PI-R might not be wholly applicable in the South African context.

A similar pattern is obtained when one examines the results at facet level. Generally facets with 50% or more items exhibiting bias were also the facets identified as problematic at the scale level. The only exceptions were Dutifulness on gender and Modesty on home

language, where these facets were not identified as problematic at the scale level analysis but were problematic in having 50% or more items demonstrating bias.

A final point of interest based on the ANOVA results is the commonality of Item 64 (Agreeableness domain, Trust facet), "…most people will take advantage of you if you let them", and Item 223 (Openness to Experience domain, Feelings facet), "Odd things – like certain scents or names of distant places – can evoke strong moods in me", as biased items for both population group and home language. Non-White and English second language speakers scored higher on Item 64 and lower on Item 223. As indicated earlier, the difference on the Trust item may be a concrete indicator of the seeds of mistrust sown in the mentality of non-White, English second language speakers after years of oppression. The significant difference on the Openness item may be due to the foreign nature of the item for people who are not from a more Westernised, urbanised and individualistic culture. Thus this difference may be due to the cultural inappropriateness of the item but could also be due to the linguistic complexity of the item. These issues were explored further in this study and are discussed hereunder.

7.15.4. Item bias: Understanding and appropriateness

From the results in Table 6.42 it is evident that a large percentage (58.82%) of the sample indicated having some difficulty understanding the items on the NEO-PI-R. Chi^2 tests were conducted to determine whether there would be any association between the understanding of items and gender, population group and home language. Significant differences were found with gender and population group, as is evident in Table 6.43. From Table 6.44 it is evident that in general females experienced more difficulties in understanding the items than males, although in the group that claimed to have no difficulty understanding the items, females were also in the majority. This is not necessarily indicative of a true gender difference. It needs to be noted that the majority of the sample were female (71.29%). Therefore this result needs to be interpreted with caution and further research is recommended.

The result across population group shows a trend different to that presented in the literature. When each of the two groupings is examined separately, it is evident that approximately two-thirds of all the White individuals and approximately half of all the non-White individuals in the sample had difficulty understanding the items on the NEO-PI-R. When the groups are examined together, it is evident that of all those who experienced no difficulty understanding the items on the NEO-PI-R, two-thirds were non-White, but an equivalent percentage of

Whites and non-Whites reported experiencing some difficulty understanding the items on the NEO-PI-R. Therefore two conclusions may be deduced. The first is that if one examines the percentage of individuals experiencing difficulty in understanding the NEO-PI-R items only in terms of those who reported some difficulty, then there is no difference between the population groups. However, if one examines the percentage of individuals who reported no difficulty in understanding items as well as the percentages for each grouping separately, White individuals appear to be experiencing more difficulties than non-White individuals. This contradicts the literature and common knowledge, which suggest that difficulties with language and understanding occur most often in non-White groups in the South African context (see Bedell et al., 1999; Nel, 2008; Taylor, 2000). This result could be linked to the acculturation trend observed in the results of the current study with this particular student sample. On the other hand, it is possible that sample size and composition had produced this result, in which case these results need to be interpreted with caution. Given that I found, as explained in Chapter 6, that students had confused the instruction, there is also the possibility that non-White individuals had not understood the item questioning whether they had an accurate understanding of the items. This explanation I think undermines the non-White grouping though and perpetuates the previous mindset in terms of what non-White individuals are capable of. However, if this was the case, then a significant association with home language should also have been found – yet home language was not significantly associated with understanding. This lends further credence to the acculturation explanation and would need to be explored further in studies that have larger, more representative samples. This result also indicates the utility of including both population group and home language as variables of interest in studies of this nature.

The results in Table 6.45 indicate that the majority (85.18%) of the sample found some items inappropriate on the NEO-PI-R. Chi^2 tests were conducted to determine whether there would be any association between the appropriateness of items and gender, population group and home language. No significant differences were found with gender, population group or home language, as evident in Table 6.46. This is an interesting result especially in the light of the results found for construct validity as well as construct and item bias. Some differences are noted across the groupings across constructs and items but the fact that in general no significant association was found for any of the three variables can suggest three things. The first conclusion that can be drawn is that the NEO-PI-R items were all appropriate according to the perceptions of this sample. However, other empirical results of this study suggest differently. This suggests the second conclusion, where it is more likely that different groupings in the study experienced different constructs and items as inappropriate but, when explored in a separate analysis that considered overall

inappropriateness, no significant associations were found since all the groupings were in agreement that there were some inappropriate items in the NEO-PI-R. Finally, the possibility of a spurious result exists since it was evident that students had confused the instruction in terms of understanding and appropriateness of items.

Since it was evident that students had confused the instruction for understanding and appropriateness, it was not possible to distinguish clearly which items were not properly understood and which were inappropriate. Hence in examining the questionnaires, an item was noted to be problematic if it was underlined, crossed out or had a comment next to it. The analysis proceeded by considering problematic items that subsumed both those that were not understood and those that were inappropriate.

7.15.5. Item bias: Qualitative analysis

Of the 240 items in the NEO-PI-R, 88 (36.7%) were found to be problematic, as evident in Table 6.47. However only 11 of those items (4.6% of the 240 items) were identified by 10 (2.4%) or more people in the sample as problematic. Problematic phrases were “panhandlers”, “fastidious and exacting”, “lackadaisical”, “new morality of permissiveness”, “crafty”, “aesthetic and artistic concerns”, “seldom apprehensive” and “rather be known as ‘merciful’ than ‘just’”. The phrases “panhandlers”, “fastidious and exacting”, “lackadaisical” and “new morality of permissiveness” were by far the most problematic words/phrases identified by over 53 individuals in the sample. “Vacationing in Las Vegas”, “shrewdness” in handling people, and cheating when playing solitaire were also identified among the most problematic items. All of these 11 items have consistently been identified as problematic in the South African context (see Horn, 2000; Taylor, 2000). Furthermore 8 out of the 11 items are among the 37 items that were revised for the NEO-PI-3 (McCrae et al., 2004). The 3 items that were not revised on the NEO-PI-3 are those containing the words/phrases “crafty”, “rather be known as ‘merciful’ than ‘just’” and “vacationing in Las Vegas”. None of the 11 problematic items in the current study were the same as those identified as problematic by Zhang and Akande (2002).

An examination of all the problematic items across domains indicates that the Agreeableness domain had the most items identified as problematic (48% of items in the domain), followed by the Openness domain (44% of items in the domain), then the Neuroticism domain (40% of items in the domain), followed by the Extraversion domain (29% of items in the domain), and finally Conscientiousness (23% of items in the domain).

This result is interesting in that Agreeableness as a domain did not feature prominently in the construct validity results as being problematic but there were significant differences noted across population groups that were consistent with those found in the literature (see Allik & McCrae, 2004; Heaven et al., 1994; Heuchert et al., 2000; Taylor, 2000). Thus I am inclined to conclude that this result stems not from the domain being problematic but more from some of the facets and items that make up the domain being problematic. Tender-Mindedness (A) was the most problematic facet, with 75% of items that make up the facet being identified as problematic. This facet has consistently been identified as problematic in the South African context and even had a lower reliability coefficient in the normative sample (Costa & McCrae, 1992). There is therefore a fair amount of evidence suggesting that this facet and its items should be examined and revised. Furthermore, Straightforwardness (A), Compliance (A) and Altruism (A) also had 50% of their items identified as problematic. These facets were not consistently identified as problematic. However, as indicated in the discussion on construct and item bias, it is quite likely that South Africa's history of inequality, oppression and differential distribution of resources has produced a mindset among certain groupings that has perpetuated and ingrained itself so deeply that it manifests even at the intrapersonal level of individual personality difference. This contention merits further research.

In terms of Openness to Experience, it is not surprising that 44% of the items were reported to be problematic. Within Openness, the facets of Aesthetics (domain O) and Values (domain O) each had 62.5% of the items being identified as problematic while Fantasy (O) had 50% of the items being identified as problematic. This finding concurs with that found in the literature (see Allik & McCrae, 2004; Cheung et al., 2008; Heuchert et al., 2000; Horn, 2000; McCrae et al., 2005a; Piedmont et al., 2002; Rossier et al., 2005; Rothman & Coetzer, 2003; Taylor, 2000; Teferi, 2004). This provides further evidence for exploring the expression of Openness to Experience in non-Western cultures.

Neuroticism also had 40% of its items being identified as problematic and therefore merits further discussion. The Neuroticism facets of Angry Hostility, Depression and Anxiety had 50% of the items on each facet being identified as problematic. Neuroticism and its facets have not consistently been found to be problematic in this study or in previous South African literature (Heaven et al., 1994; Heuchert et al., 2000; Horn, 2000; Rothman & Coetzer, 2003; Taylor, 2000; Zhang & Akande, 2002). However, it is possible that the language of certain items is problematic in a South African context. For example, "rarely", "seldom", "feel lonely or blue", "especially 'lighthearted'", "eat myself sick", "worrier", "jittery" and "fearful or

anxious" have been cited as problematic in this study as well as in the research by Taylor (2000), Horn (2000) and Zhang and Akande (2002).

A similar argument can be espoused for the Extraversion and Conscientiousness domains. With Extraversion, although Excitement-Seeking is identified in the literature as being somewhat problematic, it is only the facet of Positive Emotions that had 62.5% of its items identified as problematic. With Conscientiousness, it is only the facet of Achievement Striving that had 50% of items on the facet being identified as problematic. The remainder of the items on both domains were spread across the facets and it does appear that language problems were the main factor in items being identified as problematic. For example, Conscientiousness facet items contained three of the most problematic words/phrases identified in the current study – "fastidious or exacting", "lackadaisical" and "cheat when I play solitaire". The Extraversion domain also had one of the most problematic items cited in this study – "vacationing in Las Vegas". Other problematic Extraversion facet item words/phrases were "especially 'lighthearted'", "vigorously", "experienced intense joy or happiness", "cheerful optimist" and "dominant, forceful and assertive". As with Neuroticism, these words and phrases are identified as problematic in other African and South African studies (Franklin-Ross, 2009; Horn, 2000; Taylor, 2000; Teferi, 2004; Zhang & Akande, 2002).

Of particular interest also is the argument that NEO-PI-R items dealing with more intense expressions of a word, for example, "vigorously" or "intense joy", have no equivalent in African languages and therefore made translation into isiXhosa or Tigrignan quite challenging (Horn, 2000; Teferi, 2004). However in the current study, these same items proved problematic even though students completed the inventory in English. This leads me to question whether such expressions are not characteristic of cultures where English is the dominant lexicon. In the earlier chapters, the argument was put forward that the applicability of the NEO-PI-R and the FFM was questionable since both were developed in accordance with the English lexicon characteristically spoken in a Euro-American context. In this study, the sample was proficient in English. From the discussion presented earlier, the sample also appears to be fairly acculturated. Yet, there are certain items, as discussed in this section, that were found to be problematic and which correspond to previous African studies (see Taylor, 2000). A few of these were found to be problematic internationally and were revised for the NEO-PI-3 but there are still some items that exhibit linguistic problems. There are also other items that exhibit more cultural difficulties and these are of greater concern in terms of using the NEO-PI-R in a South African context. This is not to say that the NEO-PI-R cannot be applicable and useful in South Africa, since only a small number of items have

been consistently identified – and identified with moderate effect sizes – to warrant consideration.

The linguistic and cultural issues identified in the quantitative analyses are also confirmed with the qualitative thematic content analysis. From Table 6.49 it is evident that 45% of students cited linguistic difficulties as a primary problem on the NEO-PI-R but a number of these students only selected the “panhandler” item or the items containing the word/s “panhandler”, “lackadaisical”, “fastidious” and/or “permissiveness”. Thus only 27.3% of the sample cited more general linguistic difficulties with the NEO-PI-R. The items frequently cited are in line with local and international trends and were thus revised in the NEO-PI-3 (McCrae et al., 2004).

More specific psychometric concerns are identified by 21.7% of students who cited item construction difficulties, with items being double-barrelled, ambiguous and/or repetitive. Others mentioned the length of the questionnaire as being problematic. These psychometric and methodological concerns are common in studies employing university students (Rosenthal & Rosnow, 1991). Length of questionnaire is also a common problem associated with personality inventories, which tend to be longer than average questionnaires due to the number of traits to be assessed (Cohen & Swerdlik, 2005). Some students expressed concern about the static nature of self-report questionnaires. This has often been cited as a criticism of personality inventories in that they do not tap the dynamic, situational dimension of personality expression (Cohen & Swerdlik, 2005; Kaplan & Sacuzzo, 2009) and it remains a valid critique of the NEO-PI-R and other similar instruments.

A final theme to emerge in the analysis centred around the relevance of the items both in terms of personal relevance and relevance to the cultures within which the individuals operate. This theme, although identified by only 8.2% of students in the qualitative analysis, is an important one since it emphasises the argument made across this discussion in terms of the relevance of certain NEO-PI-R items in the South African context based on the results of the current study as well as other African and South African studies (Horn, 2000; Taylor, 2000; Teferi, 2004; Zhang & Akande, 2002).

7.16. ITEM BIAS IN THE CPAI-2

As with the NEO-PI-R, item bias in the CPAI-2 was examined in several ways. Firstly Chi^2 tests were conducted for each item across the three variables (gender, population group, home language) to determine if there were significant differences between the groups on

item responses. Secondly the questionnaires were examined for crossed out or underlined items and the open-ended questions included after the CPAI-2 were analysed to determine the frequency of people who identified the CPAI-2 items as problematic in terms of understanding and appropriateness. These responses were also analysed to determine which items were identified as problematic, and finally thematic analysis was conducted on the responses that individuals supplied to substantiate their responses as to whether the items were problematic or not. These results are discussed hereunder.

7.16.1. Item bias across gender

From the results presented in Table 6.37, it is evident that the Social Potency and Dependability factors were the most problematic, with 24 items demonstrating significant associations across gender. At the subscale level, the Enterprise subscale (Social Potency) and the Veraciousness versus Slickness subscale (Accommodation) had the most items demonstrating significant associations across gender. There has been little research on the CPAI-2 generally, since it is a fairly new instrument (F. M. Cheung, personal communication, January 5, 2010) but it is possible to discuss these trends in terms of the research differences across gender found with the NEO-PI-R. This is because the CPAI-2 scales have loaded fairly congruently with the NEO-PI-R domains and facets (see Cheung et al., 2008). From the CPAI-2, item bias appears to exist more on the Openness to Experience and Conscientiousness factors. This does not concur with the literature in terms of gender differences in that the literature is fairly consistent in finding gender differences across Neuroticism and Agreeableness (Costa et al., 2001; Feingold, 1994; McCrae et al., 2005a; Zhang & Akande, 2002). None of the significant associations found with the CPAI-2 items for gender had effect sizes above .45. For gender only 5 items (1.5% of the 341 items) had significant associations with effect sizes ranging from .28 to .37, as evident in Table 6.37.

Examination of these items indicates content that deals with a preference for reading romantic rather than detective stories, a preference for science, as well as whether individuals cry easily or have their feelings hurt easily. Females tended to read more romantic novels, have a lesser preference for science, cry more easily and have their feelings hurt more easily than males. Even though Cheung et al. (2008) have the three items relating to feelings on three separate scales, it is evident that they are the same item and that they would correspond mainly with the Neuroticism domain and with the Feelings facet to a lesser degree (O). In both cases, the content of the three items fits in well with what is known about gender differences in personality. Similarly with the two preference items; it is to be expected that males would have a preference for science since research has shown

that males tend to be more scientifically minded than females (Friedman & Schustack, 2009). Females would also tend to have a preference for romantic over detective novels based on the fact that females tend to be more nurturing than males. The item content for the five items reflects the Neuroticism and the feminine Openness domains (Costa et al., 2001; McCrae et al., 2005a). However, given that none of the associations had moderate effect sizes, it would be unwise to suggest that the CPAI-2 is demonstrating something different about gender. Further research is warranted before making any claims.

7.16.2. Item bias across population group

Table 6.39 indicates associations across population groups for the CPAI-2 items but none of the associations had effect sizes above .45. There were only two items with effect sizes of .27. These deal with thinking from another person's point of view and wearing practical and comfortable clothing. Non-White individuals proved less likely to think about things from another person's point of view but more likely to choose comfortable clothing. The Dependability factor, the Consistency scale and the subscales of Internal versus External Locus of Control, Traditionalism versus Modernity and Relationship Orientation were the most problematic in terms of items that demonstrated significant associations with population group. However, given the small effect sizes, it is not possible to interpret the results with confidence. It is interesting to note that Dependability, which has generally proved problematic in the current study, also had the most number of significant associations with population group at the item level. Another point to note is that the three most problematic subscales in terms of item bias and population group are three new scales introduced by the CPAI-2 that were not covered by the NEO-PI-R or the FFM. However, further research with other South African samples is warranted before reaching any conclusions.

7.16.3. Item bias across home language grouping

An examination of the biased items across home language (see Table 6.41) indicates that 22 items (6.5% of the 341 items) had significant differences with effect sizes in the moderate to large range (> .50) and 46 items (13.5% of the 341 items) had significant differences with effect sizes in the small to moderate range (.20 to .49). An examination of the differences on home language indicates that the differences were not restricted to a particular scale. Although the factor of Dependability had the most biased items, the other factors also had at least 30% or more of their items demonstrating systematic differences between the two home language groups. It would be useful for further research to examine the exact nature of the difference on each item to determine the source of the problem. However for the

current study the number of significant items found as well as the fact that these items demonstrated moderate to large effect sizes and were not restricted to any particular scale suggests that item bias on the CPAI-2 may be operational at the level of home language.

Across gender, population group and home language, it is therefore evident that the most items exhibiting bias were found across home language (43.4% of the 341 items) followed by population group (30.8% of the 341 items) and lastly gender (24.9% of the 341 items). Table 7.4 provides a summary of the percentage of items found to be problematic across the three variables for the four factors across the factor level and across the entire questionnaire. For gender it is evident that Social Potency and Dependability were the most problematic factors, followed by Accommodation and Interpersonal Relatedness. These results, particularly as they pertain to Social Potency and Accommodation, mirror the pattern found at scale level in this study as well as in other studies (see Costa et al., 2001; Feingold, 1994; McCrae et al., 2005a; Zhang & Akande, 2002). For population group, based on both the percentages for the entire scale and percentages for the factor, it is evident that Dependability and Interpersonal Relatedness were the most problematic factors, followed by Accommodation and Social Potency. These results do not mirror those found in previous literature, in that the Openness to Experience, Agreeableness and Extraversion results found at scale level were not wholly replicated at item level in an African context (see Heaven et al., 1994; Heuchert et al., 2000; Piedmont et al., 2002; Teferi, 2004; Zhang & Akande, 2002). For home language, Dependability was the factor with the most problematic items. Across the three variables as well, there seemed to be a trend for Dependability items to exhibit bias. Results from the ANOVAs and factor analyses also demonstrate that the Dependability factor in the CPAI-2 was problematic at the scale level.

Table 7.4: Percentage of CPAI-2 items identified as problematic from Chi^2 results

Variable	Social Potency	Dependability	Accommodation	Interpersonal Relatedness
Gender	7.0	7.0	4.1	4.1
	30	**23.4**	**28**	**20.9**
Population	5.9	8.2	5.6	7.3
group	**25**	**27.7**	**38**	**37.3**
Home	8.7	14.4	4.7	9.7
language	**41.2**	**48.5**	**26.9**	**32**

Note. Values in ordinary typeface indicate percentage in relation to the 341 items in the CPAI-2. Values in bold indicate percentage in relation to the number of items in the factor.

A similar pattern is found when one examines the results at subscale level for gender and population group but not for home language. Generally CPAI-2 subscales with 50% or more items exhibiting bias were also the subscales identified as problematic at the scale level for gender and population group. For example, significant gender differences were found on the Veraciousness versus Slickness subscale (Accommodation factor) at scale level. At item level, Veraciousness versus Slickness had 80% of its 10 items demonstrating item bias. For home language, there were far too many items with low to moderate effect sizes. The subscales found to have 50% or more also did not correspond to the differences found at factor level. Once again this suggests the possibility that the actual items of the CPAI-2 are not appropriately phrased for a South African sample.

7.16.4. Item bias: Understanding and appropriateness

From Tables 6.42 and 6.45 it is evident that the sample was fairly evenly split in terms of those who experienced difficulties with the understanding of items, with 51.06% reporting some difficulty in understanding items. The majority of the sample (75.29%) expressed some difficulty with the appropriateness of items on the CPAI-2. Thus more individuals reported that items were inappropriate. However, as indicated in Chapter 6, a number of students confused the instruction for this task. Hence a conclusion on this basis would not be very useful.

In order to determine if sub-groups within the sample were differentially experiencing difficulties with understanding and appropriateness of items on the CPAI-2, Chi^2 tests were conducted for each of the three variables (gender, population group, home language) and the frequencies obtained for understanding and appropriateness. As is evident from Tables 6.43 and 6.46, there were no significant differences for any of the three variables on either understanding or appropriateness of items. This, together with the results obtained on item bias across the three variables (gender, population group, home language), suggests that for South Africans as represented in this sample, there is agreement that the CPAI-2 items need revision both in terms of language and appropriateness.

7.16.5. Item bias: Qualitative analysis

Since many students did not adequately distinguish between understanding and appropriateness it was not viable to continue with this line of analysis. Hence, in examining the questionnaires an item was noted to be problematic if it was underlined, crossed out or

had a comment next to it. Of items in the CPAI-2, 34% (*n* = 117) were found to be problematic, as is evident in Table 6.48.

From Table 6.48, it is evident that 17 of the 117 problematic items came from the Infrequency scale, and the Infrequency scale had only 20 items. Of the most problematic items, 5 were also from the Infrequency scale. Of the 117 items, 7 came from the Consistency scale, which consists of 9 pairs of items. Thus 24 of the 117 problematic items (20.5% of the problematic items, 7% of total items on the CPAI-2) came from 2 of the validity scales, suggesting that these scales be revisited and revised for use in the South African context.

It is also evident from Table 6.48 that Interpersonal Relatedness was the most problematic factor, with 49% of its items being problematic, followed by Accommodation, with 36% of its items being problematic. Three Interpersonal Relatedness subscales (Traditionalism versus Modernity, Relationship Orientation, Discipline), two Accommodation subscales (Defensiveness, Graciousness versus Meanness), two Social Potency subscales (Aesthetics, Logical versus Affective Orientation) and one Dependability subscale (Internal versus External Locus of Control) had 50% or more problematic items.

However only 5% (*n* = 17) of the 117 items had 10 or more people identifying them as problematic. From the 17 items, 6 were from the Traditionalism versus Modernity subscale (Interpersonal Relatedness), 5 from the Infrequency scale, 2 from the Thrift versus Extravagance subscale (Interpersonal Relatedness) and 1 each from the Social Potency subscale of Divergent Thinking, the Dependability subscales of Inferiority versus Self-Acceptance and Internal versus External Locus of Control, and the Accommodation subscale of Self versus Social Orientation.

From these results it is possible to note that Interpersonal Relatedness appears to be the most problematic factor, and the subscales identified by Cheung et al. (2008) as missing from the FFM of personality were among the most problematic. Based on this, it is possible to conclude that these scales have no – or very little – applicability in the South African context. However it would be premature to do this. Although Dependability as a factor appears to have replicated poorly throughout this study, results on the subscales have been variable. Furthermore, it needs to be borne in mind that the sample used in this study is not a representative one for South Africa and can be described as fairly acculturated, as argued earlier. Finally, the results demonstrated significant linguistic problems, which would need to be addressed before weighing the merits of the instrument.

Linguistic difficulties were cited as a problem by 45% (*n* = 191) of the sample. However phrases such as ”filial piety”, ”cohabitation” and/or “thrifty” were the only citations in terms of linguistic difficulties by 13.7% of the 45%. Thus it was only 26.1% of students who experienced more generalised linguistic difficulties. Item construction was also cited by 41.4% of the sample as being problematic. Students reported items as being either ambiguous, double-barrelled or repetitive; the questionnaire had too many items and the item content or phrasing was inappropriate. Many also expressed displeasure at the dichotomous response format. The static nature of self-report questionnaires was also cited as a problem. As indicated with the NEO-PI-R, these psychometric and methodological concerns are common for most studies employing university students (Rosenthal & Rosnow, 1991). The length of questionnaire is frequently cited as a problem with personality inventories (Cohen & Swerdlik, 2005) and the static nature of self-report questionnaires has often been cited as a criticism of personality inventories (Cohen & Swerdlik, 2005; Kaplan & Sacuzzo, 2009). This remains a valid critique of the NEO-PI-R and the CPAI-2.

Finally 21.7% of students cited the personal and/or cultural relevance of the CPAI-2 items as being problematic. This is important as it complements and highlights the quantitative findings on item bias, which indicated the need for a revision of items based on responses from the sample. Revisions would need to first consider linguistic difficulties and then move onto cultural appropriateness. The developers of the CPAI-2 are keen to establish the instrument cross-culturally (Cheung et al., 2008) and would therefore need to investigate these issues more thoroughly on larger, more representative samples in the South African context.

7.17. OVERALL FINDINGS AND IMPLICATIONS FOR FUTURE RESEARCH

This study aimed to explore the utility of the NEO-PI-R and the CPAI-2 in the South African context by exploring the reliability, validity and issues of bias in the two instruments. From the results in Chapter 6 and the discussion presented in this chapter, it is evident that the internal consistency reliability coefficients for the domains and facets of the NEO-PI-R were good and consistent with those found in the normative sample (Costa & McCrae, 1992) as well as in other Western and some Eastern samples (see McCrae et al., 2005a). Only the facets of Impulsiveness and Tender-Mindedness were below .60. Test-retest reliability for the NEO-PI-R was also good except for the Extraversion domain and scales. However, it would be incorrect to conclude that Extraversion had a poor test-retest reliability since the

sample on whom the data was collected was extremely small (*n* = 10). Hence further research is warranted.

The NEO-PI-R was found to have good face validity. It also demonstrated excellent construct validity, with the five factor solution replicating as was postulated in the normative sample (Costa & McCrae, 1992) and more recently in line with the structures proposed for Western and some Eastern nations (e.g. Turkey) in McCrae et al. (2005a). Only the Openness to Experience facet of Actions was found to be problematic, failing to load above .40 on any of the domains and loading at -.38 on Neuroticism with only a secondary loading of .34 on Openness to Experience.

Construct bias was found to be operational for all three variables – gender, population group and home language – in the NEO-PI-R. These results are generally in line with other research found on systematic differences in personality across gender, population group and to a lesser extent home language. Thus females were found to be higher in Neuroticism and Agreeableness than males and non-White individuals were found to score lower on Extraversion and Openness to Experience than White individuals. These results are for the most part congruent with previous research (Allik & McCrae, 2004; Costa et al., 2001; Heuchert et al., 2000; McCrae et al., 2005a; Zhang & Akande, 2002). In terms of home language, significant differences were found, leading one to conclude that generally English second language speakers are lower on Openness to Experience. However effect sizes for these differences were small to moderate. Therefore this conclusion is made with caution and further research is warranted. Evidence was also found for method bias across home language, with English second language speakers being more likely to endorse extreme responses. This is in contradiction to previous research (Allik & McCrae, 2004), which found a higher tendency in Asian and African cultures to endorse responses towards the middle of the scale. Evidence for item bias in the NEO-PI-R at both quantitative and qualitative levels corresponds to the construct bias findings, with items from the same problematic scales evidencing bias. A number of problematic items were identified and these need to be explored further in the South African context to determine the nature and extent of the difficulties with the items. Linguistic difficulties, item construction difficulties and the personal and cultural relevance of items were cited as possible reasons for this item bias.

Therefore, in considering the utility of the NEO-PI-R in a South African sample of university students, it is possible to conclude that the NEO-PI-R is a reliable and valid instrument for use in the South African context, particularly when it comes to university students. Issues of bias are operational but in the discussion I alluded to the fact that the systematic differences

found in this study correspond to systematic differences in other studies, suggesting that the issues are broader than just the consideration of bias in the psychometric sense. These findings have the potential to contribute to important theoretical developments in personality psychology such as the FFM and the FFT.

For the CPAI-2, internal consistency reliability for all four factors proved acceptable. Subscale internal consistency reliability coefficients were found to be adequate with the exception of Logical versus Affective Orientation (Social Potency), Practical Mindedness (Dependability) and the Interpersonal Relatedness subscales of Traditionalism versus Modernity, Relationship Orientation and Social Sensitivity, which were all below .60. Test-retest reliability for the CPAI-2 was fair at best, with two factors (Dependability and Interpersonal Relatedness) demonstrating retest coefficients below .60 and huge variation in subscale retest coefficients, which ranged from .05 to .88. However as indicated with the NEO-PI-R, the sample was extremely small, necessitating further research before any conclusions can be drawn.

The face validity of the CPAI-2 was generally found to be adequate. Construct validity was fair in that the four factor model, as proposed by Cheung et al. (2008), could not be wholly retrieved in this sample of South African students in either a four factor solution, or a five factor solution, or in a joint factor analysis with the NEO-PI-R. The Dependability factor was particularly problematic in this regard. The Interpersonal Relatedness factor was also problematic in the sense that even though it was retrieved, the loadings were not the same as those proposed by Cheung et al. (2008), suggesting that Interpersonal Relatedness might be a valid factor in the South African context but with a different flavour. This Interpersonal Relatedness factor was also strongly linked to the Internal versus External Locus of Control subscale (CPAI-2 Dependability factor) as well as the NEO-PI-R Values facet. This was discussed in the light of the Individualism/Collectivism dimension proposed in the literature. The Family Orientation subscale (Dependability) and the Interpersonal Relatedness subscales of Relationship Orientation and Thrift versus Extravagance were found to be differentially problematic across the various factor solutions. However, promising congruence coefficients – found using the factor matrix provided by Cheung et al. (2008) as the target matrix and the varimax rotated four factor solution as the second matrix – suggest potential construct validity for the CPAI-2 in a South African context. Evidence for the five factors was consistently found in the CPAI-2 factor solutions.

As with the NEO-PI-R, evidence for construct bias across the three variables (gender, population group, home language) was found but this was consistent with evidence found in

previous studies (Allik & McCrae, 2004; Costa et al., 2001; Feingold, 1994; Heaven et al., 1998; Heuchert et al, 2000; McCrae et al., 2005a; Taylor, 2000; Zhang & Akande, 2002). Method bias in terms of socially desirable responding was found to differ only as a function of population group, with White individuals demonstrating more socially desirable responses than non-White students. This contradicts findings in the area (Bernardi, 2006) and merits further research. Item bias on the CPAI-2 was visibly more problematic than on the NEO-PI-R with more items being identified as problematic at both quantitative and qualitative level. Item bias also appeared to be more of a problem across home language than gender or population group, suggesting that English first language speakers and English second language speakers were responding differently on a number of items. From the qualitative feedback on linguistic difficulties, difficulties with item construction as well as the personal and cultural relevance of items were cited as reasons for the possible difficulties with items but these difficulties were more pronounced on the CPAI-2 than those with the NEO-PI-R. The Infrequency scale items and the Consistency scale items were also frequently found to be problematic in both the quantitative and qualitative analysis.

Thus, given the results found for the reliability, validity, construct, method and item bias, one is bound to conclude that the CPAI-2 in its current form is not as viable an instrument in the South African context. By virtue of its inclusion of the Interpersonal Relatedness dimension, which is not wholly subsumed in the five factors, it certainly has something to offer. However, adaptation of items and a re-alignment of scales would probably be necessary before using the instrument in South Africa.

An issue relating to both instruments, which deserves mention, is the order of factor loadings and the percentage of variance explained. The current study frequently found differences on either of these issues or both of them. Block (1995) argues that the order of factor loadings and the variance explained is not necessarily an indication of factor importance. However, I would think that it provides a valid comparison, which allows for cross-cultural examination of personality differences. At this point though it would be premature to read anything into this. Further research is required.

Another interesting finding is that if the results of studies conducted in South Africa on student samples from 1994 are compared across the years to the present time, it appears that the FFM is becoming increasingly more replicable in a South African context. In this chapter I make the argument that this is largely due to acculturation, and that the sample in this study represents a more acculturated sample. This might also explain the similarity

between the results obtained in the current study and those of the normative sample for the NEO-PI-R, as discussed in the descriptive statistics section of this chapter.

The argument presented above, together with the findings of this study, have important implications for psychometric and other psychological research in the South African context. It also has important implications for the FFM and the FFT, for studies on national identity and for etic-emic debates.

7.17.1. Implications for psychometric research in the South African context

The current study demonstrates the need for psychometric research in the South African context, to provide more valid and reliable instruments for use on South Africans and also to contribute to the body of international research on personality theory and assessment. As is evident from this study, there exists a void in terms of South African and African research findings on personality instruments despite the fact that the Employment Equity Act (Office of the President, 1998) calls for reliable, valid and fair psychometric instruments.

The current study has also made use of methods and techniques that are in line with international research but have yet to become uniformly applied in psychometric studies in South Africa. The techniques used with the factor analyses in terms of identifying the number of factors and the use of Procrustes rotation are standard practice internationally (see Hopwood & Donnellan, 2010) but have yet to become standard in South African psychometric research on personality instruments. This study therefore serves as a starting point and calls for more rigorous methods to be employed in psychometric research.

Furthermore, this study has important implications for how we understand and study the various groupings present in South Africa. The current study, unlike its predecessors, provides a valid rationale for using the various groupings, that is, gender, population group and home language. It also touches on notions of “culture” and “cross-cultural” and how these terms may be operationalised for future psychometric research. I acknowledge that the arguments are still under development but they do provide a starting point from which discussion and debate can ensue. This platform for dialogue and discussion was largely neglected and can now be firmly established.

Also related to the groupings is my argument for psychometric research to use the term “population group” rather than “race”. I acknowledge that this is a contentious issue within psychometric research but, as the findings of this study have demonstrated, “race” or any

term to look at population groupings should not matter now. Thus, the variable is increasingly losing its utility (that is, if it had any utility to begin with) in South Africa. Socio-economic status – that is, divisions along class and economic strata – are fast becoming better predictors of understanding the dynamics in South Africa. This suggestion has already been put into action quite successfully in the field of intelligence testing (see Shuttleworth-Edwards, Gaylard & Radloff, in press a; see Shuttleworth-Edwards, Van der Merwe & Radloff, in press b). According to Shuttleworth-Edwards et al. (in press b), quality of education (a variable that is used as a proxy for socioeconomic status) was a strong discriminator on performance on both the WISC-IV and the WAIS-III. Future research should therefore consider adding variables along these lines as standard practice within psychometric research.

7.17.2. Implications for acculturation research

Given the findings of this study and the arguments presented for acculturation, this study has highlighted an important area for personality research in the South African context. A number of acculturation scales exist that can be employed in studies of this nature to empirically determine the influence of this variable. In a recent e-mail from Fons van de Vijver (personal communication, September 21, 2010) in his capacity of executive member of the European Association of Psychology (EAPA), no less than 26 measures of acculturation and multiculturalism were circulated. Therefore, I think acculturation measures should be routinely included in studies. This will provide a clearer understanding of this variable.

7.17.3. Implications for the universality of the FFM and the FFT

The five factors as proposed by the FFM have consistently been found across both instruments in this study, providing further evidence for the universality of the FFM. However there has also been evidence to suggest that the role of Internal and External locus of Control merits further attention. The support found for some of the interpersonal relatedness dimensions of the CPAI-2 suggest also that there is value in considering factors other than just the five factors. The nature of the possible other factors appears to be along the lines of Individualism and Collectivism as well as Spirituality.

The universality found for the NEO-PI-R domains also provides evidence in favour of the FFT, which argues for the five factors being basic tendencies present in all human beings. It can be argued that the variations observed across the facets of the five factors indicate

possible evidence for characteristic adaptations that occur across context. However the fact that the five factors were not consistently found in all African and South African studies negates this argument somewhat. The findings of the current study suggest that the five factors are found mainly in Western or acculturated samples. This needs to be explored in more depth at the level of both the FFM and the FFT.

7.17.4. Implications for etic versus emic approaches

As alluded to in the previous section, this study has a contribution to make with regard to etic approaches to personality assessment in the South African context since two etic instruments were employed on a South African student sample and were found to be differentially applicable. The NEO-PI-R, which has often been shown to have at best mediocre applicability in African and South African studies, was found by the current study to be quite applicable, suggesting that etic instruments can be used quite successfully with educated and acculturated samples. The CPAI-2, also an etic instrument, yielded results that were less impressive. Given the arguments presented in Chapters 1 to 4, this was surprising, particularly when it came to the more indigenous scales like Relationship Orientation and Family Orientation. However linguistic difficulties, length of questionnaire and item content appeared to contribute much to these findings. Hence the CPAI-2 would need some revision and reworking of items before it could be concluded that this etic instrument has no utility. In general, then, this study contributes to the etic-emic debate by demonstrating that etic instruments do have a place in South Africa.

7.17.5. Implications for research on gender differences in personality

The pattern of differences found across gender in this study corresponds closely to the international and local literature on gender differences and personality using the NEO-PI-R (see Allik & McCrae, 2004; Costa et al., 2001; Feingold, 1994; Heuchert et al., 2000; McCrae et al., 2005a; Zhang & Akande, 2002). These results for gender therefore have important implications for the study of personality using the NEO-PI-R locally and internationally. Since gender differences are consistently found, this study asks the question as to whether these differences should merely be seen as bias or whether they provide evidence of deeper, more ingrained, differences between males and females. The FFT and evolutionary psychology approaches imply that these differences are inherent but if this argument is accepted then we need to employ separate norms or separate tests consistently for females and males. Recent research (Maheshwari & Kumar, 2008) argues that males and females have both masculine and feminine traits along a continuum. Any individual, regardless of biological sex,

may have a feminine orientation, a masculine orientation, or a high degree of masculine and feminine traits, which is referred to as androgyny or an undifferentiated orientation (low on both masculinity and femininity). Adopting the stance that females and males are consistently different is in itself biased. Therefore psychometric and personality research should consistently employ gender as a variable for analysis.

7.17.6. Implications for cross-cultural research on personality based on findings associated with population group and home language

As discussed earlier, I am of the opinion that population group as a variable of interest is fast becoming ineffective. Other variables are needed for cross-cultural research on personality, most notably those associated with socio-economic status. Home language as a variable will always be useful in studies of personality that employ the FFM particularly because this model of personality developed from a particular English lexicon. In addition to home language, a quantitative indicator of language proficiency that is more objective and reliable than the two items used in the current study would be beneficial in the South African context.

7.17.7. Implications for research on national identity, aggregate personality and ethos

In the literature review I briefly addressed the constructs of national identity, aggregate personality and ethos. In Chapter 4, I presented McCrae's (2009) definitions of the three constructs, where ethos was regarded as a personality profile of a particular culture, whereas aggregate personality was the mean profile of the people belonging to a culture and national character referred to the shared perceptions of the mean profile of the "typical" citizen and was, according to McCrae (2009), akin to a national stereotype. I looked at these constructs for two reasons.

The first was in relation to understanding the concept of culture and how it fit into personality research. McCrae (2009) argues that culture is akin to ethos, that is, the manners, customs and institutions that embody the characteristic spirit of culture. From Franklin-Ross's (2009) study it was evident that South Africans shared an ethos. From the results of the current study, it is also evident that there are shared characteristics among South Africans that are unique, despite the differences on gender, population group and home language. There are indications that this might be something representing "Ubuntu". However, this evidence is not sufficient to argue that definitive support was found for a South African ethos, and further research is warranted.

The second reason I considered national identity, aggregate personality and ethos was in relation to the separation of South Africans into Black and White groupings. I indicated that this may be inappropriate in that post-1994 South Africans are increasingly becoming a cohesive nation sharing a common dream. I also argued in accordance with Okeke et al. (1999) and Heuchert et al. (2000) that Black South Africans are increasingly becoming acculturated, thus reducing the gap between White and Black South Africans. The results found in the current study attest to this. I argued further that the findings by McCrae and Costa (2008b) – that White South Africans still resemble Europeans – provided support for the idea that White South Africans did not acculturate to the indigenous culture in South Africa; rather they transported their culture with them even across many generations. In retrospect, this argument is only partially true. Post-1994, it is evident from daily interactions that acculturation is occurring in both directions. Throughout the discussion, I indicate that Black South Africans are acculturating to a Western culture, since this is what the results of the study suggest. However if one looks more closely at the results of the CPAI-2 it is evident that acculturation is occurring in the opposite direction as well, with White South Africans absorbing aspects of African culture. As a South African I have also seen this in the daily interaction of people in my community and on campus but the clearest example of this was seen during the recent FIFA World Cup event. For the first time, South Africans were showcased as a cohesive nation and not as divisive with tensions between Black and White groups. On the ground, the concept of Ubuntu was also clearly evident, suggesting that we are developing a national identity. I use the term “national identity” cautiously though as research by McCrae et al. (2005a) and Terraccciano et al. (2005) suggests this may be a problematic concept. It is probably better to say that evidence exists to suggest that South Africans have a characteristic ethos but, as suggested earlier, this requires further research.

The finding of a common national identity or ethos also suggests the limited utility of population group as a variable for analysis. I have argued in this chapter that variables of a socio-economic nature would perhaps be better indicators of the divisions in South Africa. I would like to reiterate that this holds true, once again using the recent FIFA World Cup as an example. Although all South Africans embraced the spirit of the event, there were very visible economic divisions in terms of who had access to the games and how. Presence at actual matches was solely the reserve of those who could afford tickets and primarily available to those who had access to the Internet and could book online. This highlighted both the vast economic and digital divides that characterise South Africa.

A final point on these constructs is that the results of the current study still indicated some differences between groups. Black and White groups still differed on some personality

constructs despite the evidence for acculturation. I attributed these differences broadly to two aspects, namely Individualism/Collectivism and the effects of apartheid on the South African psyche. Perhaps Individualism/Collectivism can fit into these three constructs at the level of aggregate personality but rather than arguing for this dimension to be a broader aspect of culture, I think it should be something incorporated at the level of the individual personality. This seems to have been somewhat achieved in the CPAI-2 but, as the results of the current study indicated, it was not clearly evident in the South African context.

Okeke et al. (1999, p.140) argue that “African cultures are marked by the trauma of several centuries of European colonisation and the enforced social change that was brought about by this experience of outside domination”. In South Africa this was exacerbated by the fact that colonisation was followed by apartheid. From the results of the current study, I was led to consider the possibility that living under colonialism and later apartheid created a cultural context that led to certain expressions of personality in Black people that still persist. Earlier in the discussion, I argued that White people still maintained their cultures despite being in South Africa for many generations. The possibility exists that certain patterns persist in the White population also due to apartheid and the policies of segregation. While White people were not subjected to the same oppressive policies as non-White individuals, the separation of groups could equally have affected White individuals to the extent that cultures imported from Europe remained despite living in South Africa for many generations. Once again, these aspects need to be further researched in larger and more representative samples.

7.17.8. Implications for personality theory and assessment research in the South African context

This study has highlighted the importance for a South African approach to personality theory and assessment that encompasses the work on the NEO-PI-R and the CPAI-2 but that also adds dimensions of South African culture. The results from this research have demonstrated that the NEO-PI-R and the CPAI-2 are applicable to some extent in South Africa but that variations exist that would benefit from further exploration. In Chapter 2, I mentioned South African initiatives like the BTI and the SAPI; at the level of personality assessment, we need to consider these emic instruments in relation to etic instruments like the NEO-PI-R and the CPAI-2. However, this study has highlighted that we cannot stop at this level. Enough information exists to start formulating an African theory of personality. This is not to say though that Africans are a homogeneous group and that we would have a single theory but unless we start working towards this we will not know what our indigenous understandings are or how they can contribute to the broader realm of personality research in psychology.

7.18: CONCLUSION

In conclusion, this chapter provided a discussion of the reliability, validity and bias results found for the NEO-PI-R and CPAI-2 in the current study. It linked these results to arguments presented in the literature review around the FFM, the FFT, etic versus emic approaches to personality assessment, and the utility of the NEO-PI-R and the CPAI-2 in the South African context based on the sample used in this study. The implications of these results for the various debates were also highlighted. As alluded to throughout this chapter, there are a number of limitations relating to the sample and methods used in the current study and it is important that they be acknowledged and discussed before embarking on recommendations that stem from the findings and discussion of this study. Thus the next chapter focuses on identifying and discussing the limitations of this study and providing recommendations for future research.

CHAPTER 8: LIMITATIONS OF THE STUDY AND RECOMMENDATIONS FOR FUTURE RESEARCH

8.1. INTRODUCTION

In previous chapters limitations in terms of methodology, sample obtained, the statistical procedures employed and the interpretation of results have been alluded to but not fully discussed. This chapter seeks to highlight some of the more salient limitations of this study. Following this, some recommendations for future research are presented.

8.2. LIMITATIONS OF A QUANTITATIVE STUDY

A fundamental methodological limitation in this study is its location largely within a quantitative paradigm. The discussion that follows focuses on the limitations of working within this paradigm, with reference to the other potential debates this elicits within the field of personality psychology.

Working within a quantitative study, I aimed to explore personality within a multicultural context but this was only considered within the theories posited by previous research, specifically the FFM and the FFT (McCrae & Costa, 2008a; 2008b). There is thus a single, tangible reality within which the research operates, and this is a limitation particularly if one considers the multidimensional complexity of the construct being investigated. Hence the critiques by Mayer (1998; 2005) and the subsequent suggestion of an integrated and unified system for personality psychology that corresponds to the vision postulated by the pioneers of personality psychology, Allport (1937) and Murray (1938).

As with any quantitative study, there is a vast amount of data in terms of short, nondescript responses from many participants but other than this there is little further elaboration on the responses. Quantitative research provides a wide sample but the depth of understanding in that sample is shallow. Although there was a qualitative aspect to this study, there was no in-depth exploration of an individual's perception of personality.

This is particularly problematic in the current study study since it sought to explore the utility of two instruments, the NEO-I-R and the CPAI-2, in the South African context with a view to commenting on their cross-cultural applicability. The research therefore aimed at providing some insight into the etic-emic debate within personality assessment but more generally

within the field of personality psychology as well. The lack of in-depth exploration in this study prevents the exploration of emic issues such as those identified by Nel (2008) and Meiring (2006; 2010). Furthermore the lack of in-depth case by case exploration alerts one to the highly nomothetic nature of the current study.

8.2.1. Nomothetic versus idiographic

The nomothetic-idiographic debate is one that is foremost within the field of personality assessment and one that continues to spark fierce debate. Nomothetic methods seek to establish general laws. This approach involves comparing and analysing statistical differences among large samples of subjects. The goal in the nomothetic approach is to obtain data that can be generalised to a broad range of people. By contrast, the idiographic approach involves the intensive study of a small number of subjects and is generally used to gain greater insights into human personality. As such, idiographic techniques attempt to understand an individual's uniqueness (McCrae & Costa, 2008a; Moerdyk, 2009; Schultz & Schultz, 2009).

It is clear from the discussion in the previous chapters that all trait-based approaches, including the FFM (McCrae et.al., 1998), are located firmly within the nomothetic tradition. Thus there appears to be little room for the exploration of individual uniqueness in personality. It is argued that the relative ease with which a trait-based approach can be administered has to be offset against the restricted information it can provide. Research in the discipline of psychology frequently errs in assuming that group statistics apply uniformly to all individuals, overlooking within-person variability (England, 1991). This corresponds to the more sophisticated and conceptual critiques by Block (2001), Cervone (2004a) and Borsboom et al. (2003).

The argument may be made that personality inventories like the NEO-PI-R and the CPAI-2 do allow for an investigation of individual uniqueness in that there is an almost infinite number of personality combinations within the 30 facet scales and 5 domain scales of the NEO-PI-R and the 4 factors and 28 subscales of the CPAI-2, particularly if the different intensities are taken into account. As such each individual should be accounted for. While accepted, this argument does not account for the fact that some other personality may exist that these instruments do not necessarily evaluate.

Apart from overlooking within-person variability, instruments developed in relation to current trait theory subscribe to Eurocentric personality conceptualisations. Thus, by relying on a

primarily nomothetic method of evaluating the utility of the two instruments in the South African context, this study does not allow for a true exploration of the possible existence of emic personality constructs. The existence of some African personality characteristics not encoded in English, for example, could possibly have been explored in this study by employing a more idiographic, qualitative approach.

The reliance on a nomothetic method alone also ensured that the procedure employed in the study was mechanical, with little in terms of researcher-subject interaction. While this may be a strength in that experimenter bias is eliminated it is also a limitation in that the human component involved in the research process is further denied.

The reliance then on a quantitative, nomothetic approach in the current study is therefore a salient limitation. It allowed for the exploration of etic constructs in personality as defined by a Eurocentric model and was useful in providing commentary on cross-cultural applicability from this perspective. Nevertheless, it is limited in terms of the information it can provide on more idiographic understandings of the Eurocentric conceptualisations as well as in terms of information that may exist about other, non-Western conceptualisations of personality. The inclusion of the CPAI-2 addresses these concerns somewhat; but again the CPAI-2 subscribes to the trait approach and has its roots in the Chinese language and culture.

It must also be noted though that emic approaches are not without problems. In emic assessment the emphasis is on ascertaining the shared experiences of the members of a culture as far as this is possible. Objectivity may at times have to be sacrificed, allowing for the introduction of bias, which may be difficult to control.

8.2.2. Static nature of personality tests

Related to these issues is the fact that personality tests are static. This concern was highlighted in the qualitative results found for this study. Personality inventories like the NEO-PI-R and the CPAI-2 fail to engage with the self as knower – an active, process-oriented entity as opposed to an undifferentiated object characterised by content-oriented passivity (England, 1991). This is a valid criticism but it is one that applies to all personality inventories. A questionnaire, by its very nature, is a static instrument, which cannot capture the dynamic nature of all human interaction. However it should be noted that inventories will always remain static but assessment does not only involve the administration of inventories. Testing occurs within the broader domain of assessment and it is within assessment that the nomothetic and idiographic should be integrated. This is of particular salience in the South

African context, where both the literature reviewed (see Abrahams & Mauer, 1999a; 1999b; Allik & McCrae, 2004; Heaven et al., 1994; Heaven & Pretorius, 1998; Horn, 2000; Heuchert et al., 2000; Matsimbi, 1997; Taylor, 2000; Zhang & Akande, 2002) and the results indicate systematic differences across various groupings. The assessment approach where multiple tests are used in conjunction with a history and collateral information is advocated (Foxcroft & Davies, 2008).

8.2.3. Limitations of self-report inventories

The nomothetic approach of testing allows for large numbers of individuals to be tested and provides objective scores but these scores are based on self-reports of behaviour and personality styles and preferences. There is always the risk that respondents are not truthful and/or are responding in a socially desirable manner. Thus various response biases may be prevalent. The results of this study suggested that response bias might be operational on some level in both instruments. However, as indicated in the discussion in Chapter 7, this was not adequately explored in the current study. The NEO-PI-R, unlike other instruments, does not contain any formal validity scales that look at social desirability, faking bad, consistency or acquiescence. Costa and McCrae (1992) make valid arguments for this and provide guidelines against which responses are checked for acquiescence and nay-saying. They also include three questions at the end of the questionnaire asking whether respondents have answered all of the questions and answered them honestly or not. This method of dealing with the validity of responses has been criticised in favour of a scale type of analysis. The CPAI-2 addressed this issue by including a Social Desirability, Inconsistency and Infrequency scale (Cheung et al., 2008). Despite these sorts of built-in mechanisms, self-report inventories are still criticized for their vulnerability to faking.

8.2.4. Response bias

The issue of response bias remains an interesting one especially in the light of findings that demonstrate differences in the manner of responding to items in individualistic versus collectivist cultures (see Allik & McCrae, 2004; McCrae, 2002; Piedmont et al., 2002). The current study was limited in that it failed to include the three questions after the presentation of the NEO-PI-R items in the questionnaire.

The study was also limited in that it examined response bias briefly for both instruments by considering extreme response scores on the NEO-PI-R and by using the Social Desirability

scale on the CPAI-2. In retrospect, this aspect of the study would have benefited from more creative thought around its assessment and evaluation.

Apart from these limitations, a number of shortcomings can be identified regarding the sample used in the study.

8.3. LIMITATIONS IN TERMS OF SAMPLING ISSUES

It is evident that the sample size was a major limitation. A sample of 425 individuals, while adequate, is not ideal for the number of variables studied. In addition to this the sample distribution was skewed, with disproportionate representations of gender groupings, population groupings and home language groupings. Given the disproportionate numbers, I had to collapse groupings in order to obtain statistically viable group sizes within variables. A valid rationale was provided for the manner in which groups were collapsed so as not to compromise the validity and heuristic value of the results but it still remains a limitation of this study. Even though the rationale was sound, the groups were not homogeneous.

A further limitation is that the sample was obtained via a non-probability snowball sampling technique (Botha & Laher, in press). Thus not every person in the population had an equal chance of being selected in the sample. The sample was therefore not representative of all students at the University of the Witwatersrand, much less students in South Africa or the general population of South Africans. The population validity of this study is therefore limited. I acknowledge that this is an important limitation but, given the need for such studies and given that the study is exploratory in nature, the sample is adequate and can yield useful information for further research on more representative samples.

The fact that a sample of students was used is also generally problematic. Despite the fact that student samples are frequently used in psychological research, it is evident that such samples are not adequate representations of the general population, particularly when one wishes to examine intercultural differences. Allik and McCrae (2004) found that across the 36 cultures that they studied, college age respondents differed systematically from adults in the mean levels of traits. McCrae (2001) argues,

> If we are interested in aspects of culture, we need to study individuals who have actually adopted the beliefs, values, and practices of the culture, not simply those whose citizenship or ethnic ancestry gives them nominal membership. Undergraduates around the world tend to be Westernised in many respects; they thus make a relatively poor choice for intercultural comparisons. Note, however, the

> effect of using Westernised respondents is presumably to minimize intercultural differences; any effects that emerge in analyses of student samples would likely be even stronger in ethnoculturally screened samples. (2001, p. 824)

Thus while the limitations of a student sample are noted, student samples are useful in that they are generally a homogeneous group and, as argued by McCrae (2001), the results obtained in student samples should be more pronounced in the general population.

The sample size of the current study was reduced as a result of a number of individuals failing to complete the questionnaires or failing to return them. Research on response rates indicates that the response rates found in this study are within the normal range. Lipschultz, Hilt and Mixan (2000) cite response rates ranging from 19.6% to 55.4% on mailed surveys. Groves and Olson (2000) report a response rate of 56% on surveys with a self-addressed, stamped return envelope and 59.7% with a self-adhering return address label. Of note though is that Groves and Olson's (2000) survey consisted of a cover page and 39 items only. Wimmer and Dominick (cited in Lipschultz et al., 2000) report that currently response rates range between 10% and 40%.

It is often argued that a non-response bias may exist in studies and that individuals who choose not to respond may have different personality styles to those that do respond. (McCrae, 2001; Nunally & Bernstein, 1994; Rosenthal & Rosnow, 1991) Since this would have a direct impact on this study it merits further exploration. Literature exploring this issue suggests that while demographic differences – for example, differences in terms of level of education, marital status and religious affiliation – do exist between responders and non-responders, there is no appreciable difference in personality between responders and non-responders (Johnson & Mowrer, 2000). Johnson and Mowrer (2000) conducted a study investigating whether initial responders differ from non-responders on the 16PF. They found a single significant difference between responders and non-responders on Liveliness, and this applied only to males. Hence it seems that the response rate obtained in this study should not duly influence the results of this study.

A further point that deserves mention though and that did emerge in the qualitative analysis of the open-ended question responses was that the questionnaire was too long. Individuals generally experience fatigue, discomfort and/or boredom when completing a single personality instrument due to the large number of items included in self-report personality inventories. In the current study, individuals were required to complete two personality instruments, the NEO-PI-R with 240 items and the CPAI-2 with 341 items. They were

required to do this only for research purposes; hence it had no value for them and they were required to complete it on a voluntary basis. There were no tangible or other benefits for the participants and this could have contributed to the non-response bias.

It could also be argued that since a convenience sample was used, a volunteer bias could be operational in the study influencing the results. Rosenthal and Rosnow (1991) cite intensive research undertaken by themselves in 1975 illustrating differences between volunteer and non-volunteer subjects. They found that volunteers tend to be better educated, more sociable, higher in need for social approval, more unconventional, less authoritarian, more altruistic and more self-disclosing than non-volunteers. Females are also more likely to volunteer for research in general than males. Dollinger and Leong (1993) found that the personality factors of Agreeableness and Openness to experience predicted volunteering in tasks involving the release of standardised scores as well as willingness to be followed up in longitudinal research. Extraversion also predicted willingness to be followed up in longitudinal research. Given that this study explores personality dimensions there is a chance that volunteer bias may have been operational and is therefore an important consideration for further research. The fact that females are more likely to respond as indicated in Rosenthal and Rosnow (1975) may also in part explain the disproportionate representation of males and females in the sample and is also a consideration for future research.

8.4. LIMITATIONS OF A CORRELATIONAL STUDY

This research may be criticised for overlooking a more qualitative paradigm but it can also be criticised for not conforming to all the standards required of rigorous positivist research. For the most part, the research is correlational in design and thus precludes causal interpretation. In addition to this, the current study only explored linear relationships. The possibility of non-linear relationships was not considered. Given the variables under study and the aims of this study, this limitation does not appear to be particularly pertinent. This study also aimed to be exploratory in nature. It was not conceptualised as a rigorous attempt at uncovering whether the NEO-PI-R and the CPAI-2 are appropriate for the South African context or not. Rather it aimed at considering the utility of the two instruments for South Africa, with a view to discussing possible strengths and pitfalls and, based on these, making recommendations for future research.

8.5. LIMITATIONS RELATED TO RELIABILITY

This research was limited in terms of the procedures it undertook to explore the various aspects of reliability and validity. Due to practical and time constraints, test-retest reliability was not examined rigourously enough. A final sample of 10 participants completed the instrument twice. As indicated earlier the length of the questionnaire was a problem for a number of people and to ask people to complete such a questionnaire twice would produce even greater lack of interest and dissatisfaction among participants. The individuals were only obtained after at least three failed attempts to collect such data and were only obtained because I was able to pay an honorarium for completing the questionnaires twice. Certainly test-retest reliability should be explored in further research. Another limitation with regard to reliability is that alternate forms reliability could not be explored. This was beyind the scope of this study and is a consideration for future research.

8.6. LIMITATIONS RELATED TO VALIDITY

In terms of validity, only face and construct validity were explored. The concept of face validity is a debated one. Most prominent psychometrics textbooks make reference to face validity but it is usually a cursory reference of not more than a paragraph, which simply defines the concept. This is primarily because it is debated as to whether the concept has anything of value to offer in psychometric research. Murphy and Davidshofer (2005) report that explorations of face validity were popular in the 1940s and 1950s but with the advent and subsequent popularity of the positivist paradigm such research was not given much importance. More recently, though, researchers are becoming more aware of the value of exploring the lay person's perspective on tests and testing (Moerdyk, 2009; Murphy & Davidshofer, 2005).

A similar argument can be put forward for the qualitative evaluation of item bias that was conducted in the current study. The fact that respondents were asked to identify problematic words and items and were asked to substantiate their choices may not be considered scientific, since they represent a non-expert, subjective viewpoint. However I would like to argue in concordance with Terre Blanche, Durrheim and Painter (2008), who suggest that psychology should move away from the elitist perspective that views the professional or practitioner as the ultimate source of knowledge. Psychology as a discipline has to recognise the power imbalance in such a perspective and start redressing these issues. Psychology has as its source the exploration of the human individual and who better to provide knowledge on the subject than the individual him/herself. Thus the more traditional, objective methods need to be complemented by the more subjective – but often more dynamic and

unconventional – methods. Thus this study considers responses of the subjects as being equally important to information provided by statistically analysed data.

A limitation in terms of face validity and the qualitative assessment of item bias are the three actual questions at the end of each instrument. The phrasing of both the instruction before each instrument to underline or cross out and the subsequent questions asking for substantiation of words or phrases that were difficult to understand or items that were inappropriate may have been problematic. As indicated in the results chapter (Chapter 6), participants experienced difficulty in distinguishing between “appropriateness” and “understanding”. Some also confused the instruction. It is therefore advised that future research be more specific on questions of this nature and provide some explanatory sentence if necessary, clarifying the requirements and/or differences between questions. Alternatively, future research can be more creative about how the information is gathered. Instead of asking respondents to cross out or underline, the researcher could make use of two additional columns where respondents can place a tick or leave blank to indicate if the item contained a linguistic difficulty or was inappropriate for the South African context.

A similar limitation was encountered with the face validity question, “Did this instrument appear to be measuring personality? Briefly substantiate your answer”. In retrospect, I was of the opinion that the word “substantiate” may have been problematic for some English second language speakers and that it might be a bit too formal for the participants, although none of them alluded to this. I am also of the opinion that the question for face validity was phrased in such a way that it may have led participants to the required response. I would therefore suggest that future research use questions to the effect of, “What in your opinion did this questionnaire assess?”

Another limitation with regard to validity is the fact that content and criterion validity could not be explored. However this was beyond the scope of the current study and is a consideration for future research.

8.7. LIMITATIONS RELATED TO BIAS

Bias refers to systematic differences across groups (Murphy & Davidshofer, 2005). A difficulty encountered in the South African context is the manner in which we decide on how these groups are constituted. As discussed in Chapter 4, the study of bias needs to become more standardised in South Africa, particularly if the research claims to be valid cross-culturally. I presented two arguments justifying the choice of variables and the sub-groupings

within them but the results of this study show that these variables and sub-groupings may no longer be valuable in the South African context and further research is warranted.

Also linked to the bias limitation is the limitation pertaining to nomenclature of what is traditionally referred to as “race”. While I have put together a strong justification for using “population group” instead of race or ethnicity, this issue is still debatable.

Furthermore, I linked the examination of bias to cultural and cross-cultural issues since we generally refer to the cross-cultural applicability of instruments in South Africa. However, in the discussion in Chapter 4 and subsequently in Chapter 7, it was evident that we need to revisit our definition of what we regard as culture in South Africa and how we operationalise this variable in psychometric studies. Currently, no consensus exists and the terms “culture” and “cross-cultural” are used quite loosely in research. I acknowledge that culture can mean many different things depending on the context, and that a single, static definition would not be viable but I do think it an appropriate academic endeavour to at least begin to introduce dialogue on what the possible meanings of “culture” are in the South African context. This will not only aid in understanding South Africa and the South African psyche better but will also be a necessary step in understanding and formulating a theory of personality that is rooted in African thought.

Aside from the limitations relating to bias, there were also some limitations relating to the statistics used in the current study, which are outlined below.

8.8. LIMITATIONS PERTAINING TO FACTOR ANALYSIS

Notwithstanding that factor analysis is the method of choice for investigating instruments within the field of personality psychology, particularly within the trait approach, this method does have its limitations and these will now be addressed (Hopwood & Donnellan, 2010; Kline, 1993; 1994; Moerdyk, 2009; Murphy & Davidshofer, 2005; Van de Vijver & Leung, 1997). Theodore Millon (1999) argued with regard to factor analysis that,

> Progression in the sciences of personology will not advance by mathematical procedures or brute empiricism alone;…What is elaborated and refined when employing a theory,… is understanding, an ability to see relations more plainly, to conceptualise categories more accurately,…To achieve this task fully, one must still depend on clinical “artistry” or the deductive powers of a theory-based model… (p. 449)

Millon (1999) argues in agreement with Heine and Buchtel (2009) that any number of factor solutions can be obtained from a single set of data, and the lack of objective criteria in determining which set is better is a limitation of the factor analytic technique. The decisions taken as to when to stop the process of selecting the number of factors, rotating the solutions and interpreting the factors are all subjective and at the discretion of the researcher. Thus it can be argued that with factor analysis you only get what you put in (Millon, 1999; Heine & Buchtel, 2009). Kline (1994) agrees that in cases where the test developers include items that are paraphrases of each other, these items will load on the same factor, hence rendering the factor analysis redundant. On the other hand it is possible to utilise factor analysis for data that on the surface appear to be essentially uncorrelated and to subject these data to a factor analysis to discover possible underlying constructs. Similarly, Hopwood and Donnellan (2010) argue for the value of factor analytic techniques, particularly exploratory factor analysis. Hopwood and Donnellan (2010) also argue for the use of multiple methods of detecting the number of factors, the use of appropriate factor rotation and the examination of congruence coefficients to ensure that factor analytic techniques are used more objectively.

In agreement with Hopwood and Donnellan (2010), I would argue that a number of techniques have been developed to ensure the best and most objective representation of the data in terms of selecting both the number of factors and the various rotations proposed, as argued in the methods chapter (Chapter 5). As early as 1955, Cronbach and Meehl (1955 cited in Nunnally & Bernstein, 1994) advised that validity is enhanced when test development is guided by both theoretical and empirical considerations. Millon (1999) himself acknowledges that progress in personology cannot happen with theory alone. Thus it is evident that both theory and empiricism are needed in the development and verification of a model.

What might constitute a limitation for the use of factor analysis in this study is the sample size. The number of factors obtained and their loadings are sometimes affected considerably by relatively small changes in the size or composition of the sample (Millon, 1999). Given the size and composition of the sample in the current study, one can argue that factor analysis may not have been an appropriate technique to employ. Kline (1994) argues that for factor analysis the more subjects there are in the study, the better, but that a sample size of 100 is sufficient, while Guadagnoli and Velicer (1988) argue that sample sizes of at least 150 are required for factor analyses to yield stable results. Kline (1994) also argues that it is better to have heterogeneous groups when conducting factor analyses since homogeneous groups tend to lower variance and thus lower factor loadings. However, in the case where it is

suspected that heterogeneous groups may actually yield separate factor structures when analysed in the specific homogeneous groupings, separate factor analyses should be run on the homogeneous groups (Kline, 1994).

In the current study, a single factor analysis was carried out with a heterogeneous sample of 425 individuals. While not ideal, the sample size was adequate. While in other circumstances the heterogeneous sample would have been recommended, in the case of this study it was problematic to conduct a single factor analysis on the heterogeneous sample. The results of the ANOVAs indicate possible differences between the various gender, population and language groupings. Hence separate factor analyses were done for the sub-groupings but, as discussed earlier, I had to collapse groupings for the analyses to be statistically viable. This led to smaller groups on which factor analyses were conducted which, although adequate, was not ideal. Hence it is recommended that larger and more representative samples be used to enhance both the methodological and statistical aspects of the study, so as to produce results that have greater generalisability.

8.9. LIMITATIONS PERTAINING TO EFFECT SIZE CALCULATION WITH NON-PARAMETRIC TESTS

I am noting this as a possible limitation to the study but I must state at the outset that I am not sure whether the claims I make here are valid – or whether they are in part due to my lack of knowledge as well as lack of resources in terms of texts and individuals knowledgeable about statistical procedures. As with the parametric ANOVAs, I have attempted to calculate effect sizes for the non-parametric ANOVAs using the techniques proposed by Hogarty and Kromrey (2000), which worked well. However, unlike the eta-squared and Cohen's *d* effect sizes, guidelines could not be located in terms of classifying the effect sizes as small, moderate or large. I therefore emailed Prof Kromrey who indicated that no published cut-off's were available but he e-mailed me cut-offs that he had calculated using Cohen's *d* approximations. I experienced similar difficulties with the Chi^2 technique. However, I could not locate an appropriate effect size calculation and hence could not comment on the effect sizes of significant associations.

The identification of these limitations is important for any study but they do not detract from the value that the study and its findings have to offer. The study has contributed much to the understanding of the utility of NEO-PI-R and the CPAI-2 in the South African context. It has also highlighted a number of areas where further research is warranted and would be of value. Thus the next part of this chapter discusses recommendations for future research.

8.10. RECOMMENDATIONS FOR FUTURE RESEARCH

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

Since this study was largely quantitative and as such is limited by the assumptions and methods employed within this paradigm, I would recommend that future research consider using more qualitative or mixed method techniques. This will ensure that the broad, descriptive trends will still be established but that the in-depth meaning and understanding of the concept of personality, particularly as it manifests in an African and South African context, can be explored. A suggestion is for further research to combine the methods used in this study with the methods employed by Abrahams (1998) and Abrahams and Mauer (1999a; 1999b) who investigated subjects' understanding of the meaning of words in the 16PF as well as whether non-English speakers understood the connotative and denotative meanings of items. Franklin-Ross (2009) followed a similar design to Abrahams and Mauer (1999b) and considered language bias in the NEO-PI-R using focus groups with a sample of 17 postgraduate Psychology students. The work presented by Nel (2008) was qualitative in that interviews were conducted and the data analysed using cluster analysis to get to a more emic model of personality in South Africa. More of these approaches are needed and they need to work in conjunction with quantitative studies in personality so as to gain a more in-depth understanding of personality and its measurement in South Africa.

The quantitative and qualitative results of the current study as well as the literature reviewed indicate that there are certain dimensions to personality that do not appear to be addressed in the NEO-PI-R and the CPAI-2. In particular, aspects of spirituality and Individualism/ Collectivism deserve more attention and research locally and internationally to determine their role in personality theories and, more specifically, whether they have a contribution to make to the FFM and the FFT. The current study also found interesting results with Internal and External Locus of Control, suggesting that individuals in collectivist cultures tend to subscribe to a more External Locus of Control. This finding merits further research. It is suggested that the Locus of Control construct be explored in more depth with the NEO-PI-R and measures of Individualism and Collectivism so as to clarify these relationships better.

In terms of utilising a mixed method approach to understand personality in the South African context, I would recommend that such research also be used to determine the possible effects of the political climate on the personality of various groups in the country.

It would perhaps be valuable to obtain textual evidence of personality, for example, diaries or letters, spanning the years prior to, during, and after apartheid and document possible changes. It would be possible to obtain personality tests utilised over the same period and analyse them in terms of differences and similarities. The problem with this method is that the tests utilised during the apartheid era were inappropriate for use on Black populations, and hence this information might not be accurate. The problem with both techniques is that they rely on written text and, as was mentioned in Chapter 7, the majority of the South African population was and is illiterate. According to Project Literacy (2010), a non-governmental organization (NGO) that delivers adult basic education and training in South Africa, there are 4.7 million South Africans who never went to school and are totally illiterate. There are a further 4.9 million adult South Africans who are functionally illiterate, that is, they left school before Grade 7 (Project Literacy, 2010). Hence letters or diaries for this group would not be readily available. A possible suggestion would be a study involving discourse analysis, with the personal as political being the focal point in interviews or focus group sessions. Whether this would reveal any evidence is doubtful though, given that apartheid spans an era of over 40 years and most people have become accustomed to their styles of relating and would probably not perceive apartheid as influencing personality development. Given the findings in this study regarding both similarities and differences between the home language and population groupings, and the arguments presented on acculturation and individualism versus collectivism, it would be interesting to note whether any change in personality trends across groupings occurs over the next 10 to 15 years in South Africa.

Thus a second recommendation follows on from that of using mixed methods research. It will be vital for longitudinal studies, similar to those employed with the NEO-PI-R (Costa & McCrae, 1992), to be conducted on South African samples. Not only will this allow for the establishment of trends but it will also allow for test-retest reliability studies on bigger samples over varied time periods. In addition to this, it will allow for the exploration of personality across the developmental span. Current arguments presented for the stability of adult personality (see 2008; De Fruyt et al., 2009; McCrae et al., 2004; McCrae, Terracciano, De Fruyt, De Bolle, Gelfand & Costa, 2010) can be explored in a South African context and compared to international trends.

Recent trends in personality research are also focusing on personality development in adolescents (Costa et al., 2008; De Fruyt et al., 2009; McCrae et al., 2004; McCrae et al., 2010). Thus it is recommended that future research be conducted on adolescent and adult samples in South Africa.

The results of the current study suggest that the variables currently used to explore the various groupings in South Africa may not be wholly appropriate. Hence it is recommended that in addition to gender, population group and home language, indicators of class and socio-economic status be included in studies of this nature. More specifically, it would be valuable to determine the role of poverty in personality development and whether there are predictable trends attributable to lower socio-economic status. Zhang and Akande (2002) found that students who occupied a higher socio-economic status, for example, exhibited significantly higher levels of Openness and Agreeableness.

Heuchert et al. (2000) argue that if political oppression, social class and educational opportunities have the potential to affect personality, one would expect racial groups in South Africa to differ on personality variables. Political out-groups might manifest a predictable pattern of personality scores but this would need to be explored in comparison with other out-groups like the Palestinians in Israel, the Tutsis in Rwanda and Catholics in Northern Ireland. Thus collaboration between South African researchers and those abroad, particularly in the countries mentioned, would be useful.

Furthermore, the results and subsequent discussion suggest that acculturation is increasingly becoming a factor in the expression and understanding of personality. Currently a number of measures exist that measure acculturation (F. Van de Vijver, personal communication, September 21, 2010). Hence it is recommended that studies of this nature routinely consider including acculturation measures.

As discussed in the literature review, the discussion and the limitations, we have not as yet established what we mean by the terms “culture” and “cross-cultural” within the psychology fraternity in South Africa. It is recommended that discussion and dialogue in this regard begin with urgency. Initially it is recommended that this be explored qualitatively, in a manner similar to that employed by Nel (2008) to explore personality. This then has the potential to culminate in more empirical understandings of this nebulous concept.

I have referred frequently in this study to the need for larger and more representative samples of South Africans. It is therefore recommended that future research employ stratified random sampling strategies[11] as far as possible. This will ensure that each group

11 Stratified random sampling may be defined as a probability sampling technique in which the strata of the population to be sampled are first identified and then only are people randomly selected within each of the identified strata (Rosenthal and Rosnow, 1991).

within the population is proportionately represented and that each person within each of the population groups has an equal chance of being represented in the sample. In addition to having a representative sample it is recommended that the sample size be larger than the one in the current sample, with approximately 1 000 subjects or more. This will ensure greater generalisability of results but will also ensure adequacy in terms of conducting appropriate statistical analyses.

Since volunteer bias tends to be particularly problematic in personality research, it is recommended that future research recruit a sample that is not solely composed of volunteer subjects. Given the experience of this study, I acknowledge that this may not be possible in practice, hence it is recommended that in the event of not being able to get a non-volunteer sample, future research should make use of sacrifice groups.[12] Future research should therefore discard the responses of a certain number of subjects and instead either in one-to-one interview sessions or in focus groups, explore the possibilities of volunteer bias influencing the study. At the same time a group of subjects who refuse to answer questionnaires or to participate in the study should be followed up and a similar procedure of interviewing or focus group sessions should be followed. Apart from offering the possibility of gaining an understanding of volunteer bias, this will make possible some insight into non-response bias as well. Furthermore, the honorarium used in this study was somewhat effective in recruiting some participants and this may be used to get more individuals to respond. This does depend on whether research funding is available or not and in South Africa this is quite difficult to secure. It also creates other limitations in that only individuals with certain personality traits might choose to respond if offered an honorarium. This is the same limitation encountered with volunteers who tend to differ in personality from non-volunteers. This is a predicament for all research, not just studies of this nature, and once again the idea of using sacrifice groups is appealing in terms of understanding these phenomena.

The results of this study revealed that some aspects of response bias might be influencing results in this study; but, as indicated in the methods and discussion chapters, this aspect of the study was not well developed. Hence it is recommended that more attention be paid to self-effacing and self-enhancing tendencies in the various groups in the South African context. Thus social desirability, acquiescent responding, naysaying, non-response bias,

12 Some subjects' responses are disregarded ("sacrificed") at different points in the study, and they are then questioned about their perceptions of the study/questionnaire/their behaviour up to that point (Rosenthal & Rosnow, 1991).

volunteer response bias and the tendency to endorse extreme scores should be explored in all psychometric studies of personality on a regular basis.

This study was not able to consider criterion validity. It is therefore recommended that future research considers this by obtaining respondents' own descriptions of their personality and correlating these with their personality traits on both instruments. Alternatively, observer and self-reports of personality can be correlated. Furthermore, future research could compare responses on the NEO-PI-R, CPAI-2 and other prominent personality instruments, like the MBTI, the16PF, the 15FQ+, the Occupational Personality Profile (OPP), the Occupational Personality Questionnaire (OPQ), the BTI and the SAPI. I mention these instruments specifically since these (with the exception of the SAPI as it is still under construction) are among the most widely used instruments in both research and practice in South Africa (see Foxcroft et al., 2004). Using these instruments together also allows for further discussion and comment on the use of etic versus emic instruments in South Africa. At a theoretical level, this type of study will also serve to assist understandings of the utility of the FFM of personality and allow for some contributions to be made to the FFT.

This study identified consistent differences in the patterns of factor loadings and the order of factors when these results were compared to those of the normative samples used for the NEO-PI-R and the CPAI-2. I think that this deserves further exploration in future studies. I am uncertain as to whether this might be an artifact of factor analysis as a technique or whether some importance should be attached to this.

The limitations of using factor analysis were discussed earlier. While it is recommended that other studies employ the exploratory factor analysis methods used in this study, it is also recommended that these limitations be recognised. If possible other techniques should also be employed. Confirmatory analysis is often recommended as an adjunct to exploratory factor analysis if possible (Hopwood & Donnellan, 2010).

The results also indicated that for the NEO-PI-R, some items need to be adapted. The item adaptations on the NEO-PI-3 (McCrae et al., 2004) went some way towards addressing this but it was evident from the current study that there are still items that needed to be adapted on the NEO-PI-R which were not adapted for the NEO-PI-3. The most obvious recommendations following on from these results would be to explore the NEO-PI-R together with the 37 revised items on the NEO-PI-3 in larger and more representative South African samples to determine which items, if any, require adaptation for this population. This may result in an adapted version of the NEO-PI-3 for South Africa.

The results for the CPAI-2 also indicated that items need to be adapted. These appear to be visibly more than those on the NEO-PI-R, possibly because the CPAI-2 has more items overall, but also because the participants in the current study felt that the language and appropriateness of items on the CPAI-2 were more inappropriate than the NEO-PI-R. Reflecting on this as well as the items cited as problematic, I am of the opinion that some of the difficulty is in the scale construction. The CPAI-2 operates at three levels, namely, as a complete scale, a normal personality scale measure and a clinical scale. As such I think that some items that are more appropriate to clinical populations are retained in the measure that is used for normally functioning adults, leading to respondents expressing dissatisfaction with the items. Furthermore I think the items associated with the more indigenous scales in the CPAI-2 were located and phrased in a manner congruent with the Chinese culture. This again leads to individuals expressing dissatisfaction with the items. Hence I would recommend that the CPAI-2 be used again in South African samples that are larger and more representative, to determine if the results found in the current study hold. Following this, a process of adapting items should follow. I do believe the CPAI-2 is of value in a country like South Africa and should be researched further.

The recommendations suggested above all contribute to establishing the utility of both the NEO-PI-R and the CPAI-2 in South Africa. Some aim at eliminating bias by considering between-group differences and others by identifying inappropriate items and/or scales. It therefore appears to be sensible to recommend that future studies attempt to incorporate many or all of the various methods recommended above. Thus I would recommend, in accordance with Caprara, Barbaranelli, Bermudez, Maslach and Ruch (2000), that any research attempting to determine the utility of any personality instrument employ a multimethod approach with item-level and scale-level analyses utilising a number of statistical techniques. Caprara et al. (2000), however, emphasise only the multivariate statistical procedures necessary in such research. I would also like to recommend that in addition to following these procedures, other, more qualitative methods be employed together with simpler univariate statistical analyses considering issues of appropriateness, understanding, validity and so on, as was done in the current study. I am in favour of utilising more qualitative methods because they allow for the possible emic constructs inherent within African personality to be explored.

8.11. CONCLUDING COMMENTS

This report commenced with a literature review that conceptualised this study within the broader field of personality psychology. The literature review then proceeded to expand on the trait approach to personality, focusing specifically on the FFM. The development of both instruments – the NEO-PI-R and the CPAI-2 – was briefly discussed within the development of the FFM. Following this, the literature review explored the shortcomings of the FFM and discussed these in relation to the FFT of personality. Critiques of both the FFM and the FFT were addressed, with a specific focus on the African and South African contexts. This discussion emphasised that theories should be developed that integrate knowledge gained from cross-cultural testing of psychological theories with local indigenous knowledge to arrive at verified universal knowledge. The literature review then proceeded to discuss issues of reliability, validity and bias and how these would be addressed and explored in the current study. Once again this discussion was situated within the South African context and important debates concerning the use of etic versus emic instruments, acculturation and national identity were addressed. Following this, I proceeded to outline the methods used in the study. The aims, rationale and research questions were specified. Thereafter, the sample, the instruments, research design, procedure, ethical considerations and methods for data analysis were discussed. Results were presented and discussed. Finally, limitations and recommendations were presented.

This study therefore presents conclusions that can be made at a practical level in terms of the utility of the two instruments studied. It also presents conclusions that can be made at the theoretical level in terms of the debates explored in the literature review; and these conclusions were revisited in the discussion, limitations and recommendations sections of this report.

At a practical level, this study has demonstrated that the NEO-PI-R, an etic instrument, can be used successfully with an acculturated, South African sample. However, there were some systematic differences noted when construct, method and item bias were explored. These would all benefit from further research before definitive conclusions are made. Overall though, the NEO-PI-R's reliability and validity results proved good. The CPAI-2 is also an etic instrument but with a different focus to the NEO-PI-R since it was developed in a Chinese culture with a Chinese lexicon. The results for the CPAI-2 proved more varied than for the NEO-PI-R, demonstrating variation in both the validity and bias analyses. The four factor model proposed by Cheung et al. (2008) could not be replicated. A similar pattern of differences as found with the NEO-PI-R was noted in the bias results. As with the NEO-PI-R, further research is warranted before definite conclusions can be reached but the CPAI-2 did appear to have less

utility in this South African sample than the NEO-PI-R. In part, this may be due to having an acculturated or nonrepresentative sample or problems that are inherent to the instrument.

At a theoretical level, this study has demonstrated that etic instruments do have value in the South African context. Both the NEO-PI-R and the CPAI-2 demonstrated a five factor model that was consistent with the FFM of personality; but in both cases there was variation at the facet/subscale level. This lends support to arguments for the universal applicability of the FFM but also suggests that there are other factors that merit consideration. The study also suggests that South Africans are increasingly developing a cohesive identity and that splitting the nation into Black and White groupings is fast becoming archaic. We need a more progressive way of looking at intergroup differences in South Africa. To this end, I argue for socio-economic indicators rather than racial division.

The current study has served as a preliminary exploratory study. As such, this study has introduced a number of research possibilities within the realm of personality theory and assessment in the South African context. It is now the task of future research studies to explore the issues identified within the study to determine whether the NEO-PI-R and the CPAI-2 would be appropriate for use within the South African context and whether it would be at all feasible to attempt adaptations of these instruments for South Africa. Furthermore, issues of personality theory as they pertain to the FFM, the FFT and indigenous knowledge need to be pursued.

REFERENCE LIST

Abrahams, F. (1996). *The cross-cultural applicability of the 16 Personality Factors Inventory.* Unpublished doctoral dissertation, University of South Africa, Pretoria.

Abrahams, F. (2002). The (un)fair useage of the 16PF (SA92) in South Africa: A response to C. H. Prinsloo and I. Ebersöhn. *South African Journal of Psychology, 32*, 58-61.

Abrahams, F. & Mauer, K. F. (1999a). The comparability of the constructs of the 16PF in the South African context. *Journal of Industrial Psychology, 25,* 53-59.

Abrahams, F. & Mauer, K. F. (1999b). Qualitative and statistical impacts of home language on responses to the items of the Sixteen Personality Factor Questionnaire (16PF) in South Africa. *South African Journal of Psychology, 29*, 76-86.

Aiken, L. R. (2003). *Psychological testing & assessment*. Boston: Pearson.

Allik, J. & McCrae, R. R. (2002). A Five-Factor Theory perspective. In R. R. McCrae & J. Allik (Eds.), *The Five-Factor Model of personality across cultures* (pp. 303-322). New York: Kluwer Academic.

Allik, J. & McCrae, R. R. (2004). Toward a geography of personality traits: Patterns of profiles across 36 cultures. *Journal of Cross-Cultural Psychology, 35*, 13-28.

Allik, J., Mottus, R., Realo, A., Pullmann, H., Trifonova, A., McCrae, R. R., Meshcheryakov, B. G. & 54 members of the Russian Character and Personality Survey. (2009). How national character is constructed: Personality traits attributed to the typical Russian. *Psychological Journal of International University of Nature, Society and Human "Dubna", 1*, 1-23.

Allport, G. W. (1937). *Personality: A psychological interpretation.* New York: Holt.

Ajani-ya-Azibo, D. (1991). Towards a metatheory of African personality. *Journal of Black Psychology, 17*, 37-45.

Al-Zeera, Z. (2001). *Wholeness and holiness in education: An Islamic perspective*. London: Guilford Press.

Anastasi, A. & Urbina, S. (2007). *Psychological testing*. New Jersey: Prentice Hall.

Ashton, M. C. & Lee, K. (2005). Honesty-humility, the Big Five, and the Five Factor Model. *Journal of Personality, 73*, 1321-1353.

Ashton, M. C. & Lee, K. (2007). Empirical, theoretical, and practical advantages of the HEXACO model of personality structure. *Personality and Social Psychology Review, 11*, 150-166.

Ashy, M. A. (1999). Health and illness from an Islamic perspective. *Journal of Religion and Mental Health, 38*, 241-257.

Bedell, B., Van Eeden, R. & Van Staden, F. (1999). Culture as a moderator variable in psychological test performance: Issues and trends in South Africa. *South African Journal of Industrial Psychology, 25,* 1-7.

Bernardi, R. A. (2006). Associations between Hofstede's cultural constructs and social desirability response bias. *Journal of Business Ethics, 65,* 45-53.

Berry, J. W. (1969). On cross-cultural comparability. *International Journal of Psychology, 4,* 119-128.

Berry, J. W., Poortinga, Y. H., Segall, M. H. & Dasen, P. R. (2004). *Cross-cultural psychology: Research and applications*. Cambridge: Cambridge University Press.

Berry, J. W. & Sam, D. (1997). Acculturation and adaptation. In J. W. Berry, M. H. Segall & C. Kagitcibasi (Eds.), *Handbook of cross-cultural psychology (Vol. 3).* Boston: Allyn & Bacon.

Bhana, K. (1987). Psychological research with Indian South Africans: Explorations in method. In K. F. Mauer & A. I. Retief (Eds.), *Psychology in context: Cross-cultural research trends in South Africa.* Pretoria: Human Sciences Research Council.

Block, J. (1995). A contrarian view of the Five-Factor approach to personality description. *Psychological Bulletin, 117,* 187-215.

Block, J. (2001). Millenial contrarianism: The Five-Factor approach to personality description 5 years later. *Journal of Research in Personality, 35,* 98-107.

Bock, P. K. (2000) Culture and personality revisited. *American Behavioral Scientist***,** *44,* 32-40.

Bond, M. H. (1994). Trait theory and cross-cultural studies of person perception. *Psychological Enquiry, 5,* 114-117.

Borsboom, D., Mellenbergh, G. J. & Van Heerden, J. (2003). The theoretical status of latent variables. *Psychological Review, 110,* 203-219.

Botha, A. & Laher, S. (in press). Methods of sampling. In B. Kawulich, M.Garner & C. Wagner (Eds.), *Social research methods for developing world contexts*. London: McGraw-Hill.

Boyle, G. J., Matthews, G. & Saklofske, D. H. (2008). *The SAGE handbook of personality theory and assessment.* Thousand Oaks, CA: SAGE Publications.

Brannon, L. (2008). *Gender psychological perspectives* (5th ed). Boston: Pearson.

Braun, V. & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3,* 77-101.

Burke, S. M., Van de Wiessen, E. & De Win, M. (2010). Serotonin and dopamine transporters in relation to neuropsychological functioning, personality traits and mood in young adults. *Psychological Medicine, 1,* 1-11.

Buss, D. M. (1996). Social adaptation and the five major factors of personality. In J. S. Wiggins (Ed.), *The Five-Factor Model of personality: Theoretical perspectives* (pp. 180-207). New York: Guilford Press.

Buss, D. M. (2003). *Evolutionary personality psychology: The new science of the mind* (2nd ed.). Boston: Allyn & Bacon.

Buss, D. M. (2009). How can evolutionary psychology successfully explain personality and individual differences? *A Perspective on Psychological Science, 4,* 359-366.

Caprara, G.V., Barabaranelli, C., Bermudez, J., Maslach, C., & Ruch, W. (2000). Multivariate methods for the comparison of factor structures in cross-cultural research. *Journal of Cross-Cultural Psychology, 31*, 437-464.

Carter, D. J. & Rashidi, A. (2003). Theoretical model of psychotherapy: Eastern Asian-Islamic women with mental illness. *Health Care for Women International, 24*, 399-413.

Cartwright, D. (2008). Psychopathology. In L. Swartz, C. de la Rey, N. Duncan & L. Townsend (Eds.), *Psychology: An introduction* (pp. 450-467). Cape Town: Oxford University Press.

Cervone, D. (2004a). Personality assessment: Tapping the social-cognitive architecture of personality. *Behavior Therapy, 35,* 113-129.

Cervone, D. (2004b). The architecture of personality. *Psychological Review, 111,* 183-204.

Cheung, F. M. (2004). Use of Western and indigenously developed personality tests in Asia. *Applied Psychology: An International Review, 53*,173-191.

Cheung, F. M. (2005). *CPAI-2 English Description*. Available from Fanny Cheung, Department of Psychology, Chinese University of Hong Kong.

Cheung, F. M. (2006). *CPAI-2 Personality Scale Description*. Available from Fanny Cheung, Department of Psychology, Chinese University of Hong Kong.

Cheung, F. M. (2007). Indigenous personality correlates from the CPAI-2 profiles of Chinese psychiatric patients. *World Cultural Psychiatry Research Review, 2,* 114-117.

Cheung, F. M., Cheung, S. F., Leung, K., Ward, C. & Leong, F. (2003). The English version of the Chinese Personality Inventory. *Journal of Cross-Cultural Psychology, 34*, 433-452.

Cheung, F. M., Cheung, S., Zhang, J., Leung, K., Leong, F. & Yeh, K. H. (2008). Relevance of Openness as a personality dimension in Chinese culture: Aspects of its cultural relevance. *Journal of Cross-Cultural Psychology, 39*, 81-108.

Cheung, F. M., Fan, W., Cheung, S. F. & Leung, K. (2008). Standardization of the Cross-Cultural (Chinese) Personality Assessment Inventory for adolescents in Hong Kong: A combined emic-etic approach to personality assessment. *Acta Psychologica Sinica, 40,* 839-852.

Cheung, F. M., Fan, W. & To, C. (2007). The Chinese Personality Assessment Inventory as a culturally relevant personality measure in applied settings. *Social and Personality Psychology Compass, 2,* 74-89.

Cheung, F. M., Kwong, J. & Zhang, J. X. (2003). Clinical validation of the Chinese Personality Assessment Inventory (CPAI). *Psychological Assessment, 15,* 89-100.

Cheung, F. M. & Leung, K. (1998). Indigenous personality measures: Chinese examples. *Journal of Cross-Cultural Psychology,* 29, 233-248.

Cheung, F. M., Leung, K., Fan, R. M., Song, W. Z., Zhang, J. X. & Zhang, J-P. (1996). Development of the Chinese Personality Assessment Inventory (CPAI). *Journal of Cross-Cultural Psychology, 27*, 181-199.

Cheung, F. M., Leung, K., Zhang, J. X., Sun, H. F., Gan, Y. Q., Song, W. Z. & Xie, D. (2001). Indigenous Chinese personality constructs: Is the Five-Factor Model complete? *Journal of Cross-Cultural Psychology, 32*, 407-433.

Cheung, G. M. & Rensvold, R. B. (2000). Assessing extreme and acquiescence response sets in cross-cultural research using structural equations modeling. *Journal of Cross-Cultural Psychology, 31,* 187-212.

Cheung, S. F., Cheung, F. M., Howard, R. & Lim, Y-H. (2006). Personality across the ethnic divide in Singapore: Are "Chinese traits" uniquely Chinese? *Personality and Individual Differences, 41*, 467-477.

Choi, I., Nisbett, R. E. & Norenzayan, A. (1998). Causal attribution across cultures: Variation and universality. *Psychological Bulletin, 125,* 47-63.

Church, A. T. (2000). Culture and personality: Toward an integrated cultural trait psychology. *Journal of Personality, 68*, 651-703.

Church, A. T. & Lonner, W. J. (1998). The cross-cultural perspective in the study of personality. *Journal of Cross-Cultural Psychology, 29*, 32-62.

Claasen, N. C. W. (1997). Cultural differences, politics and test bias in South Africa. *European Review of Applied Psychology, 47*, 297-307.

Cohen, R. J. & Swerdlik, M. E. (2005). *Psychological testing and assessment* (6th ed). Boston: McGraw-Hill.

Costa, P. T., Jr. & McCrae, R. R. (1992). *Revised Neo Personality Inventory (NEO-PI-R) and Neo Five-Factor Inventory (NEO-FFI) professional manual.* Odessa, FL: Psychological Assessment Resources.

Costa, P. T., Jr. & McCrae, R. R. (2008). The Revised NEO Personality Inventory. In G. J. Boyle, G. Matthews & D. H. Saklofske (Eds.), *The SAGE handbook of personality theory and assessment* (pp. 179-198). London: SAGE Publications.

Costa, P. T., Jr., Terracciano, A. & McCrae, R. R. (2001). Gender differences in personality traits across cultures: Robust and surprising findings. *Journal of Personality and Social Psychology, 81*, 322-331.

Costa, P. T., Jr. & Widiger, T. A. (2002). *Personality disorders and the Five-Factor Model of personality.* Washington, DC: American Psychological Association.

Dalton, J. H., Elias, M. J. & Wanderman, A. (2002) *Community psychology: Linking* individuals *and communities*. Belmont, CA: Wadsworth.

Dalton, M. & Wilson, M. (2000). The relationship of the Five-Factor Model of personality to job performance for a group of Middle Eastern expatriate managers. *Journal of Cross-Cultural Psychology, 31*, 250-258.

De Fruyt, F., De Bolle, M., McCrae, R. R., Terracciano, A., Costa, P. T., Jr. & collaborators of the Adolescent Personality Profiles of Cultures Project. (2009). Assessing the universal structure of personality in early adolescence: The NEO-PI-R and NEO-PI-3 in 24 cultures. *Assessment, 16,* 301-311.

Devey, R., Skinner, C. & Valodia, I. (2006). The state of the informal economy. In S. Buhlungu, J. Daniel, R. Southall & J. Lutchman (Eds.), *The state of the nation (2005-2006).* Cape Town: HSRC Press.

Dey, E. L. (1997). Working with low survey response rates: The efficacy of weighting adjustments. *Research in Higher Education, 38,* 215-227.

DeYoung, C. G. (2006). Higher-order factors of the Big Five in a multi-informant sample. *Journal of Personality and Social Psychology, 91,* 1138-1151.

Digman, J. M. (1997). Higher-order factors of the Big Five. *Journal of Personality and Social Psychology, 73*, 1246-1256.

Dollinger, S. J. & Leong, F. T. (1993). Volunteer bias and the Five-Factor Model. *Journal of Psychology, 127*, 29-36.

Eagly, A. H. & Carli, L. L. (2007). Women and the labyrinth of leadership. *Harvard Business Review, 85,* 62.

Eaton, L & Louw, J. (2002). Culture and self in SA: Individualism and collectivism predictions. *Journal of Social Psychology, 140,* 210-217.

Efficace, F. & Marrone, R. (2002). Spiritual issues and quality of life assessment in cancer care. *Death Studies, 26*, 743-756.

Ellemers, N., Spears, R. & Doosje, B. (2002). Self and social identity. *Annual Review of Psychology, 53,* 161-186.

Ellis, A., Abrahams, M. & Abrams, L. D. (2009). *Personality theories: Critical perspectives*. Thousand Oaks, CA: SAGE Publications.

England, J. (1991). *Personality assessment: A review with special reference to the South African situation.* Pretoria: Human Sciences Research Council.

Feingold, A. (1994). Gender differences in personality: A meta-analysis*. Psychological Bulletin, 116*, 429-456.

Fiske, A. P. (2002). Using individualism and collectivism to compare cultures – A critique of the validity and measurement of the constructs: Comment on Oyserman et al. (2002). *Psychological Bulletin, 128*, 78-88.

Foxcroft, C. (2002). Ethical issues related to psychological testing in Africa: What I have learned (so far). In W. J. Lonner, D. L. Dinnel, S. A. Hayes & D. N. Sattler (Eds.), *Online readings in*

psychology and culture (Unit 5, Chapter 4). Retrieved May 16, 2010, from: http://orpc.iaccp.org/index.php?view=article&catid=23%3Achapter&id=45%3Afoxcroft&format=pdf&option=com_content

Foxcroft, C. (2004). Planning a psychological test in the multicultural South African context. *South African Journal of Industrial Psychology, 30*, 8-15.

Foxcroft, C. & Davies, C. (2008). Historical perspectives on psychometric testing in South Africa. In C. van Ommen & D. Painter (Eds.), *Interiors: A history of psychology in South Africa* (pp.152-182). Pretoria: UNISA Press.

Foxcroft, C., Paterson, H., Le Roux, N. & Herbst, D. (2004). *Psychological assessment in South Africa: A needs analysis.* Pretoria: Human Sciences Research Council.

Foxcroft, C. & Roodt, G. (2008). *An introduction to psychological assessment in the South African context* (2nd ed.). Cape Town: Oxford University Press.

Franklin-Ross, D. (2009). *Exploring language bias in the NEO-PI-R.* Unpublished master's dissertation (research psychology). University of the Witwatersrand, Johannesburg.

Friedman, H. S. & Schustack, M. W. (2009). *Personality: Classic theories and modern research* (4th ed). Boston: Pearson.

Funder, D. C. (2001). Personality. *Annual Review of Psychology, 52,* 197-221.

Gallinat, J., Kunz, D., Lang, U. E. & Neu, P. (2007). Association between cerebral glutamate and human behaviour: The sensation-seeking personality trait. *Neuroimage, 34*, 671-678.

Gan, Y. Q. (1998). *Healthy personality traits and unique pathways to psychological adjustment: Cultural and gender perspectives.* Unpublished doctoral dissertation, Chinese University, Hong Kong.

Gardini, S., Cloninger, C. S. & Venneri, A. (2009). Individual differences in personality traits reflect structural variance in specific brain regions. *Brain Research Bulletin, 179,* 265-270.

Glorfeld, L. W. (1995). An improvement on Horn's parallel analysis methodology for selecting the correct number of factors to retain. *Educational and Psychological Measurement, 55,* 377-393.

Goldberg, L. R. (1981). Language and individual differences: The search for universals in personality lexicons. In L. Wheeler (Ed.), *Review of personality and social psychology* (Vol. 2, pp. 141-165). Beverly Hills, CA: SAGE Publications.

Goldberg, L. R. (1982). From ace to zombie: Some explorations in the language of personality. In C. D. Spielberger & J. N. Butcher (Eds.), *Advances in personality assessment* (Vol. 1, pp. 203-234). Hillsdale, NJ: Lawrence Erlbaum Associates.

Goldberg, L. R. (1990). An alternative description of personality: The Big-Five factor structure. *Journal of Personality and Social Psychology, 59,* 1216-1229.

Goldberg, L. R. (1995). What the hell took so long? Donald W. Fiske and the Big-Five factor structure. In P. E. Shrout & S. T. Fiske (Eds.), *Personality research, methods, and theory: A*

Festschrift honoring Donald W. Fiske (pp. 29-43). Hillsdale, NJ: Lawrence Erlbaum Associates.

Green, E. G. T., Deschamps, J-L. & Páez, D. (2005). Variation of Individualism and Collectivism within and between 20 countries: A typological analysis. *Journal of Cross-Cultural Psychology*, 36, 321-339.

Groves, B. W. & Olson, R. H. (2000). Response rates to surveys with self-addressed stamped envelopes versus a self-addressed label. *Psychological Reports, 86*, 1226-1228.

Groves, R. M. & Peytcheva, E. (2008). The impact of nonresponse rates on nonresponse bias: A meta-analysis. *Public Opinion Quarterly, 72,* 167-189.

Guadagnoli, E. & Velicer, W. F. (1988). Relationship of sample size to the stability of component patterns. *Psychological Bulletin, 103,* 265-275.

Gulgoz, S. (2002). Five-factor model and the NEO-PI-R in Turkey. In R. R. McCrae & J. Allik (Eds.), *The Five-Factor Model of personality across cultures* (pp. 175-196). New York: Kluwer Academic.

Guttman, L. (1954). Some necessary conditions for common factor analysis. *Psychometrika, 19,* 149-162.

Hamamura, T., Heine, S.J. & Paulhus, D. L. (2008). Cultural differences in response styles: The role of dialectical thinking. *Personality and Individual Differences, 44,* 932-942.

Hase, H. D. & Goldberg, L. R. (1967). The comparative validity of different strategies of deriving personality inventory scales. *Psychological Bulletin, 67,* 231-248.

Haven, S. & Ten Berge, J. M. F. (1977). *Tucker's coefficient of congruence as a measure of factorial invariance: An empirical study.* Heyman Bulletin, No. 290 EX, University of Groningen, the Netherlands.

Hayton, J. C., Allen, D. G. & Scarpello, V. (2004). Factor retention decisions in exploratory factor analysis: A tutorial on parallel analysis. *Organisational Research Methods, 7,* 191-205.

Heaven, P. C. & Pretorius, A. (1998). Personality structure among Black and White South Africans. *The Journal of Social Psychology, 138*, 664-666.

Heaven, P. C. L., Connors, J. & Stones, C. R. (1994). Three or five personality dimensions? An analysis of natural language terms in two cultures. *Journal of Personality & Individual Differences 17*, 181-189.

Heine, S. J. & Buchtel, E. E. (2009). Personality: The universal and the culturally specific. *Annual Review of Psychology, 60*, 369-394.

Heuchert, J. W. P., Parker, W. D., Stumpf, H. & Myburgh, C. P. H. (2000). The Five-Factor Model of personality in South African college students. *American Behavioral Scientist, 44,* 112-125.

Higgins, E. T. (2008). Culture and personality: Variability across universal motives as the missing link. *Social and Personality Psychology Compass, 2,* 608-634.

Hofstede, G. & McCrae, R. R. (2004). Personality and culture revisited: Linking traits and dimensions of culture. *Cross-Cultural Research, 38,* 52-88.

Hogarty, K. Y. & Kromrey, J. D. (1999). Poster presented at 24th International Conference for SAS Users. Retrieved October 27, 2009, from: http://www2.sas.com/proceedings/sugi24/posters/p238-24.pdf

Hogarty, K. Y. & Kromrey, J. D. (2000). *Robust effect size estimates and meta-analytic tests of homogeneity*. Poster presented at 25th International Conference for SAS Users. Retrieved October 27, 2009, from: http://www2.sas.com/proceedings/sugi25/25/po/25p217.pdf

Hopwood, C. J. & Donnellan, M. B. (2010). How should the internal structure of personality inventories be evaluated? *Personality and Social Psychology Review, 14,* 332-346.

Horn, B. S. (2000). *A Xhosa translation of the revised Neo Personality Inventory: A pilot study.* Unpublished master's dissertation (Counselling Psychology). University of Port Elizabeth, South Africa.

Horn, J. L. (1965). A rationale and test for the number of factors in factor analysis. *Psychometrika, 30,* 179-185.

Huck, S. W. (2009). *Reading statistics and research* (5th ed). Boston: Pearson.

Hui, C. H. & Triandis, H. C. (1989). Effects of culture and response format on extreme response style. *Journal of Cross-Cultural Psychology, 20*, 296-309.

Hyde, J. S. (2005). The gender similarities hypothesis. *American Psychologist, 60,* 581-592.

Jansen, J., Herman, C., Matentjie, T., Morake, R., Pillay, V., Sehoole, C. & Weber, E. (2007). Tracing and explaining change in higher education: The South African case. *Review of higher education in South Africa* (Ch. 4). Pretoria: Council on Higher Education

John, O. P. & Srivastava, S. (1999). The Big-Five trait taxonomy: History, measurement & theoretical perspectives. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research* (2nd ed., pp. 102-138). New York: Guilford Press.

Johnson, J. S. & Mowrer, R. R. (2000). Mail surveys among college students: Do initial responders score differently from nonresponders on the 16PF? *Psychological Reports, 86*, 901-908.

Kaplan, R. M. & Saccuzzo, D. P. (2009). *Psychological testing: Principles, applications and issues* (7th ed.). Pacific Grove, CA: Brooks/Cole.

Kirkpatrick, L. A. (1999). Towards an evolutionary psychology of religion and personality. *Journal of Personality, 67,* 321-951.

Kline, P. (1993). *Personality: The psychometric view*. New York: Routledge.

Kline, P. (1994). *An easy guide to factor analysis*. London: Routledge.

Konstabel, K., Realo, A. & Kallasmaa, T. (2002). Exploring sources of variations in the structure of personality traits across cultures. In R. R. McCrae & J. Allik (Eds.), *The Five-Factor Model of personality across cultures* (pp. 29-53). New York: Kluwer Academic.

Kosek, R. B. (1999). Adaptation if the Big Five as a hermeneutic instrument for religious constructs. *Personality and Individual Differences, 27,* 229-237.

Krippendorf, K. (1980). *Content analysis: An introduction to its methodology*. London: SAGE Publications.

Kwong, J. Y. Y. & Cheung, F. M. (2003). Prediction of performance facets using specific personality traits in the Chinese context. *Journal of Vocational Behavior, 63,* 99-110.

Laher, S. (2007). Personality reconceptualised: A Millonian approach? *South African Journal of Psychology, 37,* 82-95.

Laher, S. (2008). Structural equivalence and the NEO-PI-R: Implications for the applicability of the Five Factor Model of personality in an African context. *South African Journal of Industrial Psychology, 34,* 76-80.

Laher, S. (2010, August). *Personality theory and assessment research in South Africa: A review*. Paper presented at the 16th South African Psychology Congress, International Convention Centre, Durban, South Africa.

Laher, S. & Cockcroft, K. (in press). Introduction. In S. Laher & K. Cockcroft (Eds.), *Psychological assessment in South Africa: Research and applications.* Johannesburg: Wits University Press.

Laher, S. & Quy, G. (2009). Exploring the role of spirituality in the context of the Five Factor Model of personality in a South African sample. *Journal of Psychology in Africa, 19(4),* 513-521.

Lai, P. C. (1999). Loss of face, acculturation, self-esteem, and birth-order among Chinese-Americans. *Dissertation Abstracts International, 60*(6-B), 3018.

Larsen, R. J. & Buss, D. M. (2008). *Personality psychology: Domains about human nature.* Boston: McGraw-Hill.

Laungani, P. (1999). Cultural influences on identity and behaviour: India and Britain. In Y. T. Lee, C. R. McCauley & J. G. Draguns (Eds.), *Personality and person perception across cultures* (pp. 191-212). Mahwah, NJ: Lawrence Erlbaum Associates.

Ledesma, R. D. & Valero-Mora, P. (2007). Determining the number of factors to retain in EFA: An easy-to-use computer program for carrying out parallel analysis. *Practical Assessment, Research and Evaluation, 12,* 1-11.

Lee, Y. T., McCauley, C. R. & Draguns, J. G. (1999). *Personality and person perception across cultures.* Mahwah, NJ: Lawrence Erlbaum Associates.

Leech, N. L. & Onwuegbuzie, A. L. (2002). *A call for greater use of nonparametric statistics*. Paper presented at the Annual Meeting of the Mid-South Educational Research Association. Retrieved January 13, 2009 from: http://eric.ed.gov/PDFS/ED471346.pdf

Leibrandt, M., Woolard, I., Finn, A. & Argent, J. (2010). *Trends in South African income distribution and poverty since the fall of apartheid*. OECD Social, Employment and Migration Working Papers, No. 101.

Lipschultz, J. H., Hilt, M. L. & Mixan, C. R. (2000). A methodological note on mail survey response rates. *Psychological Reports, 86,* 1273-1274.

Lodhi, P. H., Deo, S. & Belhekar, V. M. (2002). The Five-Factor Model of personality: measurement and correlates in the Indian context. In R. R. McCrae & J. Allik (Eds.), *The Five-Factor Model of personality across cultures* (pp. 227-248). New York: Kluwer Academic.

Lönnqvist, J. E. L., Paunonen, S., Verkasalo, M., Leikas, S., Tuulio-Henriksson, A. & Lönnqvist, J. (2007). Personality characteristics of research volunteers. *European Journal of Personality, 21*, 1017-1030.

Louw, D. J. (2001). *Ubuntu and the challenges of multiculturalism in post-apartheid South Africa*. Retrieved January 25, 2007, from: http://www.phys.uu.nl/~unitwin/ubuntu.html.

Lowe, J. R. & Widiger, T. A. (2009). Clinicians' judgements of clinical utility: A comparison of the DSM-IV with dimensional models of general personality. *Journal of Personality Disorders, 23,* 211-229.

Luo, X., Kranzler, H. R., Zuo, L., Zhang, H., Wang, S. & Gelertner, J. (2007). CHRM2 variation predisposers to personality traits of Agreeableness and Conscientiousness. *Human Molecular Genetics, 16,* 1557-1568.

Ma, V. & Schoeneman, T. J. (1997). Individualism versus collectivism: A comparison of Kenyan and American self-concepts. *Basic and Applied Social Psychology, 19,* 261-73.

MacDonald, K. (1998). Evolution, culture and the Five-Factor Model. *Journal of Cross-Cultural Psychology, 29*, 119-149.

MacDonald, D. A. (2000). Spirituality: Description, measurement, and relation to the Five Factor Model of personality. *Journal of Personality, 68*, 153-197.

Maheshwari, N. & Kumar, V. (2008). Personal effectiveness as a function of psychological androgyny. *Industrial Psychiatry Journal, 17,* 39-45.

Marcus, B. & Schutz, A. (2005). Who are the people reluctant to participate in research? Personality correlates of four different types of nonresponse as inferred from self- and observer ratings. *Journal of Personality, 73,* 959-980.

Markus, H. R. & Kitayama, S. (1998). The cultural psychology of personality. *Journal of Cross-Cultural Psychology, 29,* 63-87.

Marx, C (2002). Ubu and Ubuntu: On the dialectics of apartheid and nation building. *Politikon: South African Journal of Political Studies, 29,* 49-69.

Matsimbi, W. E. (1997). *Cross-cultural generalisability of the Five Factor Model: A study on South African white collar males*. Unpublished master's dissertation, University of the Witwatersrand, Johannesburg.

Matsumoto, D. (2007) Some thoughts about teaching issues of culture in psychology. In S. A. Meyers & J. R. Stowell (Eds.), *Essays from e-xcellence in teaching (Vol. 7, pp. 14-17).*

Society for the Teaching of Psychology. Retrieved November 1, 2009, from: http://teachpsych.org/resources/e-books/eit2007/eit2007.php

Mayer, J. D. (1998). A systems framework for the field of personality. *Psychological Inquiry, 9*, 118-144.

Mayer, J. D. (2005). A tale of two visions: Can a new view of personality help integrate psychology? *American Psychologist, 60,* 294-307.

Mayring, P (2000). Qualitative content analysis. *Forum: Qualitative Social Research, 1,* 105-114.

Mazrui, A. A. & Levine, T. K. (1986). *The Africans: A reader.* New York: Praeger.

Mbeki, T. (2003). *The second economy, what it is and what is needed to meet the growth and development challenges it presents.* Address of the president to the National Council of Provinces (NCOP). Retrieved December 7, 2009, from: http://www.info.gov.za/speeches/2003/03111115461004.htm

McAdams, D. P. (1996). Personality, modernity and the storied self: A contemporary framework for studying persons. *Psychological Inquiry, 7*, 295-321.

McAdams, D. P. & Pals, J. L. (2006). A New Big Five: Fundamental principles for an Integrative Science of Personality. *American Psychologist,* 61, 204-217.

McAdams, D. P. & Walden, K. (2010). Jack Block, the Big Five, and personality from the standpoints of actor, agent, and author. *Psychological Inquiry, 21,* 50-56.

McCrae, R. R. (1996). Social consequences of experiential openness. *Psychological Bulletin, 120*, 323-337.

McCrae, R.R. (1999). Mainstream personality psychology and the study of religion. *Journal of Personality, 67*, 1209-1218.

McCrae, R. R. (2000). Trait psychology and the revival of personality and culture studies. *American Behavioral Scientist, 44*, 10-31.

McCrae, R. R. (2001). Trait psychology and culture: Exploring intercultural comparisons. *Journal of Personality, 69*, 819-846.

McCrae, R. R. (2002). NEO-PI-R data from 36 cultures: Further intercultural comparison. In R. R. McCrae & J. Allik. (Eds.), *The Five-Factor Model of personality across cultures* (pp. 105-125). New York: Kluwer Academic/Plenum.

McCrae, R. R. (2004). Human nature and culture: A trait perspective. *Journal of Research in Personality, 38,* 3-14.

McCrae, R. R. (2009). Personality profiles of cultures: Patterns of ethos. *European Journal of Personality,* 23, 205-227.

McCrae, R. R. & Allik, J. (2002). Introduction. In R. R. McCrae & J. Allik (Eds.), *The Five-Factor Model of personality across cultures* (pp. 1-5). New York: Kluwer Academic/Plenum.

McCrae, R. R. & Costa, P. T., Jr. (1996). Toward a new generation of personality theories: Theoretical contexts for the Five-Factor Model. In J. S. Wiggins (Ed.), *The Five-Factor Model of personality: Theoretical perspectives* (pp. 51-87). New York: Guilford Press.

McCrae, R. R. & Costa, P. T., Jr. (1997). Personality trait structure as a human universal. *American Psychologist, 52*, 509-516.

McCrae, R. R. & Costa, P. T., Jr. (2003). *Personality in adulthood: A Five-Factor Theory perspective* (2nd ed.). New York: Guilford Press.

McCrae, R. R. & Costa, P. T., Jr. (2004). Age differences in personality traits across cultures: Self-report and observer perspectives. *European Journal of Personality, 18,* 143-157.

McCrae, R. R. & Costa, P. T. Jr. (2008a). Empirical and theoretical status of the Five Factor Model of personality traits. In G. J. Boyle, G. Matthews & D. H. Saklofske (Eds.), *The SAGE handbook of personality theory and assessment* (pp. 273-294). London: SAGE Publications.

McCrae, R. R. & Costa, P. T., Jr. (2008b). The Five Factor Theory of personality. In O. P. John, R. W. Robins & L. A. Pervin (Eds.), *Handbook of personality: Theory and research* (3rd ed., pp. 157-180). New York: Guilford Press.

McCrae, R. R., Costa, P. T., Del Pilar, G. H., Rolland, J. P. & Parker, W. D. (1998). Cross-cultural assessment of the Five-Factor Model. *Journal of Cross-Cultural Psychology*, 29, 171-188.

McCrae, R. R., Costa, P. T. Jr. & Martin, T. A. (2005). The NEO-PI-3: A more readable revised NEO Personality Inventory. *Journal of Personality Assessment, 84*, 261-270.

McCrae, R. R., Terracciano, A. & 79 members of the Personality Profiles of Cultures Project. (2005a). Universal features of personality traits from the observer's perspective: Data from 50 cultures. *Journal of Personality and Social Psychology, 88*, 547-561.

McCrae, R. R., Terracciano, A. & 78 members of the Personality Profiles of Cultures Project. (2005b). Personality profiles of cultures: Aggregate personality traits. *Journal of Personality and Social Psychology, 89*, 407-425.

McCrae, R. R., Yik, M. S., Trapnell, P. D., Bond, M. H. & Paulhus, D. (1998). Interpreting personality profiles across cultures: Bilingual, acculturation, and peer rating studies of Chinese undergraduates. *Journal of Personality and Social Psychology, 74*, 1041-1055.

McCrae, R. R., Zonderman, A. B., Bond, M. H. & Paunonen, S. V. (1996). Evaluating replicability of factors in the Revised NEO Personality Inventory: Confirmatory factor analysis versus Procrustes rotation. *Journal of Social and Personality Psychology, 70,* 552-566.

Meehl, P. E. (1992). Factors and taxa, traits and types, differences of degree and differences in kind. *Journal of Personality, 60,* 117-174.

Meiring, D. (2006). *South African Personality Inventory Project*. Retrieved October 11, 2007, from: http://www.meiringd.co.za/sapi.htm

Meiring, D. (2008). *Bias and equivalence of psychological measures in South Africa.* Ridderkerk, the Netherlands: Labyrinth Publications.

Meiring, D. (2010, July). *The SAPI in South Africa.* Paper presented at the Annual Congress of the Society for Industrial/Organisational Psychology in South Africa, The Forum Campus, Bryanston, South Africa.

Meiring, D., Van de Vijver, F. J. & Rothmann, S. R. (2006). Bias in an adapted version of the 15FQ+ questionnaire in South Africa. *South African Journal of Psychology, 36*, 340-356.

Meiring, D., Van de Vijver, F., Rothmann, S. & Barrick, M. R. (2005). Construct, item and method bias of cognitive and personality tests in South Africa. *South African Journal of Industrial Psychology, 31*, 1-8.

Meyer, W., Moore, C. & Viljoen, H. (2003). *Personology: From individual to ecosystem.* Sandton: Heinemann Publishers.

Michalski, R. L. & Shackelford, T. K. (2010). Evolutionary personality psychology: Reconciling human nature and individual differences. *Personality and Individual Differences, 48,* 509-516.

Miller, T. R. (1991). The psychotherapeutic utility of the Five-Factor Model of personality: A clinician's experience. *Journal of Personality Assessment, 57,* 415-433.

Millon, T. (1990). *Toward a new personology: An evolutionary model.* New York: John Wiley & Sons.

Millon, T. (1999). Reflections on psychosynergy. *Journal of Personality Assessment, 72*, 437-456

Mischel, W. (1968). *Personality and assessment.* New York: Wiley.

Mkhize, N. J. (2004). *Culture and the self in moral and ethical decision-making: A dialogical approach*. Unpublished doctoral dissertation, University of KwaZulu-Natal.

Moerdyk, A. (2009). *The principles and practice of psychological assessment.* Pretoria: Van Schaik Publishers.

Mohammed, E. F., Unher, M. & Sugawara, M. (2009). Big Five personality factors: Cross-cultural comparison between Japanese and Egyptian students. *Acta Psychologica Sinica, 8*, 135-141.

Morasco, B. J., Gfeller, J. D. & Elder, A. K. (2007). The utility of the NEO-PI-R validity scales to detect response distortion: A comparison with the MMPI-2. *Journal of Personality Assessment, 88,* 276-283.

Mount, M. K., Barrick, M. R., Scullen, S. M. & Rounds, J. (2005). Higher-order dimensions of the Big Five personality traits and the Big Six vocational interest types. *Personnel Psychology, 58*, 447-478.

Mpofu, E. (2001). Exploring the self concept in African culture. *Journal of Genetic Psychology, 155*, 341-354.

Mulaik, S. A. (1972). *The foundations of factor analysis*. New York: McGraw-Hill.

Murray, H. A. (1938). *Explorations in personality.* New York: Oxford University Press.

Murphy, K. R. & Davidshofer, C. O. (2005). *Psychological testing: Principles and applications*. New Jersey: Prentice Hall.

Mwamwenda, T. S. (2004). *Educational psychology: An African perspective* (3rd. ed.) Sandton: Heinemann Publishers.

Naidoo, P., Townsend, L. & Carolissen, R. (2008). Mainstream theories and non-mainstream approaches to personality. In L. Swartz, C. de la Rey, N. Duncan & L. Townsend (Eds.), *Psychology: An introduction* (2nd ed., pp. 117-139). Cape Town: Oxford University Press.

Nel, J. A. (2008). *Uncovering personality dimensions in eleven different language groups in South Africa: An exploratory study*. Unpublished doctoral dissertation, University of the North-West, Potchefstroom.

Nell, V. (1999). Standardising the WAIS-III and the WMS-III for South Africa: Legislative, psychometric and policy issues. *South African Journal of Psychology, 29*, 128-137.

Norman, W. T. (1967). Toward an adequate taxonomy of personality attributes: Replicated factor structure in peer nomination personality ratings. *Journal of Abnormal and Social Psychology, 66,* 574-583.

Nunally, J. C. & Bernstein, I. H. (1994). *Psychometric theory.* New York: McGraw-Hill.

Nzimande, B. (1995, June). *To test or not to test?* Paper presented at the Congress on Psychometrics, Council for Scientific and Industrial Research, Pretoria.

O'Connor, B. (2000). SPSS and SAS programs for determining the number of components using parallel analysis and Velicer's MAP test. *Behavior Research Methods, Instruments and Computers, 32,* 396-402.

Office of the President. (1998). *Employment Equity Act* (Act No. 55, 1998). Government Gazette Vol. 400, No. 19370, 19 October 1998.

Ogbonnaya, A. O. (1994). Person as community: An African understanding of the person as an intrapsychic community. *Journal of Black Psychology, 20*, 75-87.

Okeke, B. I., Draguns, J. G., Sheku, B. & Allen, W. (1999). Culture, self and personality in Africa. In Y. T. Lee, C. R. McCauley & J. G. Draguns (Eds.), *Personality and person perception across cultures* (pp. 139-162). Mahwah, NJ: Lawrence Erlbaum Associates.

Oyserman, D., Coon, H. M. & Kemmelmeier, M. (2002). Rethinking Individualism and Collectivism: Evaluation of theoretical assumptions and meta-analyses. *Psychological Bulletin, 128,* 3-72.

Ozer, D. J. & Benet-Martinez, V. (2006). Personality and the predictions of consequential outcomes. *Annual Review of Psychology,* 57, 401-421.

Paranjpe, A. C. (1998). *Self and identity in modern psychology and Indian thought.* New York: Plenum.

Paranjpe, A. C. (2010). Theories of self and cognition. *Psychology and Developing Societies, 22,* 5-48.

Pargament, K. (1997). *The psychology of religion and coping: Theory, research, practice.* New York: Guilford Press.

Paunonen, S. V. & Ashton, M. C. (1998). The structured assessment of personality across cultures. *Journal of Cross-Cultural Psychology, 29,* 150-170.

Paunonen, S. V. & Jackson, D. N. (2000). What is beyond the Big Five? Plenty! *Journal of Personality, 68*, 821-836.

Paunonen, S. V., Jackson, D. N., Trzebinski, J. & Forsteling, F. (1992). Personality structure across cultures: A multimethod evaluation. *Journal of Personality and Social Psychology, 62,* 447-456.

Paunonen, S. V., Zeidner, M., Engvik, H. A., Oosterveld, P. & Maliphant, R. (2000). The nonverbal assessment of personality in five cultures*. Journal of Cross-Cultural Psychology, 31*, 220-239.

Pervin, L. A. (1994). A critical analysis of current trait theory. *Psychological Inquiry, 5,* 103-113.

Pervin, L. A. (1999). The cross-cultural challenge to personality. In Y. T. Lee, C. R. McCauley & J. G. Draguns (Eds.), *Personality and person perception across cultures* (pp. 23-44)*.* Mahwah, NJ: Lawrence Erlbaum Associates.

Pervin, L. A. & John, O. P. (2001). *Personality: Theory and research* (8th ed.). New York: Wiley.

Piedmont, R. L. (1999). Does spirituality represent the sixth factor of personality? Spiritual transcendence and the Five-Factor Model. *Journal of Personality, 67*, 985-1013.

Piedmont, R. L., Bain, E., McCrae, R. R. & Costa, P. T., Jr. (2002). The applicability of the Five Factor Model in a sub-Saharan culture: The NEO-PI-R in Shona. In R. R. McCrae & J. Allik (Eds.), *The Five-Factor Model of personality across cultures* (pp. 155-174). New York: Kluwer Academic.

Philip, K. & Hassen, E. (2008). *The review of the Second Economy Programmes: An overview for the Presidency's 15 Year Review.* Pretoria: Trade and Industrial Policy Secretariat.

Poortinga, Y. H. (1989). Equivalence of cross-cultural data: An overview of basic issues. *International Journal of Psychology, 24,* 737-756.

Poortinga, Y. H., Van de Vijver, F. & Van Hemert, D. A. (2002). Cross cultural equivalence of the Big Five: A tentative interpretation of the evidence. In R. R. McCrae & J. Allik (Eds.), *The Five-Factor Model of personality across cultures* (pp. 281-303). New York: Kluwer Academic.

Presidency. (2007). *Towards a fifteen year review.* Pretoria: Government Communication and Information Service.

Project Literacy. (2010). *Project Literacy: Leaders in Adult Learning.* Retrieved, July 3, 2010, from: http://www.projectliteracy.org.za/

Quirk, S. W., Christiansen, N. D., Wagner, S. H. & McNutty, J. L. (2003). On the usefulness of measures of normal personality for clinical assessment: Evidence for the incremental validity of the Revised NEO Personality Inventory. *Psychological assessment, 15,* 311-325.

Quy, G. (2007). T*he Five-Factor Model of personality and spirituality*. Unpublished honour's research report (Psychology), University of the Witwatersrand, Johannesburg.

Retief, A. (1992). The cross-cultural utility of the SAPQ – Bias or fruitful difference? *South African Journal of Psychology, 22,* 202-207.

Ritts, V. (2001). *Personality, the self and culture*. Retrieved February 12, 2003, from: http://www.stlcc.cc.mo.us/mc/users/vritts/self.html

Rolland, J. P. (2002). Cross-cultural generalizability of the Five Factor Model of personality. In R. R. McCrae & J. Allik (Eds.), *The Five-Factor Model of personality across cultures* (pp. 7-28). New York: Kluwer Academic.

Rosenthal, R. & Rosnow, R. L. (1991). *Essentials of behavior research: Methods and data analyses*. New York: McGraw-Hill.

Rossier, J., Dahourou, D. & McCrae, R. R. (2005). Structural and mean level analyses of the Five-Factor Model and Locus of Control: Further evidence from Africa. *Journal of Cross-Cultural Psychology, 36,* 227–246.

Rothman, S. & Coetzer, E. P. (2003). The Big Five personality dimensions and job performance. *South African Journal of Industrial Psychology, 29*, 68-74.

Rushton, J. P. & Irwing, P. (2008). A General Factor of Personality (GFP) from two meta-analyses of the Big Five: Digman (1997) and Mount, Barrick, Scullen, and Rounds (2005). *Personality and Individual Differences, 45,* 679-683.

Ryckman, R. (2008). *Theories of personality*. Belmont, CA: Wadsworth.

Saroglou, V. (2002). Religion and the Five Factors of personality: A meta-analytic review. *Personality and Individual Differences, 32,* 15-25.

Saucier, G. (1997). Effects of variable selection on the factor structure of person descriptors. *Journal of Personality and Social Psychology, 73*, 1296-1312.

Schroeder, M. L., Wormworth, J. A. & Livesley, W. J. (1992). Dimensions of personality disorder and their relationships to the Big Five dimensions of personality. *Psychological Assessment, 4,* 47-53.

Schultz, P. & Schultz, S. E. (2009). *Theories of personality* (9th ed.). Belmont, CA: Wadsworth.

Seekings, J. & Nattrass, N. (2006). *Class, race, and inequality in South Africa.* Scottsville: UKZN Press.

Segall, M. H., Dasen, P. R., Berry, J. W. & Poortinga, Y. H. (1999). *Human behavior in global perspective* (2nd ed.). Boston: Allyn & Bacon.

Segall, M. H., Lonner, W. J. & Berry, J. W. (1998). Cross-cultural psychology as a scholarly discipline: On the flowering of culture in behavioral research. *American Psychologist*, *53*, 1111-1120.

Sehlapelo, M. & Terre Blanche, M. (1996). Psychometric testing in South Africa: Views from above and below. *Psychology in Society, 21*, 49-59.

Shillington, S. J. (1988). *An Afrikaans MMPI: Some variables which affect the response of normal Afrikaans population.* Unpublished doctoral dissertation, University of Port Elizabeth.

Shutte, A. (2001). *Ubuntu: An ethic for a new South Africa*. Pietermaritzburg: Cluster Publications.

Shuttleworth-Edwards, A.B., Gaylard, E.K. & Radlof, S.E. (in press a). WAIS-III test performance in a SA context: Extension of an existing cross-cultural normative database. In S. Laher & K. Cockcroft (Eds.), *Psychological assessment in South Africa: Research and applications.* Johannesburg: Wits University Press.

Shuttleworth-Edwards, A.B., Van der Merwe, H. & Radlof, S.E. (in press b). WISC-IV test performance in a South African context: A collation of cross-cultural norms. In S. Laher & K. Cockcroft (Eds.), *Psychological assessment in South Africa: Research and applications.* Johannesburg: Wits University Press.

Shuttleworth-Jordan, A. B. (1996). On not reinventing the wheel: A clinical perspective on culturally relevant test usage in South Africa. *South African Journal of Psychology, 26*, 96-106.

Singer, J. A. (2005). *Personality and psychotherapy: Treating the whole person*. New York: Guilford Press.

Skinner, C. & Valodia, I. (2006). Two economies: Mistaken idea. *South African Labour Bulletin, 30*, 57-60.

Sow, A. I. (1980). *Anthropological structures of madness in Black Africa*. New York: International Universities Press.

Statistics South Africa (2001). *Census 2001*. Retrieved May 21, 2010, from: http://www.statsa.gov.za/publications/populationstats.asp

Statistics South Africa. (2009). *Mid-year population estimates 2009*. Retrieved May 21, 2010, from: http://www.statsa.gov.za/publications/populationstats.asp

Stephenson, J. T. (1997). Characteristic response patterns in firstborns and thirdborns: An application of the systems theory of birth order. *Dissertation Abstracts International, 58*(5-B), 2737.

Stevens, G. (2008). Ethnicity. In L. Swartz, C. de la Rey, N. Duncan & L. Townsend (Eds.), *Psychology: An introduction* (2nd ed., pp. 321-333). Cape Town: Oxford University Press.

Storm, K. & Rothmann, S. (2003). The relationship between burnout, personality traits and coping strategies in a corporate pharmaceutical group. *South African Journal of Industrial Psychology, 29*, 35-42.

Sulloway, F. J. (1996). *Born to rebel: Birth order, family dynamics and creative lives*. New York: Pantheon Books.

Swanson, S. (2007). Ubuntu: An African contribution to (re) research for/with a humble togetherness. *Journal of Contemporary Issues in Education, 2,* 53-67.

Taylor, A. & MacDonald, D. A. (1999). Religion and the Five-Factor Model of

personality: An exploratory investigation using a Canadian university sample. *Personality and Individual Difference, 27,* 1243-1259.

Taylor, I. A. (2000). *The construct comparability of the NEO-PI-R questionnaire for black and white employees*. Unpublished doctoral dissertation, University of the Orange Free State, Bloemfontein.

Taylor, N. (2004) *The construction of a South African Five Factor personality questionnaire.* Unpublished master's dissertation, Rand Afrikaans University, Johannesburg.

Taylor, N. & De Bruin, G. P. (2005). *Basic Traits Inventory: Technical manual.* Johannesburg: Jopie van Rooyen & Partners, SA.

Taylor, T. R. & Boeyens, J. C. A. (1991). The comparability of the scores of Blacks and Whites on the South African personality questionnaire: An exploratory study. *South African Journal of Psychology, 21,* 1-11.

Teferi, T. B. (2004). *The application of the NEO-PI-R in the Eritrean context*. Unpublished master's dissertation (research psychology), University of the Witwatersrand, Johannesburg.

Terracciano, A., Costa, P. T., Jr. & McCrae, R. R. (2006). Personality plasticity after age 30. *Personality and Social Psychology Bulletin, 32*, 999-1009.

Terracciano, A., McCrae, R. R., Brant, L. J. & Costa, P. T., Jr. (2005). Hierarchical linear modeling analyses of NEO-PI-R scales in the Baltimore Longitudinal Study of Aging. *Psychology and Aging, 20*, 493-506.

Terre Blanche, M., Durrheim, K. & Painter, D. (2008). *Research in practice* (2nd ed.). Cape Town: UCT Press.

Triandis, H. C. (1972). *The analysis of subjective culture*. New York: John Wiley.

Triandis, H. C. (1989). The self and social behavior in differing contexts. *Psychological Review, 96,* 508-520.

Triandis, H. C. (2001). Individualism-Collectivism and personality. *Journal of Personality, 69*, 907-924.

Triandis, H. C. & Gelfand, M. J. (1998). Converging measurement of horizontal and vertical individualism and collectivism. *Journal of Personality and Social Psychology. 74*, 118-128.

Triandis, H. C., Leung, K., Villareal, M. J. & Clack, F. L. (1985). Allocentric versus idiocentric tendencies: Convergent and discriminant validation. *Journal of Research in Personality, 19,* 395-415.

Triandis, H. C., McCusker, C. & Hui, C. H. (1990). Multimethod probes of Individualism and Collectivism. *Journal of Personality & Social Psychology, 59*, 1006-1020.

Triandis, H. C. & Suh, E. M. (2002). Cultural influences on personality. *Annual Review of Psychology, 50*, 133-160.

Trull, T. J., Useda, J. D., Costa, P. T. & McCrae, R. R. (1995). Comparison of the MMPI-2 Personality Psychology Five (PSY-5), The NEO PI and the NEO PI-R. *Psychological Assessment, 7,* 508-516.

Tutu, D. (1999). *No future without forgiveness.* New York: Doubleday.

Van der Berg, S., Burger, R. & Louw, M. (2010). Post-apartheid South Africa: Poverty and distribution. In Nissanke, M. & Thorbecke, E. (Eds.). *Trends in an Era of Globalization: The Poor under Globalization in Africa, Asia, and Latin America*. Oxford: Oxford University Press.

Van de Vijver, F. & Leung, K. (1997). *Methods and data analysis for cross cultural research*. Newbury Park, CA: SAGE Publications.

Van de Vijver, F. & Phalet, K. (2004). Assessment in multicultural groups: The role of acculturation. *Applied Psychology: An International Review, 53*, 215-236.

Van de Vijver, F. & Rothmann, S. (2004). Assessment in multicultural groups: The South African case. *South African Journal of Industrial Psychology, 30,* 1-7.

Van de Vijver, F. & Tanzer, N. K. (1997). Bias and equivalence in cross-cultural assessment: An overview. *European Review of Applied Psychology, 47,* 263-280.

Van Dyk, G. A. J. & De Kock, F. S. (2004). The relevance of the Individualism-Collectivism (IC) factor for the management of diversity in the South African National Defence Force. *South African Journal of Industrial Psychology, 30,* 90-95.

Van Eeden, R. & Mantsha, T. (2007). Theoretical and methodological considerations in the translation of the 16PF5 into an African language. *South African Journal of Psychology, 37*, 62-81.

Van Eeden, R. & Prinsloo, C. H. (1997). Using the South African version of the 16PF in a multicultural context. *South African Journal of Psychology, 27*, 151-159.

Velicer, W. F. (1976). Determining the number of components from the matrix of partial correlations. *Psychometrika, 41,* 321-327.

Verheul, R. (2005). Clinical utility of dimensional models for personality pathology. *Journal of Personality Disorders, 19*, 283-303.

Vogt, L. & Laher, S. (2009). The relationship between individualism/collectivism and the Five Factor Model of personality: An exploratory study. *Psychology in Society, 37,* 39-54.

Weiten, W. (2009). *Psychology: Themes and variations*. Belmont, CA: Brooks/Cole.

Whitley, B. E. (2002). *Principles of research and behavioral science.* Boston: McGraw-Hill.

Widiger, T. A., Costa, P. T., Jr. & McCrae, R. R. (2002). A proposal for Axis II: Diagnosing personality disorders using the Five-Factor Model. In P. T. Costa, Jr. & T. A. Widiger (Eds.), *Personality disorders and the Five-Factor Model of personality* (2nd ed., pp. 431-456). Washington, DC: American Psychological Association.

Wiggins, J. S. (1996). *The Five-Factor Model of personality: Theoretical perspectives.* New York: Guilford Press.

Wiggins, J. S. & Trapnell, P. D. (1996). A dyadic-interactional perspective on the Five-Factor Model. In J. S. Wiggins (Ed.), *The Five Factor Model of personality: Theoretical perspectives* (pp. 88-162). New York: Guilford Press.

Wrigley, C. S. & Neuhaus, J. O. (1955). The matching of two sets of factors. *American Psychologist, 10,* 418-419.

Yamagata, S., Suzuki, A., Ando, J., Ono, Y., Kijima, N., Yoshimura, K., et al. (2006). Is the genetic structure of human personality universal? A cross-cultural twin study from North America, Europe and Asia. *Journal of Personality and Social Psychology, 90*, 987-998.

Yang, K-S. & Bond, M. H. (1990). Exploring implicit personality theories with indigenous or imported constructs: The Chinese case. *Journal of Personality and Social Psychology, 58,* 1087-1095.

Yik, M. S. & Bond, M. H. (1993). Exploring the dimensions of Chinese person perception with indigenous and imported constructs: Creating a culturally balanced scale. *International Journal of Psychology, 2,* 79-95.

Zhang, L-F. & Akande, A. (2002). What relates to the Big Five among South African university students? *IFE PsychologIA: An International Journal, 10,* 49-74.

APPENDIX A: QUESTIONNAIRE USED IN THIS STUDY

Psychology
School of Human & Community Development
University of the Witwatersrand
Private Bag 3, WITS, 2050
Tel: (011) 717 4500 Fax: (011) 717 4559

Dear Sir / Madam

Hi! I am currently completing my PhD at the University of the Witwatersrand and am conducting research into personality theory and personality assessment. Part of this research requires your responses on the questionnaire below. It should take you approximately 1½ hours to complete the questionnaire. I understand that this is a substantial investment of your time. However your response is valuable as it will contribute towards a South African understanding of personality and will have an impact on research nationally and internationally. I would therefore like to invite you to participate in this research.

Your responses will remain confidential and anonymity is guaranteed. At no time will I know who you are since the questionnaire requires no identifying information. Completion and return of the questionnaire will be considered to indicate permission for me to use your responses for the research project. Should you choose not to participate, this will not be held against you in any way. As I am only interested in group trends, and have no way of linking any individual's identity to a particular questionnaire, I will not be able to give you individual feedback. You may visit the psychology website (http://www.umthombo.wits.ac.za/psychology) approximately 9 months after completion of this questionnaire should you require general feedback on the results of this study. All raw data will be retained in a locked cupboard for three years and will be destroyed thereafter. If you have any further questions or require feedback on the progress of the research, please feel free to contact me. My contact details appear below my signature.

Thank you for considering taking part in the research project. Please detach and keep this sheet.

_____

Ms. S. Laher
011 717 4532 / sumaya.laher@wits.ac.za

Demographic Information

(Please cross the option that applies to you, where appropriate)

1. Age: _____

2. Gender: MALE FEMALE

3. Population group:

(This specific response is required for purposes of this research and is not meant to offend any research participant)

BLACK COLOURED INDIAN WHITE OTHER

If other, please specify _____

4. Religious Affiliation:

CHRISTIANITY HINDUISM ISLAM

JUDAISM TRADITIONAL AFICAN RELIGION

NO RELIGIOUS AFFILIATION OTHER

If other, please specify _____

5. Home language:

AFRIKAANS ENGLISH isiNDEBELE sePEDI

sISWATI seSOTHO xiTSONGA seTSWANA

tshiVENDA isiXHOSA isiZULU OTHER

If other, please specify:_____

6. If English is not your home language, please rate your English reading skills with 1 being ‘not so good’ and 5 being ‘excellent’.

1	2	3	4	5

7. If English is not your home language, please rate your English understanding/ comprehension skills with 1 being ‘not so good’ and 5 being ‘excellent’.

1	2	3	4	5

8. Have you ever taken a psychological test before? YES NO

9. If yes, can you rate your familiarity with psychological testing processes from 1 to 5 with 1 being ‘somewhat familiar’ and 5 being ‘very familiar’.

1	2	3	4	5

This questionnaire contains 240 statements. Please read each item carefully and place a cross (X) on the answer that best corresponds to your agreement or disagreement. The responses range from 0 to 4 with 0 indicating ‘Strongly Disagree’ and 4 indicating ‘Strongly Agree’. There are no right or wrong answers, and you do not need to be an ‘expert’ to complete this questionnaire. Describe yourself honestly and state your opinions as accurately as possible. Please answer every item.

At any point if you **do not understand any item or word, please <u>underline</u>** the item or word. If you think an item is **inappropriate, please ~~cross out~~** the item.[1]

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If you identified any items or words you did not understand, briefly indicate why they were difficult to understand.

_____
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_____

If you identified any items as inappropriate, briefly indicate why they were inappropriate.

_____
_____
_____
_____

Did this instrument appear to be measuring personality? YES NO

Briefly substantiate your answer.

_____
_____
_____

The following questionnaire contains a number of items relevant to your personality characteristics. Please consider each item and decide if the content correctly describes your personality characteristics. If it does, please place a cross (X) on the 'True' answer. If not, please place a cross (X) on the 'False' answer. There are no correct or wrong answers. Please answer all questions honestly.

At any point if you **do not understand any item or word, please <u>underline</u>** the item or word. If you think an item is **inappropriate, please ~~cross out~~** the item.[2]

CPAI-2 NOT INCLUDED DUE TO COPYRIGHT RESTRICTIONS

2 This questionnaire is adapted from Cross-Cultural (Chinese) Personality Assessment Inventory-2 (CPAI-2) ©2001 The Chinese University of Hong Kong & Institute of Psychology, Academia Sinica, China Fanny M. Cheung, Kwok Leung, Song Weizheng, and Zhang Jianxin (The Author) All rights reserved. No parts of this publication may be reproduced or distributed in any form or by any means, or stored in a database or retrieval system, without the prior written permission of the Author.

If you identified any items or words you did not understand, briefly indicate why they were difficult to understand.

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If you identified any items as inappropriate, briefly indicate why they were inappropriate.

_____
_____
_____
_____

Did this instrument appear to be measuring personality? YES NO

Briefly substantiate your answer.

_____
_____
_____

THANK YOU FOR YOUR CO-OPERATION!

APPENDIX B: TEST-RETEST QUESTIONNAIRE USED IN THIS STUDY

Psychology
School of Human & Community Development
University of the Witwatersrand
Private Bag 3, WITS, 2050
Tel: (011) 717 4500 Fax: (011) 717 4559

Dear Sir / Madam

Hi! I am currently completing my PhD at the University of the Witwatersrand and am conducting research into personality theory and personality assessment. Part of this research requires your responses on the questionnaire below. It should take you approximately 1½ hours to complete the questionnaire. Since I am interested in the stability of responses you will need to complete the questionnaire twice over a three week interval. I understand that this is a substantial investment of your time. However your response is valuable as it will contribute towards a South African understanding of personality and will have an impact on research nationally and internationally. In order to acknowledge your contribution, you will receive an honorarium of R50-00 on completion of the second questionnaire. I would therefore like to invite you to participate in this research.

Your responses will remain confidential and anonymity is guaranteed. At no time will I know who you are since the questionnaire requires no identifying information. You are only required to fill in a unique four digit number which I will use to match responses. Completion and return of the questionnaire will be considered to indicate permission for me to use your responses for the research project. Should you choose not to participate, this will not be held against you in any way. As I am only interested in group trends, I will not be able to give you individual feedback. You may visit the psychology website (http://web.wits.ac.za/academic/humanities/ umthombo/psychology.htm) approximately 9 months after completion of this questionnaire should you require general feedback on the results of this study. All raw data will be retained in a locked cupboard for three years and will be destroyed thereafter. If you have any further questions or require feedback on the progress of the research, please feel free to contact me. My contact details appear below my signature.

Thank you for considering taking part in the research project. Please detach and keep this sheet.

_____

Ms. S. Laher
011 717 4532 / Sumaya.laher@wits.ac.za

Four digit number ☐

Demographic Information

(Please cross the option that applies to you, where appropriate)

1. Age: _____

2. Gender: ☐ MALE ☐ FEMALE

3. Population group:

(This specific response is required for purposes of this research and is not meant to offend any research participant)

☐ BLACK ☐ COLOURED ☐ INDIAN ☐ WHITE ☐ OTHER

If other, please specify _____

4. Religious Affiliation:

☐ CHRISTIANITY ☐ HINDUISM ☐ ISLAM

☐ JUDAISM ☐ TRADITIONAL AFICAN RELIGION

☐ NO RELIGIOUS AFFILIATION ☐ OTHER

If other, please specify _____

5. Home language:

☐ AFRIKAANS ☐ ENGLISH ☐ isiNDEBELE ☐ sePEDI

☐ sISWATI ☐ seSOTHO ☐ xiTSONGA ☐ seTSWANA

☐ tshiVENDA ☐ isiXHOSA ☐ isiZULU ☐ OTHER

If other, please specify:_____

6. If English is not your home language, please rate your English reading skills with 1 being ‘not so good’ and 5 being ‘excellent’.

1	2	3	4	5

7. If English is not your home language, please rate your English understanding/ comprehension skills with 1 being ‘not so good’ and 5 being ‘excellent’.

1	2	3	4	5

8. Have you ever taken a psychological test before? YES NO

9. If yes, can you rate your familiarity with psychological testing processes from 1 to 5 with 1 being ‘somewhat familiar’ and 5 being ‘very familiar’.

1	2	3	4	5

This questionnaire contains 240 statements. Please read each item carefully and place a cross (X) on the answer that best corresponds to your agreement or disagreement. The responses range from 0 to 4 with 0 indicating ‘Strongly Disagree’ and 4 indicating ‘Strongly Agree’. There are no right or wrong answers, and you do not need to be an ‘expert’ to complete this questionnaire. Describe yourself honestly and state your opinions as accurately as possible. Please answer every item.

At any point if you **do not understand any item or word, please <u>underline</u>** the item or word. If you think an item is **inappropriate, please ~~cross out~~** the item.[1]

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If you identified any items or words you did not understand, briefly indicate why they were difficult to understand.

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If you identified any items as inappropriate, briefly indicate why they were inappropriate.

_____
_____
_____
_____

Did this instrument appear to be measuring personality? YES NO

Briefly substantiate your answer.

_____
_____
_____

The following questionnaire contains a number of items relevant to your personality characteristics. Please consider each item and decide if the content correctly describes your personality characteristics. If it does, please place a cross (X) on the 'True' answer. If not, please place a cross (X) on the 'False' answer. There are no correct or wrong answers. Please answer all questions honestly.

At any point if you **do not understand any item or word, please <u>underline</u>** the item or word. If you think an item is **inappropriate, please ~~cross out~~** the item.[2]

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If you identified any items or words you did not understand, briefly indicate why they were difficult to understand.

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If you identified any items as inappropriate, briefly indicate why they were inappropriate.

_____
_____
_____
_____

Did this instrument appear to be measuring personality? YES NO

Briefly substantiate your answer.

_____
_____
_____

THANK YOU FOR YOUR CO-OPERATION!

APPENDIX C: ANOVA RESULTS FOR GENDER AND THE NEO-PI-R ITEMS

Item	Facet	Domain	DF	f	P
1.	Anxiety	N	1.417	14.18	0.0002
2.	Angry Hostility	N	1.421	12.49	0.0005
3.	Depression	N	1.411	3.04	0.0820
4.	Self-Consciousness	N	1.419	0.12	0.7278
5.	Impulsivity	N	1.418	1.39	0.2387
6.	Vulnerability	N	1.423	3.01	0.0836
7.	Warmth	E	1.422	0.02	0.8862
8.	Gregariousness	E	1.406	0.00	0.9909
9.	Assertiveness	E	1.412	1.17	0.2794
10.	Activity	E	1.419	1.17	0.2795
11.	Excitement-Seeking	E	1.422	0.79	0.3741
12.	Positive Emotions	E	1.416	1.41	0.2363
13.	Fantasy	O	1.417	0.00	0.9696
14.	Aesthetics	O	1.422	18.30	<0.0001
15.	Feelings	O	1.422	12.95	0.0004
16.	Actions	O	1.415	3.82	0.0513
17.	Ideas	O	1.419	13.63	0.0003
18.	Values	O	1.418	1.21	0.2724
19.	Trust	A	1.421	1.87	0.1718
20.	Straightforwardness	A	1.404	2.13	0.4530
21.	Altruism	A	1.416	1.30	0.2552
22.	Compliance	A	1.421	0.27	0.6028
23.	Modesty	A	1.420	10.50	0.0013
24.	Tender-Mindedness	A	1.421	23.14	<0.0001
25.	Competence	C	1.423	1.32	0.2513
26.	Order	C	1.422	3.24	0.0726
27.	Dutifulness	C	1.423	11.74	0.0007
28.	Achievement Striving	C	1.422	2.84	0.0924
29.	Self-Discipline	C	1.421	0.80	0.3709
30.	Deliberation	C	1.419	0.93	0.3356
31.	Anxiety	N	1.423	15.93	<0.0001
32.	Angry Hostility	N	1.422	4.23	0.0404
33.	Depression	N	1.421	0.15	0.6961
34.	Self-Consciousness	N	1.419	0.43	0.5126
35.	Impulsivity	N	1.421	3.94	0.0479
36.	Vulnerability	N	1.420	0.06	0.8066
37.	Warmth	E	1.421	1.96	0.1625
38.	Gregariousness	E	1.422	0.03	0.8637
39.	Assertiveness	E	1.421	7.83	0.0054
40.	Activity	E	1.420	4.23	0.0403
41.	Excitement-Seeking	E	1.418	7.51	0.0064
42.	Positive Emotions	E	1.418	3.48	0.0630
43.	Fantasy	O	1.422	2.45	0.1182

44.	Aesthetics	O	1.418	2.49	0.1152
45.	Feelings	O	1.420	5.87	0.0158
46.	Actions	O	1.422	3.46	0.0634
47.	Ideas	O	1.416	0.07	0.7943
48.	Values	O	1.423	4.77	0.0296
49.	Trust	A	1.419	5.33	0.0214
50.	Straightforwardness	A	1.423	0.41	0.5245
51.	Altruism	A	1.421	1.97	0.1615
52.	Compliance	A	1.420	0.00	0.9940
53.	Modesty	A	1.422	2.53	0.1122
54.	Tender-Mindedness	A	1.422	2.83	0.0934
55.	Competence	C	1.423	1.26	0.2629
56.	Order	C	1.423	3.08	0.0798
57.	Dutifulness	C	1.421	1.24	0.2658
58.	Achievement Striving	C	1.422	2.50	0.1145
59.	Self-Discipline	C	1, 422	0.37	0.5361
60.	Deliberation	C	1.422	1.23	0.2671
61.	Anxiety	N	1.420	11.07	0.0010
62.	Angry Hostility	N	1.420	5.25	0.0225
63.	Depression	N	1.420	1.77	0.1840
64.	Self-Consciousness	N	1.423	0.95	0.3300
65.	Impulsivity	N	1.422	0.36	0.5476
66.	Vulnerability	N	1.423	1.18	0.2779
67.	Warmth	E	1.422	0.03	0.8686
68.	Gregariousness	E	1.420	49.27	<0.0001
69.	Assertiveness	E	1.422	0.04	0.0028
70.	Activity	E	1.413	0.23	0.6348
71.	Excitement-Seeking	E	1.421	0.21	0.6442
72.	Positive Emotions	E	1.422	0.14	0.7040
73.	Fantasy	O	1.423	2.25	0.1343
74.	Aesthetics	O	1.423	10.35	0.0014
75.	Feelings	O	1.421	5.06	0.0250
76.	Actions	O	1.420	1.26	0.2621
77.	Ideas	O	1.422	0.26	0.6133
78.	Values	O	1.419	7.83	0.0054
79.	Trust	A	1.422	0.45	0.5004
80.	Straightforwardness	A	1.421	1.99	0.1590
81.	Altruism	A	1.422	0.71	0.4002
82.	Compliance	A	1.423	0.20	0.6549
83.	Modesty	A	1.422	0.08	0.7733
84.	Tender-Mindedness	A	1.419	9.86	0.0018
85.	Competence	C	1.421	14.03	0.0002
86.	Order	C	1.421	24.66	<0.0001
87.	Dutifulness	C	1.422	0.03	0.8579
88.	Achievement Striving	C	1.423	1.88	0.1713
89.	Self-Discipline	C	1.422	1.07	0.3026
90.	Deliberation	C	1.422	0.42	0.5186
91.	Anxiety	N	1.423	1.42	0.2340

92.	Angry Hostility	N	1.422	7.48	0.0065
93.	Depression	N	1.423	1.38	0.2402
94.	Self-Consciousness	N	1.423	3.32	0.0691
95.	Impulsivity	N	1.423	1.74	0.1873
96.	Vulnerability	N	1.421	0.06	0.8130
97.	Warmth	E	1.421	3.08	0.0800
98.	Gregariousness	E	1.420	0.08	0.7766
99.	Assertiveness	E	1.422	3.63	0.0575
100.	Activity	E	1.423	2.84	0.0925
101.	Excitement-Seeking	E	1.422	0.80	0.3718
102.	Positive Emotions	E	1.422	7.03	0.0083
103.	Fantasy	O	1.420	2.89	0.0897
104.	Aesthetics	O	1.423	9.18	0.0026
105.	Feelings	O	1.416	2.39	0.1229
106.	Actions	O	1.423	17.01	<0.0001
107.	Ideas	O	1.422	1.19	0.2764
108.	Values	O	1.422	0.09	0.7625
109.	Trust	A	1.423	0.59	0.4434
110.	Straightforwardness	A	1.421	14.31	0.0002
111.	Altruism	A	1.422	3.89	0.0494
112.	Compliance	A	1.422	9.24	0.0025
113.	Modesty	A	1.423	3.98	0.0466
114.	Tender-Mindedness	A	1.423	5.53	0.0192
115.	Competence	C	1.419	0.87	0.3510
116.	Order	C	1.420	4.32	0.0384
117.	Dutifulness	C	1.416	16.18	<0.0001
118.	Achievement Striving	C	1.418	8.44	0.0039
119.	Self-Discipline	C	1.286	2.09	0.1494
120.	Deliberation	C	1.422	0.00	0.9942
121.	Anxiety	N	1.409	2.25	0.1342
122.	Angry Hostility	N	1.423	5.73	0.0171
123.	Depression	N	1.422	0.09	0.7665
124.	Self-Consciousness	N	1.423	0.23	0.6328
125.	Impulsivity	N	1.419	0.32	0.5728
126.	Vulnerability	N	1.421	0.06	0.8024
127.	Warmth	E	1.422	0.31	0.5765
128.	Gregariousness	E	1.422	8.99	0.0029
129.	Assertiveness	E	1.422	2.42	0.1202
130.	Activity	E	1.422	6.69	0.0100
131.	Excitement-Seeking	E	1.423	1.20	0.2737
132.	Positive Emotions	E	1.422	1.17	0.2791
133.	Fantasy	O	1.423	13.29	0.0003
134.	Aesthetics	O	1.422	1.47	0.2267
135.	Feelings	O	1.422	0.64	0.4228
136.	Actions	O	1.421	3.77	0.0529
137.	Ideas	O	1.420	0.59	0.4433
138.	Values	O	1.421	0.23	0.6323
139.	Trust	A	1.419	0.92	0.3373

140.	Straightforwardness	A	1.420	3.25	0.0723
141.	Altruism	A	1.421	0.51	0.4773
142.	Compliance	A	1.419	1.88	0.1707
143.	Modesty	A	1.421	0.01	0.9123
144.	Tender-Mindedness	A	1.419	22.49	<0.0001
145.	Competence	C	1.421	0.75	0.3872
146.	Order	C	1.423	15.53	<0.0001
147.	Dutifulness	C	1.419	2.22	0.1371.
148.	Achievement Striving	C	1.422	0.06	0.8028
149.	Self-Discipline	C	1.422	3.15	0.0767
150.	Deliberation	C	1.423	0.03	0.8603
151.	Anxiety	N	1.423	5.54	0.0191
152.	Angry Hostility	N	1.423	0.15	0.6997
153.	Depression	N	1.423	0.02	0.8973
154.	Self-Consciousness	N	1.422	1.53	0.2163
155.	Impulsivity	N	1.421	0.00	0.9634
156.	Vulnerability	N	1.421	2.63	0.1054
157.	Warmth	E	1.422	2.31	0.1294
158.	Gregariousness	E	1.421	0.50	0.4792
159.	Assertiveness	E	1.422	9.83	0.0018
160.	Activity	E	1.366	1.55	0.2132
161.	Excitement-Seeking	E	1.420	10.54	0.0013
162.	Positive Emotions	E	1.421	0.95	0.3311
163.	Fantasy	O	1.421	1.04	0.3083
164.	Aesthetics	O	1.421	1.85	0.1750
165.	Feelings	O	1.419	0.47	0.4919
166.	Actions	O	1.423	2.43	0.1199
167.	Ideas	O	1.423	3.43	0.0648
168.	Values	O	1.422	18.36	<0.0001
169.	Trust	A	1.422	2.69	0.1015
170.	Straightforwardness	A	1.423	11.82	0.0006
171.	Altruism	A	1.415	0.97	0.3241
172.	Compliance	A	1.419	5.51	0.0193
173.	Modesty	A	1.418	0.34	0.5629
174.	Tender-Mindedness	A	1.421	3.21	0.0739
175.	Competence	C	1.422	0.33	0.5662
176.	Order	C	1.421	4.09	0.0439
177.	Dutifulness	C	1.421	0.67	0.4150
178.	Achievement Striving	C	1.421	0.07	0.7908
179.	Self-Discipline	C	1.421	5.42	0.0203
180.	Deliberation	C	1.423	1.57	0.2109
181.	Anxiety	N	1.421	13.79	0.0002
182.	Angry Hostility	N	1.422	3.44	0.0643
183.	Depression	N	1.418	0.55	0.4574
184.	Self-Consciousness	N	1.422	7.95	0.0050
185.	Impulsivity	N	1.421	0.17	0.6817
186.	Vulnerability	N	1.419	0.86	0.3545
187.	Warmth	E	1.421	7.49	0.0065

188.	Gregariousness	E	1.422	4.31	0.0386
189.	Assertiveness	E	1.423	7.50	0.0064
190.	Activity	E	1.419	3.52	0.0613
191.	Excitement-Seeking	E	1.420	5.02	0.0256
192.	Positive Emotions	E	1.421	0.55	0.4567
193.	Fantasy	O	1.416	20.14	<0.0001
194.	Aesthetics	O	1.422	4.20	0.0411
195.	Feelings	O	1.422	4.94	0.0267
196.	Actions	O	1.423	1.22	0.2706
197.	Ideas	O	1.421	0.13	0.7212
198.	Values	O	1.415	0.16	0.6933
199.	Trust	A	1.423	0.54	0.4639
200.	Straightforwardness	A	1.421	0.74	0.3895
201.	Altruism	A	1.422	0.37	0.5420
202.	Compliance	A	1, 422	0.45	00.5034
203.	Modesty	A	1.419	4.68	0.0312
204.	Tender-Mindedness	A	1.422	4.38	0.0370
205.	Competence	C	1.421	0.00	0.9640
206.	Order	C	1.422	4.80	0.0290
207.	Dutifulness	C	1.421	3.70	0.0549
208.	Achievement Striving	C	1.422	0.01	0.9044
209.	Self-Discipline	C	1.423	4.15	0..0423
210.	Deliberation	C	1.421	3.02	0.0830
211.	Anxiety	N	1.423	3.97	0.0469
212.	Angry Hostility	N	1.423	0.55	0.4580
213.	Depression	N	1.421	0.49	0.4832
214.	Self-Consciousness	N	1.422	0.64	0.4235
215.	Impulsivity	N	1.422	9.17	0.0026
216.	Vulnerability	N	1.423	0.65	0.4199
217.	Warmth	E	1.423	0.67	0.4137
218.	Gregariousness	E	1.422	12.11	0.0006
219.	Assertiveness	E	1.410	5.04	0.0253
220.	Activity	E	1.420	0.06	0.8047
221.	Excitement-Seeking	E	1.421	10.14	0.0016
222.	Positive Emotions	E	1.423	1.68	0.1950
223.	Fantasy	O	1.421	1.21	0.2720
224.	Aesthetics	O	1.422	0.19	0.6658
225.	Feelings	O	1.423	0.26	0.6132
226.	Actions	O	1..420	0.41	0.5240
227.	Ideas	O	1.423	6.71	0.0099
228.	Values	O	1.421	0.02	0.8957
229.	Trust	A	1.421	4.46	0.0352
230.	Straightforwardness	A	1.422	1.88	0.1710
231.	Altruism	A	1.422	7.38	0.0069
232.	Compliance	A	1.423	0.22	0.6431
233.	Modesty	A	1.423	2.72	0.0998
234.	Tender-Mindedness	A	1.421	20.11	<0.0001
235.	Competence	C	1.422	0.44	0.5078.

236.	Order	C	1.422	2.78	0.0961
237.	Dutifulness	C	1.419	6.70	0.0100
238.	Achievement Striving	C	1.374	0.01	0.9324
239.	Self-Discipline	C	1.413	0.05	0.8298
240.	Deliberation	C	1.422	2.37	0.1241

APPENDIX D: CHI^2 RESULTS FOR GENDER AND THE CPAI-2 ITEMS

Item	χ	P	Xm	Xf
1.	2.83	0.09	0.83	0.75
2.	1.38	0.24	0.48	0.55
3.	0.70	0.40	0.67	0.63
4.	4.25	0.04	0.06	0.13
5.	0.33	0.57	0.66	0.69
6.	0.06	0.81	0.32	0.31
7.	21.34	0.00	0.47	0.24
8.	0.40	0.53	0.85	0.83
9.	2.59	0.11	0.92	0.96
10.	1.35	0.25	0.32	0.38
11.	0.02	0.89	0.38	0.38
12.	0.24	0.63	0.25	0.28
13.	4.83	0.03	0.15	0.25
14.	4.92	0.03	0.16	0.08
15.	0.05	0.82	0.18	0.17
16.	4.87	0.03	0.62	0.73
17.	0.03	0.85	0.83	0.84
18.	0.01	0.94	0.87	0.87
19.	1.85	0.17	0.66	0.73
20.	0.11	0.74	0.81	0.82
21.	0.97	0.32	0.71	0.76
22.	0.02	0.88	0.15	0.14
23.	17.95	0.00	0.33	0.55
24.	0.18	0.67	0.61	0.64
25.	3.95	0.05	0.80	0.87
26.	1.39	0.24	0.49	0.43
27.	5.25	0.02	0.79	0.67
28.	3.05	0.08	0.43	0.53
29.	1.52	0.22	0.80	0.74
30.	1.88	0.17	0.46	0.39
31.	2.86	0.09	0.70	0.77
32.	6.55	0.01	0.14	0.25
33.	14.22	0.00	0.37	0.57
34.	2.52	0.11	0.48	0.56
35.	1.06	0.30	0.79	0.74
36.	0.01	0.93	0.27	0.27
37.	0.02	0.88	0.49	0.50
38.	2.15	0.14	0.93	0.89

39.	4.70	0.03	0.64	0.53
40.	4.36	0.04	0.35	0.46
41.	0.61	0.43	0.31	0.28
42.	2.05	0.15	0.52	0.44
43.	6.81	0.01	0.58	0.44
44.	10.92	0.00	0.61	0.77
45.	0.01	0.91	0.57	0.57
46.	0.09	0.76	0.93	0.92
47.	5.71	0.02	0.08	0.03
48.	0.81	0.37	0.42	0.37
49.	5.04	0.02	0.52	0.63
50.	5.58	0.02	0.72	0.60
51.	0.12	0.72	0.65	0.63
52.	1.33	0.25	0.93	0.95
53.	0.71	0.40	0.60	0.65
54.	0.53	0.47	0.34	0.38
55.	0.25	0.62	0.56	0.53
56.	5.38	0.02	0.35	0.24
57.	2.06	0.15	0.29	0.22
58.	0.26	0.61	0.91	0.92
59.	2.67	0.10	0.66	0.74
60.	4.83	0.03	0.90	0.96
61.	9.97	0.00	0.53	0.36
62.	2.57	0.11	0.63	0.54
63.	0.45	0.50	0.24	0.21
64.	1.68	0.20	0.77	0.71
65.	2.63	0.10	0.71	0.63
66.	6.06	0.01	0.64	0.76
67.	10.02	0.00	0.55	0.71
68.	0.77	0.38	0.57	0.52
69.	2.08	0.15	0.38	0.30
70.	1.83	0.18	0.53	0.46
71.	13.05	0.00	0.74	0.55
72.	1.94	0.16	0.35	0.28
73.	0.42	0.52	0.96	0.94
74.	18.11	0.00	0.65	0.42
75.	3.23	0.07	0.55	0.64
76.	3.07	0.08	0.51	0.41
77.	0.00	0.99	0.92	0.92
78.	3.47	0.06	0.73	0.81
79.	0.58	0.45	0.20	0.17
80.	0.70	0.40	0.38	0.33

81.	0.02	0.89	0.87	0.86
82.	3.99	0.05	0.83	0.73
83.	0.19	0.66	0.28	0.30
84.	0.03	0.86	0.39	0.40
85.	0.02	0.88	0.51	0.52
86.	6.27	0.01	0.56	0.69
87.	4.43	0.04	0.53	0.64
88.	3.18	0.07	0.70	0.61
89.	0.04	0.84	0.50	0.49
90.	2.11	0.15	0.87	0.82
91.	6.44	0.01	0.75	0.63
92.	1.37	0.24	0.83	0.78
93.	0.59	0.44	0.29	0.33
94.	3.58	0.06	0.25	0.34
95.	7.64	0.01	0.83	0.92
96.	0.25	0.62	0.26	0.24
97.	1.78	0.18	0.32	0.26
98.	0.94	0.33	0.82	0.86
99.	1.68	0.19	0.39	0.33
100.	22.84	0.00	0.28	0.10
101.	0.77	0.38	0.33	0.38
102.	0.14	0.71	0.09	0.08
103.	5.76	0.02	0.17	0.09
104.	1.28	0.26	0.57	0.50
105.	4.33	0.04	0.56	0.67
106.	28.32	0.00	0.22	0.51
107.	3.34	0.07	0.62	0.52
108.	0.02	0.89	0.91	0.91
109.	4.81	0.03	0.53	0.42
110.	3.67	0.06	0.41	0.32
111.	0.62	0.43	0.89	0.92
112.	1.98	0.16	0.17	0.12
113.	2.85	0.09	0.20	0.13
114.	5.42	0.02	0.39	0.52
115.	1.72	0.19	0.59	0.66
116.	0.71	0.40	0.80	0.76
117.	0.00	0.96	0.83	0.82
118.	0.05	0.82	0.63	0.64
119.	0.10	0.75	0.39	0.37
120.	11.63	0.00	0.61	0.43
121.	3.83	0.05	0.38	0.48
122.	2.08	0.15	0.28	0.22
123.	0.04	0.83	0.43	0.45
124.	8.08	0.00	0.24	0.38

125.	0.57	0.45	0.67	0.63
126.	1.43	0.23	0.60	0.54
127.	1.42	0.23	0.83	0.77
128.	0.65	0.42	0.70	0.74
129.	3.39	0.07	0.25	0.17
130.	0.00	0.98	0.27	0.27
131.	1.01	0.32	0.49	0.44
132.	0.29	0.59	0.38	0.35
133.	8.98	0.00	0.80	0.66
134.	6.92	0.01	0.19	0.10
135.	0.38	0.54	0.47	0.44
136.	3.51	0.06	0.73	0.63
137.	0.95	0.33	0.08	0.06
138.	47.25	0.00	0.26	0.63
139.	0.00	0.96	0.96	0.96
140.	0.38	0.54	0.48	0.51
141.	0.04	0.84	0.49	0.50
142.	0.10	0.76	0.09	0.10
143.	1.12	0.29	0.79	0.83
144.	1.43	0.23	0.06	0.03
145.	0.65	0.42	0.24	0.20
146.	4.68	0.03	0.38	0.27
147.	4.75	0.03	0.80	0.88
148.	4.04	0.04	0.81	0.72
149.	1.49	0.22	0.52	0.59
150.	6.53	0.01	0.28	0.17
151.	10.49	0.00	0.35	0.53
152.	1.94	0.16	0.64	0.71
153.	0.00	0.98	0.20	0.20
154.	1.60	0.21	0.40	0.34
155.	0.58	0.45	0.65	0.61
156.	2.67	0.10	0.48	0.39
157.	0.04	0.84	0.78	0.79
158.	0.04	0.85	0.87	0.86
159.	5.22	0.02	0.55	0.43
160.	5.96	0.01	0.26	0.16
161.	1.13	0.29	0.22	0.18
162.	10.77	0.00	0.80	0.91
163.	0.25	0.62	0.23	0.21
164.	4.14	0.04	0.39	0.29
165.	0.16	0.69	0.64	0.66
166.	0.03	0.86	0.46	0.47
167.	3.17	0.07	0.82	0.74
168.	4.17	0.04	0.87	0.78

169.	0.57	0.45	0.84	0.86
170.	1.03	0.31	0.30	0.25
171.	0.74	0.39	0.13	0.10
172.	9.33	0.00	0.40	0.25
173.	2.50	0.11	0.21	0.28
174.	4.00	0.05	0.86	0.92
175.	0.04	0.84	0.76	0.77
176.	1.21	0.27	0.28	0.23
177.	0.10	0.75	0.43	0.41
178.	8.21	0.00	0.73	0.58
179.	1.25	0.26	0.55	0.49
180.	4.66	0.03	0.89	0.80
181.	0.00	0.98	0.60	0.60
182.	2.49	0.11	0.60	0.68
183.	0.22	0.64	0.11	0.10
184.	0.76	0.38	0.69	0.65
185.	1.34	0.25	0.73	0.68
186.	0.34	0.56	0.83	0.80
187.	4.14	0.04	0.91	0.83
188.	3.48	0.06	0.78	0.85
189.	7.14	0.01	0.76	0.87
190.	1.50	0.22	0.43	0.50
191.	0.29	0.59	0.44	0.41
192.	33.72	0.00	0.64	0.33
193.	0.42	0.52	0.30	0.33
194.	0.04	0.85	0.48	0.47
195.	0.02	0.88	0.93	0.93
196.	0.53	0.47	0.51	0.47
197.	0.38	0.54	0.43	0.46
198.	0.04	0.84	0.60	0.61
199.	5.47	0.02	0.70	0.80
200.	1.55	0.21	0.45	0.38
201.	0.04	0.85	0.03	0.03
202.	0.60	0.44	0.18	0.21
203.	0.65	0.42	0.11	0.14
204.	0.18	0.67	0.64	0.62
205.	1.41	0.24	0.08	0.12
206.	1.29	0.26	0.47	0.53
207.	0.11	0.74	0.19	0.18
208.	2.98	0.08	0.25	0.34
209.	5.90	0.02	0.46	0.33
210.	2.00	0.16	0.35	0.28
211.	3.18	0.07	0.08	0.04
212.	1.81	0.18	0.56	0.49

213.	0.61	0.44	0.08	0.10
214.	0.00	0.96	0.25	0.25
215.	2.90	0.09	0.45	0.55
216.	0.11	0.74	0.69	0.68
217.	1.32	0.25	0.23	0.18
218.	0.06	0.81	0.08	0.08
219.	2.77	0.10	0.91	0.85
220.	1.15	0.28	0.17	0.22
221.	8.73	0.00	0.46	0.62
222.	0.04	0.85	0.82	0.83
223.	4.66	0.03	0.45	0.33
224.	0.78	0.38	0.86	0.89
225.	2.44	0.12	0.14	0.09
226.	0.64	0.42	0.30	0.26
227.	27.75	0.00	0.74	0.46
228.	0.29	0.59	0.61	0.58
229.	0.55	0.46	0.18	0.15
230.	0.42	0.52	0.37	0.34
231.	0.09	0.76	0.17	0.16
232.	0.37	0.54	0.65	0.62
233.	2.08	0.15	0.30	0.37
234.	4.13	0.04	0.42	0.31
235.	0.06	0.81	0.83	0.82
236.	1.33	0.25	0.40	0.46
237.	0.37	0.55	0.29	0.32
238.	0.66	0.42	0.16	0.13
239.	6.64	0.01	0.30	0.19
240.	4.53	0.03	0.17	0.09
241.	0.99	0.32	0.06	0.04
242.	0.35	0.55	0.31	0.28
243.	0.01	0.94	0.57	0.56
244.	3.04	0.08	0.45	0.36
245.	2.94	0.09	0.78	0.85
246.	1.62	0.20	0.75	0.81
247.	5.18	0.02	0.77	0.66
248.	0.18	0.67	0.55	0.52
249.	0.00	0.96	0.26	0.25
250.	0.82	0.36	0.66	0.61
251.	2.70	0.10	0.21	0.14
252.	1.12	0.29	0.18	0.14
253.	3.39	0.07	0.06	0.02
254.	0.07	0.79	0.68	0.67
255.	6.37	0.01	0.78	0.87
256.	5.28	0.02	0.08	0.03

257.	1.46	0.23	0.42	0.36
258.	4.56	0.03	0.47	0.36
259.	0.83	0.36	0.35	0.30
260.	4.92	0.03	0.08	0.03
261.	1.29	0.26	0.32	0.26
262.	3.85	0.05	0.57	0.47
263.	0.97	0.32	0.18	0.14
264.	0.88	0.35	0.78	0.74
265.	5.24	0.02	0.85	0.75
266.	3.83	0.05	0.29	0.39
267.	2.31	0.13	0.24	0.17
268.	2.44	0.12	0.33	0.25
269.	0.07	0.79	0.07	0.06
270.	0.04	0.84	0.10	0.11
271.	4.94	0.03	0.70	0.58
272.	1.11	0.29	0.75	0.70
273.	1.32	0.25	0.49	0.55
274.	0.36	0.55	0.80	0.82
275.	0.18	0.67	0.37	0.35
276.	6.43	0.01	0.29	0.18
277.	2.11	0.15	0.27	0.34
278.	2.34	0.13	0.24	0.31
279.	11.67	0.00	0.25	0.12
280.	4.91	0.03	0.54	0.42
281.	0.15	0.70	0.47	0.49
282.	0.01	0.91	0.38	0.38
283.	1.35	0.24	0.10	0.14
284.	1.63	0.20	0.27	0.21
285.	0.01	0.93	0.40	0.40
286.	0.83	0.36	0.24	0.20
287.	1.16	0.28	0.82	0.86
288.	8.93	0.00	0.59	0.74
289.	0.06	0.81	0.08	0.08
290.	20.12	0.00	0.38	0.18
291.	3.86	0.05	0.29	0.20
292.	1.39	0.24	0.07	0.04
293.	1.89	0.17	0.79	0.73
294.	7.27	0.01	0.88	0.77
295.	1.96	0.16	0.41	0.34
296.	9.23	0.00	0.80	0.65
297.	3.98	0.05	0.92	0.96
298.	0.14	0.71	0.75	0.73
299.	0.24	0.62	0.90	0.88
300.	0.16	0.69	0.14	0.16

301.	0.09	0.76	0.58	0.60
302.	0.25	0.62	0.31	0.28
303.	1.12	0.29	0.22	0.27
304.	1.21	0.27	0.55	0.61
305.	4.39	0.04	0.54	0.43
306.	0.67	0.41	0.40	0.44
307.	7.18	0.01	0.59	0.45
308.	35.51	0.00	0.69	0.37
309.	2.18	0.14	0.76	0.69
310.	0.11	0.73	0.70	0.68
311.	1.24	0.27	0.55	0.60
312.	1.14	0.28	0.65	0.71
313.	4.52	0.03	0.23	0.34
314.	2.36	0.12	0.87	0.92
315.	0.72	0.40	0.20	0.16
316.	0.51	0.48	0.88	0.91
317.	5.98	0.01	0.22	0.13
318.	3.77	0.05	0.57	0.67
319.	0.35	0.56	0.43	0.47
320.	0.02	0.88	0.42	0.43
321.	4.00	0.05	0.11	0.05
322.	0.16	0.69	0.52	0.55
323.	2.10	0.15	0.83	0.76
324.	3.15	0.08	0.59	0.49
325.	2.92	0.09	0.37	0.46
326.	0.12	0.73	0.38	0.36
327.	4.34	0.04	0.91	0.96
328.	1.73	0.19	0.79	0.72
329.	2.57	0.11	0.20	0.14
330.	10.36	0.00	0.19	0.35
331.	2.65	0.10	0.36	0.28
332.	2.43	0.12	0.82	0.88
333.	0.22	0.64	0.79	0.77
334.	3.49	0.06	0.13	0.21
335.	5.97	0.01	0.73	0.60
336.	1.43	0.23	0.83	0.87
337.	5.23	0.02	0.29	0.19
338.	1.36	0.24	0.35	0.29
339.	0.88	0.35	0.75	0.79
340.	0.23	0.63	0.50	0.53
341.	12.35	0.00	0.73	0.87

APPENDIX E: ANOVA RESULTS FOR POPULATION GROUP AND THE NEO-PI-R ITEMS

Item	Facet	Domain	DF	F	P
1.	Anxiety	N	1.417	0.18	0.6685
2.	Angry Hostility	N	1.421	0.19	0.6656
3.	Depression	N	1.411	1.08	0.2982
4.	Self-Consciousness	N	1.419	0.75	0.3874
5.	Impulsivity	N	1.418	2.87	0.0910
6.	Vulnerability	N	1.423	0.04	0.8379
7.	Warmth	E	1.422	2.26	0.1331
8.	Gregariousness	E	1.406	3.05	0.0816
9.	Assertiveness	E	1.412	0.21	0.6497
10.	Activity	E	1.419	0.20	0.6510
11	Excitement-Seeking	E	1,422	4.02	0.0456
12	Positive Emotions	E	1.416	0.53	0.4682
13	Fantasy	O	1.417	0.86	0.3540
14	Aesthetics	O	1.422	0.51	0.4761
15	Feelings	O	1.422	10.96	0.0010
16	Actions	O	1.415	2.58	0.1091
17	Ideas	O	1.419	6.84	0.0092
18	Values	O	1.418	5.08	0.0247
19	Trust	A	1.421	4.65	0.0317
20	Straightforwardness	A	1.404	0.47	0.4949
21	Altruism	A	1.416	2.66	0.1037
22	Compliance	A	1.421	0.07	0.7925
23	Modesty	A	1.420	2.67	0.1029
24	Tender-Mindedness	A	1.421	1.47	0.2255
25	Competence	C	1.423	0.03	0.8709
26	Order	C	1.422	5.74	0.0170
27	Dutifulness	C	1.423	0.52	0.4707
28	Achievement Striving	C	1.422	0.86	0.3538
29	Self-Discipline	C	1.421	0.70	0.4046
30	Deliberation	C	1.419	0.94	0.3332
31	Anxiety	N	1.423	0.40	0.5270
32	Angry Hostility	N	1.422	3.91	0.0487
33	Depression	N	1.421	25.82	<0.0001
34	Self-Consciousness	N	1.419	0.19	0.6667.
35	Impulsivity	N	1.421	1.44	0.2315
36	Vulnerability	N	1.420	0.07	0.7844
37	Warmth	E	1.421	2.46	0.1174
38	Gregariousness	E	1.422	2.32	0.1287
39	Assertiveness	E	1.421	2.33	0.1277
40	Activity	E	1.420	6.16	0.0134
41	Excitement-Seeking	E	1.418	1.54	0.2157
42	Positive Emotions	E	1.418	0.44	0.5072

43	Fantasy	O	1.422	4.29	0.0389
44	Aesthetics	O	1.418	5.62	0.0183
45	Feelings	O	1.420	6.68	0.0101
46	Actions	O	1.422	0.10	0.7496
47	Ideas	O	1.416	16.57	<0.0001
48	Values	O	1.423	0.22	0.6416
49	Trust	A	1.419	1.57	0.2110
50	Straightforwardness	A	1.423	1.70	0.1925
51	Altruism	A	1.421	3.74	0.0538
52	Compliance	A	1.420	5.13	0.0241
53	Modesty	A	1.422	3.92	0.0483
54	Tender-Mindedness	A	1.422	3.78	0.0525
55	Competence	C	1.422	0.60	0.4371
56	Order	C	1.423	0.40	0.5298
57	Dutifulness	C	1.421	1.63	0.2026
58	Achievement Striving	C	1.422	0.01	0.9070
59	Self-Discipline	C	1.422	1.17	0.2801
60	Deliberation	C	1.422	5.87	0.0158
61	Anxiety	N	1.420	5.69	0.0175
62	Angry Hostility	N	1.420	0.19	0.6660
63	Depression	N	1.420	0.00	0.9714
64	Self-Consciousness	N	1.423	48.32	<0.0001
65	Impulsivity	N	1.422	0.02	0.8790.
66	Vulnerability	N	1.423	0.20	0.6531
67	Warmth	E	1.422	4.57	0.0330
68	Gregariousness	E	1.420	7.06	0.0082
69	Assertiveness	E	1.422	0.81	0.3691
70	Activity	E	1.413	12.78	0.0004
71	Excitement-Seeking	E	1.421	0.53	0.4676
72	Positive Emotions	E	1.422	0.70	0.4049
73	Fantasy	O	1.423	1.40	0.2371
74	Aesthetics	O	1.423	3.63	0.0573
75	Feelings	O	1.421	0.26	0.6108
76	Actions	O	1.420	0.17	0.6848
77	Ideas	O	1.422	4.60	0.0325
78	Values	O	1.419	2.11	0.1466
79	Trust	A	1.422	1.26	0.2617
80	Straightforwardness	A	1.421	0.23	0.6288
81	Altruism	A	1.422	0.06	0.8135
82	Compliance	A	1.423	1.57	0.2110
83	Modesty	A	1.422	0.80	0.3707
84	Tender-Mindedness	A	1.419	0.17	0.6800
85	Competence	C	1.422	9.26	0.0025
86	Order	C	1.421	2.38	0.1237
87	Dutifulness	C	1.422	0.07	0.7888
88	Achievement Striving	C	1.423	15.74	<0.0001
89	Self-Discipline	C	1.422	5.81	0.0164.
90	Deliberation	C	1.422	8.19	0.0044

91	Anxiety	N	1.423	2.39	0.1227
92	Angry Hostility	N	1.422	1.03	0.3108
93	Depression	N	1.423	2.94	0.0871
94	Self-Consciousness	N	1.423	0.10	0.7524
95	Impulsivity	N	1.423	4.61	0.0323
96	Vulnerability	N	1.421	1.86	0.1731
97	Warmth	E	1.421	0.26	0.6118
98	Gregariousness	E	1.420	2.28	0.1315
99	Assertiveness	E	1.422	1.64	0.2004
100	Activity	E	1.423	11.08	0.0009
101.	Excitement-Seeking	E	1.422	2.63	0.1058
102.	Positive Emotions	E	1.422	2.80	0.0949
103.	Fantasy	O	1.420	15.17	0.0001
104.	Aesthetics	O	1.423	0.59	0.4441.
105.	Feelings	O	1.416	0.36	0.5515
106.	Actions	O	1.423	0.26	0.6115
107.	Ideas	O	1.422	2.09	0.1493
108.	Values	O	1.422	0.33	0.5649
109.	Trust	A	1.423	0.03	0.8573
110.	Straightforwardness	A	1.421	0.38	0.5356
111	Altruism	A	1.422	1.68	0.1951
112	Compliance	A	1.422	20.95	<0.0001
113	Modesty	A	1.423	2.89	0.0898
114	Tender-Mindedness	A	1.423	9.95	0.0017
115	Competence	C	1.419	0.78	0.3790
116	Order	C	1.420	0.84	0.3598
117	Dutifulness	C	1.416	1.39	0.2390
118	Achievement Striving	C	1.418	0.52	0.4730
119	Self-Discipline	C	1.286	0.40	0.5264
120	Deliberation	C	1.422	8.54	0.0037
121	Anxiety	N	1.409	3.22	0.0736
122	Angry Hostility	N	1.423	1.75	0.1860
123	Depression	N	1.422	0.59	0.4435
124	Self-Consciousness	N	1.423	5.64	0.0180
125	Impulsivity	N	1.419	2.33	0.1277
126	Vulnerability	N	1.421	10.94	0.0010
127	Warmth	E	1.422	0.93	0.3355
128	Gregariousness	E	1.422	0.03	0.8721
129	Assertiveness	E	1.422	4.74	0.0300
130	Activity	E	1.422	0.06	0.8101
131	Excitement-Seeking	E	1.423	0.30	0.5853
132	Positive Emotions	E	1.422	0.79	0.3740
133	Fantasy	O	1.423	3.56	0.0598
134	Aesthetics	O	1.422	1.18	0.2788
135	Feelings	O	1.422	4.98	0.0262
136	Actions	O	1.421	1.30	0.2553
137	Ideas	O	1.420	3.73	0.0543
138	Values	O	1.421	0.12	0.7330

139	Trust	A	1.419	0.61	0.4336
140	Straightforwardness	A	1.420	4.67	0.0312
141	Altruism	A	1.421	26.91	<0.0001
142	Compliance	A	1.419	2.23	0.1365.
143	Modesty	A	1.421	0.81	0.3684
144	Tender-Mindedness	A	1.419	8.91	0.0030
145	Competence	C	1.421	0.05	0.8263
146	Order	C	1.423	1.09	0.2981
147	Dutifulness	C	1.419	0.18	0.6737
148	Achievement Striving	C	1.422	15.33	0.0001
149	Self-Discipline	C	1.422	0.02	0.8939
150	Deliberation	C	1.423	0.04	0.8383
151	Anxiety	N	1.423	0.16	0.8928
152	Angry Hostility	N	1.423	1.15	0.2840
153	Depression	N	1.423	5.68	0.0176
154	Self-Consciousness	N	1.422	3.98	0.0467
155	Impulsivity	N	1.421	1.81	0.1789
156	Vulnerability	N	1.421	0.34	0.5618
157	Warmth	E	1.422	4.60	0.0326
158	Gregariousness	E	1.421	0.03	0.8532
159	Assertiveness	E	1.422	2.44	0.1187
160	Activity	E	1.366	2.20	0.1393
161	Excitement-Seeking	E	1.420	2.89	0.0897
162	Positive Emotions	E	1.421	0.09	0.7624
163	Fantasy	O	1.421	31.20	<0.0001
164	Aesthetics	O	1.421	2.19	0.1394.
165	Feelings	O	1.419	1.57	0.2109
166	Actions	O	1.423	13.95	0.0002
167	Ideas	O	1.423	3.67	0.0560
168	Values	O	1.422	8.84	0.0031
169	Trust	A	1.422	10.08	0.0016
170	Straightforwardness	A	1.423	1.30	0.2551
171	Altruism	A	1.415	0.92	0.3390
172	Compliance	A	1.419	4.21	0.0408
173	Modesty	A	1.418	12.23	0.0005
174	Tender-Mindedness	A	1.421	0.02	0.8877
175	Competence	C	1.422	0.01	0.9250
176	Order	C	1.421	0.00	0.9944
177	Dutifulness	C	1.421	1.06	0.3037
178	Achievement Striving	C	1.421	0.05	0.8228
179	Self-Discipline	C	1.421	6.05	0.0143
180	Deliberation	C	1.423	1.08	0.2996
181	Anxiety	N	1.421	3.34	0.0685
182	Angry Hostility	N	1.422	6.02	0.0145
183	Depression	N	1.418	23.00	<0.0001
184	Self-Consciousness	N	1.422	0.40	0.5252.
185	Impulsivity	N	1.421	3.81	0.0515
186	Vulnerability	N	1.419	2.08	0.1504

187	Warmth	E	1.421	4.06	0.0446
188	Gregariousness	E	1.422	0.13	0.7238
189	Assertiveness	E	1.423	1.46	0.2280
190	Activity	E	1.419	2.90	0.0892
191	Excitement-Seeking	E	1.420	0.70	0.4035
192	Positive Emotions	E	1.421	0.28	0.5939
193	Fantasy	O	1.416	3.39	0.0663
194	Aesthetics	O	1.422	3.94	0.0477
195	Feelings	O	1.422	0.00	0.9824
196	Actions	O	1.423	0.72	0.3974
197	Ideas	O	1.421	15.00	0.0001
198	Values	O	1.415	0.91	0.3415
199	Trust	A	1.423	5.98	0.0149
200	Straightforwardness	A	1.421	1.11	0.2918
201.	Altruism	A	1.422	1.13	0.2884
202.	Compliance	A	1.422	0.50	0.4789
203.	Modesty	A	1.419	5.04	0.0253
204.	Tender-Mindedness	A	1.422	0.42	0.5149
205.	Competence	C	1.421	1.09	0.2969
206.	Order	C	1.422	3.16	0.0763
207.	Dutifulness	C	1.421	12.04	0.0006
208.	Achievement Striving	C	1.423	35.70	<0.0001
209.	Self-Discipline	C	1.423	1.20	0.2735
210.	Deliberation	C	1.421	1.52	0.2178
211	Anxiety	N	1.423	0.32	0.5695
212	Angry Hostility	N	1.423	9.22	0.0025
213	Depression	N	1.421	16.34	<0.0001
214	Self-Consciousness	N	1.422	0,16	0.6904
215	Impulsivity	N	1.422	1.09	0.2965
216	Vulnerability	N	1.423	7.11	0.0079
217	Warmth	E	1.423	4.74	0.0301
218	Gregariousness	E	1.422	0.03	0.8721
219	Assertiveness	E	1.410	6.81	0.0094
220	Activity	E	1.420	0.50	0.4808
221	Excitement-Seeking	E	1.421	0.57	0.4525
222	Positive Emotions	E	1.423	4.34	0.0379
223	Fantasy	O	1.421	20.65	<0.0001
224	Aesthetics	O	1.422	0.05	0.8213
225	Feelings	O	1.423	3.59	0.0589
226	Actions	O	1.420	1.83	0.1770
227	Ideas	O	1.423	0.80	0.3718
228	Values	O	1.421	3.19	0.0746
229	Trust	A	1.421	0.60	0.4400
230	Straightforwardness	A	1.422	0.36	0.5477
231	Altruism	A	1.422	15.90	<0.0001
232	Compliance	A	1.423	0.98	0.3229.
233	Modesty	A	1.423	2.21	0.1381
234	Tender-Mindedness	A	1.421	0.39	0.5332

235	Competence	C	1.422	6.39	0.0118
236	Order	C	1.422	4.20	0.0411
237	Dutifulness	C	1.419	0.02	0.8928
238	Achievement Striving	C	1.374	1.26	0.2625
239	Self-Discipline	C	1.413	0.37	0.5418
240	Deliberation	C	1.422	15.16	0.0001

APPENDIX F: CHI^2 RESULTS FOR POPULATION GROUP AND THE CPAI-2 ITEMS

Item	χ	p	Xw	Xnw
1.	3.81	0.05	0.82	0.74
2.	0.63	0.43	0.55	0.51
3.	2.54	0.11	0.68	0.61
4.	0.72	0.40	0.12	0.09
5.	0.05	0.82	0.68	0.67
6.	1.47	0.22	0.28	0.34
7.	1.36	0.24	0.34	0.28
8.	0.15	0.70	0.84	0.83
9.	5.39	0.02	0.97	0.92
10.	0.48	0.49	0.38	0.35
11.	0.46	0.50	0.36	0.40
12.	0.42	0.52	0.26	0.28
13.	5.81	0.02	0.17	0.26
14.	6.43	0.01	0.06	0.14
15.	0.83	0.36	0.19	0.16
16.	1.08	0.30	0.67	0.72
17.	1.43	0.23	0.86	0.82
18.	0.01	0.93	0.87	0.87
19.	1.26	0.26	0.74	0.69
20.	0.90	0.34	0.80	0.84
21.	0.24	0.62	0.73	0.76
22.	6.79	0.01	0.10	0.18
23.	21.01	0.00	0.37	0.59
24.	1.05	0.31	0.60	0.65
25.	2.60	0.11	0.88	0.82
26.	8.46	0.00	0.37	0.51
27.	1.44	0.23	0.73	0.68
28.	0.02	0.88	0.51	0.50
29.	0.06	0.81	0.76	0.75
30.	0.64	0.42	0.43	0.39
31.	30.87	0.00	0.88	0.65
32.	6.18	0.01	0.17	0.27
33.	3.42	0.06	0.46	0.55
34.	2.91	0.09	0.49	0.58
35.	1.05	0.30	0.77	0.73
36.	0.01	0.91	0.27	0.28
37.	1.63	0.20	0.53	0.47

38.	1.77	0.18	0.88	0.92
39.	0.29	0.59	0.57	0.55
40.	20.73	0.00	0.31	0.53
41.	2.35	0.13	0.25	0.32
42.	22.80	0.00	0.34	0.57
43.	15.20	0.00	0.38	0.56
44.	11.70	0.00	0.80	0.65
45.	1.25	0.26	0.60	0.55
46.	0.35	0.56	0.91	0.93
47.	9.64	0.00	0.01	0.07
48.	2.45	0.12	0.34	0.42
49.	1.14	0.29	0.63	0.58
50.	12.78	0.00	0.73	0.56
51.	7.12	0.01	0.57	0.69
52.	2.18	0.14	0.96	0.93
53.	6.76	0.01	0.57	0.69
54.	0.02	0.90	0.37	0.37
55.	0.01	0.91	0.54	0.54
56.	5.07	0.02	0.22	0.32
57.	5.29	0.02	0.19	0.28
58.	0.03	0.87	0.92	0.92
59.	1.50	0.22	0.69	0.74
60.	0.07	0.78	0.94	0.94
61.	0.14	0.70	0.40	0.41
62.	1.38	0.24	0.60	0.54
63.	0.53	0.47	0.20	0.23
64.	12.70	0.00	0.81	0.66
65.	7.55	0.01	0.72	0.60
66.	2.23	0.14	0.69	0.76
67.	1.85	0.17	0.70	0.64
68.	9.45	0.00	0.45	0.60
69.	3.65	0.06	0.28	0.36
70.	14.37	0.00	0.38	0.56
71.	2.88	0.09	0.65	0.57
72.	11.92	0.00	0.22	0.37
73.	3.11	0.08	0.93	0.97
74.	0.11	0.74	0.49	0.48
75.	2.96	0.09	0.57	0.65
76.	9.98	0.00	0.36	0.51
77.	1.01	0.31	0.93	0.90
78.	5.18	0.02	0.84	0.75
79.	10.68	0.00	0.11	0.23

80.	4.40	0.04	0.29	0.39
81.	4.94	0.03	0.91	0.83
82.	0.81	0.37	0.78	0.74
83.	0.90	0.34	0.27	0.31
84.	1.85	0.17	0.36	0.43
85.	2.74	0.10	0.47	0.55
86.	0.11	0.74	0.66	0.65
87.	1.93	0.17	0.64	0.58
88.	0.03	0.86	0.64	0.63
89.	0.90	0.34	0.47	0.52
90.	3.90	0.05	0.87	0.80
91.	2.44	0.12	0.62	0.69
92.	0.03	0.86	0.79	0.80
93.	2.12	0.15	0.28	0.35
94.	0.87	0.35	0.29	0.33
95.	0.75	0.39	0.88	0.91
96.	13.13	0.00	0.16	0.31
97.	0.09	0.76	0.27	0.28
98.	3.13	0.08	0.88	0.82
99.	0.09	0.77	0.34	0.35
100.	0.92	0.34	0.13	0.16
101.	0.77	0.38	0.34	0.38
102.	0.43	0.51	0.07	0.09
103.	0.72	0.40	0.09	0.12
104.	0.84	0.36	0.55	0.50
105.	0.08	0.78	0.64	0.63
106.	11.90	0.00	0.33	0.50
107.	1.19	0.27	0.52	0.58
108.	1.65	0.20	0.93	0.90
109.	12.84	0.00	0.35	0.53
110.	14.82	0.00	0.25	0.42
111.	0.16	0.69	0.92	0.91
112.	0.06	0.80	0.13	0.14
113.	7.30	0.01	0.10	0.19
114.	0.73	0.39	0.46	0.50
115.	9.01	0.00	0.72	0.58
116.	0.88	0.35	0.75	0.79
117.	0.16	0.69	0.82	0.83
118.	1.09	0.30	0.66	0.61
119.	0.16	0.69	0.37	0.39
120.	12.47	0.00	0.39	0.56
121.	0.28	0.60	0.44	0.46
122.	2.16	0.14	0.20	0.26

123.	0.36	0.55	0.46	0.43
124.	8.04	0.00	0.27	0.40
125.	3.20	0.07	0.60	0.68
126.	2.86	0.09	0.51	0.59
127.	0.03	0.86	0.78	0.79
128.	7.43	0.01	0.79	0.68
129.	1.30	0.25	0.17	0.21
130.	2.80	0.09	0.23	0.30
131.	1.85	0.17	0.49	0.42
132.	0.10	0.75	0.35	0.37
133.	2.23	0.14	0.66	0.73
134.	0.39	0.53	0.12	0.14
135.	3.97	0.05	0.39	0.49
136.	0.75	0.39	0.68	0.64
137.	4.37	0.04	0.04	0.09
138.	0.02	0.88	0.52	0.53
139.	0.13	0.72	0.96	0.96
140.	22.74	0.00	0.37	0.60
141.	0.17	0.68	0.48	0.50
142.	5.26	0.02	0.06	0.13
143.	0.90	0.34	0.84	0.80
144.	0.73	0.39	0.03	0.05
145.	7.60	0.01	0.15	0.26
146.	2.76	0.10	0.26	0.33
147.	0.60	0.44	0.88	0.85
148.	3.43	0.06	0.70	0.78
149.	3.46	0.06	0.62	0.53
150.	0.10	0.75	0.19	0.21
151.	0.54	0.46	0.46	0.49
152.	4.52	0.03	0.64	0.73
153.	4.80	0.03	0.15	0.24
154.	0.05	0.82	0.36	0.35
155.	1.99	0.16	0.66	0.59
156.	5.83	0.02	0.35	0.47
157.	0.00	0.98	0.79	0.78
158.	0.31	0.58	0.85	0.87
159.	19.90	0.00	0.34	0.56
160.	1.66	0.20	0.16	0.21
161.	7.02	0.01	0.14	0.24
162.	0.01	0.91	0.88	0.88
163.	3.67	0.06	0.17	0.25
164.	35.53	0.00	0.17	0.44
165.	0.12	0.73	0.66	0.64
166.	30.16	0.00	0.32	0.59

167.	1.74	0.19	0.79	0.74
168.	0.06	0.80	0.81	0.80
169.	0.17	0.68	0.86	0.85
170.	6.54	0.01	0.21	0.32
171.	8.23	0.00	0.06	0.15
172.	1.58	0.21	0.27	0.32
173.	1.40	0.24	0.23	0.28
174.	0.10	0.75	0.90	0.91
175.	2.93	0.09	0.81	0.74
176.	11.92	0.00	0.17	0.31
177.	0.09	0.77	0.41	0.42
178.	0.62	0.43	0.60	0.64
179.	0.08	0.78	0.49	0.51
180.	0.08	0.78	0.82	0.83
181.	15.46	0.00	0.71	0.52
182.	0.68	0.41	0.67	0.64
183.	0.78	0.38	0.12	0.09
184.	0.52	0.47	0.68	0.65
185.	18.15	0.00	0.80	0.60
186.	1.68	0.20	0.84	0.79
187.	7.60	0.01	0.80	0.90
188.	2.45	0.12	0.86	0.81
189.	3.59	0.06	0.88	0.81
190.	0.95	0.33	0.45	0.50
191.	1.73	0.19	0.38	0.45
192.	3.42	0.06	0.37	0.46
193.	1.36	0.24	0.29	0.34
194.	0.00	0.98	0.47	0.47
195.	0.26	0.61	0.94	0.92
196.	2.23	0.14	0.45	0.52
197.	0.11	0.74	0.46	0.44
198.	2.03	0.15	0.64	0.57
199.	0.43	0.51	0.79	0.76
200.	0.23	0.63	0.39	0.41
201.	5.04	0.02	0.01	0.05
202.	27.85	0.00	0.09	0.30
203.	0.99	0.32	0.11	0.14
204.	6.20	0.01	0.69	0.58
205.	1.05	0.30	0.09	0.13
206.	1.35	0.24	0.54	0.48
207.	0.78	0.38	0.16	0.20
208.	2.79	0.09	0.35	0.28
209.	12.24	0.00	0.28	0.44
210.	2.44	0.12	0.26	0.33

211.	15.46	0.00	0.01	0.09
212.	1.35	0.25	0.48	0.53
213.	0.82	0.36	0.08	0.10
214.	0.33	0.56	0.27	0.24
215.	7.94	0.00	0.45	0.58
216.	0.01	0.94	0.68	0.68
217.	0.88	0.35	0.17	0.21
218.	8.37	0.00	0.04	0.11
219.	0.01	0.93	0.86	0.87
220.	6.34	0.01	0.15	0.25
221.	0.01	0.91	0.57	0.57
222.	2.07	0.15	0.85	0.80
223.	21.91	0.00	0.25	0.47
224.	0.23	0.63	0.89	0.88
225.	4.90	0.03	0.07	0.13
226.	11.61	0.00	0.19	0.34
227.	0.31	0.57	0.56	0.53
228.	2.85	0.09	0.64	0.55
229.	28.14	0.00	0.06	0.25
230.	7.36	0.01	0.28	0.41
231.	4.10	0.04	0.13	0.20
232.	14.69	0.00	0.53	0.71
233.	0.38	0.54	0.33	0.36
234.	12.36	0.00	0.26	0.42
235.	0.92	0.34	0.80	0.84
236.	0.70	0.40	0.42	0.46
237.	2.72	0.10	0.35	0.27
238.	7.14	0.01	0.09	0.18
239.	15.09	0.00	0.13	0.29
240.	5.68	0.02	0.07	0.15
241.	6.32	0.01	0.02	0.07
242.	2.83	0.09	0.25	0.32
243.	8.91	0.00	0.64	0.50
244.	4.16	0.04	0.33	0.43
245.	1.21	0.27	0.81	0.85
246.	1.90	0.17	0.82	0.77
247.	9.57	0.00	0.76	0.63
248.	0.84	0.36	0.51	0.55
249.	4.69	0.03	0.20	0.30
250.	8.47	0.00	0.55	0.69
251.	2.39	0.12	0.13	0.19
252.	2.77	0.10	0.12	0.17
253.	5.73	0.02	0.01	0.05
254.	0.50	0.48	0.66	0.69

255.	3.91	0.05	0.88	0.82
256.	8.06	0.00	0.01	0.06
257.	2.83	0.09	0.33	0.41
258.	13.50	0.00	0.29	0.47
259.	0.32	0.57	0.33	0.31
260.	3.51	0.06	0.03	0.06
261.	0.71	0.40	0.26	0.30
262.	16.99	0.00	0.39	0.59
263.	0.04	0.84	0.16	0.15
264.	0.08	0.78	0.75	0.74
265.	0.09	0.77	0.77	0.79
266.	0.27	0.60	0.37	0.35
267.	5.08	0.02	0.15	0.23
268.	12.69	0.00	0.19	0.34
269.	0.53	0.47	0.05	0.07
270.	8.13	0.00	0.06	0.14
271.	1.26	0.26	0.64	0.59
272.	0.00	0.94	0.72	0.72
273.	5.81	0.02	0.47	0.59
274.	1.97	0.16	0.84	0.79
275.	17.88	0.00	0.25	0.44
276.	0.42	0.52	0.23	0.20
277.	10.98	0.00	0.24	0.39
278.	0.07	0.80	0.28	0.30
279.	3.91	0.05	0.12	0.18
280.	4.99	0.03	0.40	0.51
281.	0.01	0.90	0.48	0.48
282.	0.92	0.34	0.35	0.40
283.	3.24	0.07	0.16	0.10
284.	0.62	0.43	0.21	0.24
285.	0.01	0.94	0.41	0.40
286.	7.21	0.01	0.15	0.26
287.	4.58	0.03	0.89	0.82
288.	0.07	0.79	0.70	0.69
289.	4.63	0.03	0.05	0.10
290.	0.05	0.82	0.23	0.24
291.	2.69	0.10	0.19	0.26
292.	0.91	0.34	0.04	0.06
293.	3.92	0.05	0.70	0.79
294.	1.85	0.17	0.77	0.83
295.	0.45	0.50	0.38	0.35
296.	0.02	0.88	0.69	0.70
297.	6.09	0.01	0.98	0.93
298.	3.89	0.05	0.78	0.70

299.	0.48	0.49	0.90	0.88
300.	23.93	0.00	0.06	0.23
301.	6.44	0.01	0.53	0.65
302.	14.06	0.00	0.20	0.36
303.	0.00	0.95	0.26	0.26
304.	0.45	0.50	0.57	0.61
305.	0.48	0.49	0.44	0.48
306.	0.68	0.41	0.41	0.45
307.	0.12	0.73	0.48	0.50
308.	0.18	0.67	0.45	0.47
309.	0.03	0.86	0.71	0.71
310.	0.57	0.45	0.71	0.67
311.	4.16	0.04	0.64	0.54
312.	1.61	0.20	0.72	0.67
313.	0.32	0.57	0.32	0.30
314.	2.23	0.14	0.93	0.88
315.	2.34	0.13	0.14	0.20
316.	2.72	0.10	0.93	0.88
317.	0.18	0.67	0.15	0.16
318.	9.75	0.00	0.72	0.57
319.	8.33	0.00	0.38	0.52
320.	19.38	0.00	0.31	0.52
321.	0.18	0.67	0.06	0.07
322.	0.53	0.47	0.52	0.56
323.	0.84	0.36	0.80	0.76
324.	1.20	0.27	0.49	0.54
325.	2.89	0.09	0.39	0.47
326.	0.00	0.99	0.36	0.36
327.	2.13	0.14	0.96	0.93
328.	11.45	0.00	0.66	0.81
329.	2.31	0.13	0.13	0.18
330.	0.02	0.89	0.30	0.31
331.	0.34	0.56	0.28	0.31
332.	2.49	0.11	0.89	0.84
333.	0.65	0.42	0.75	0.79
334.	0.03	0.87	0.18	0.19
335.	0.77	0.38	0.61	0.65
336.	0.09	0.76	0.86	0.85
337.	0.16	0.69	0.22	0.21
338.	8.14	0.00	0.24	0.36
339.	11.13	0.00	0.85	0.71
340.	6.30	0.01	0.59	0.47
341.	0.03	0.87	0.83	0.83

APPENDIX G: ANOVA RESULTS FOR HOME LANGUAGE AND THE NEO-PI-R ITEMS

Item	Facet	Domain	*df*	*f*	*p*
1.	Anxiety	N	1.417	0.36	0.5486
2.	Angry Hostility	N	1.421	0.01	0.9230
3.	Depression	N	1.411	0.35	0.5563
4.	Self-Consciousness	N	1.419	3.44	0.0642
5.	Impulsivity	N	1.418	1.38	0.2411
6.	Vulnerability	N	1.423	0.40	0.5261
7.	Warmth	E	1.422	0.13	0.7163
8.	Gregariousness	E	1.406	0.09	0.7618
9.	Assertiveness	E	1.412	0.32	0.5715
10.	Activity	E	1.419	0.63	0.4289
11	Excitement-Seeking	E	1.422	0.08	0.7809
12	Positive Emotions	E	1.416	0.84	0.3613
13	Fantasy	O	1.417	3.75	0.0536
14	Aesthetics	O	1.422	0.06	0.8096
15	Feelings	O	1.422	2.90	0.0891
16	Actions	O	1.415	0.24	0.6219
17	Ideas	O	1.419	5.88	0.0157
18	Values	O	1.418	4.87	0.0279
19	Trust	A	1.421	5.91	0.0154
20	Straightforwardness	A	1.404	0.21	0.6445
21	Altruism	A	1.416	2.63	0.1059
22	Compliance	A	1.421	0.51	0.4757
23	Modesty	A	1.420	2.93	0.0878
24	Tender-Mindedness	A	1.421	0.81	0.3683
25	Competence	C	1..423	0.27	0.6062
26	Order	C	1.422	2.85	0.0918
27	Dutifulness	C	1.423	0.12	0.7342
28	Achievement Striving	C	1.422	3.94	0.0479
29	Self-Discipline	C	1.421	0.26	0.6124
30	Deliberation	C	1.419	0.45	0.5020
31	Anxiety	N	1.423	0.18	0.6738
32	Angry Hostility	N	1.422	0.86	0.3545
33	Depression	N	1.421	7.30	0.0072
34	Self-Consciousness	N	1.419	0.90	0.3424
35	Impulsivity	N	1.421	0.85	0.3562
36	Vulnerability	N	1.420	0.52	0.4715
37	Warmth	E	1.421	4.87	0.0279
38	Gregariousness	E	1.422	0.48	0.4875
39	Assertiveness	E	1.421	1.48	0.2250
40	Activity	E	1.420	5.79	0.0165
41	Excitement-Seeking	E	1.418	4.68	0.0311
42	Positive Emotions	E	1.418	2.10	0.1480
43	Fantasy	O	1.422	8.55	0.0037
44	Aesthetics	O	1.418	12.46	0.0005

45	Feelings	O	1.420	3.29	0.0702
46	Actions	O	1.422	2.75	0.0977
47	Ideas	O	1.416	3.24	0.0724
48	Values	O	1.423	0.58	0.4454
49	Trust	A	1.419	1.07	0.3009
50	Straightforwardness	A	1.423	0.02	0.8955
51	Altruism	A	1.421	0.10	0.7545
52	Compliance	A	1.420	1.01	0.3157
53	Modesty	A	1.422	1.65	0.1992
54	Tender-Mindedness	A	1.422	0.26	0.6088
55	Competence	C	1.422	3.04	0.0818
56	Order	C	1.423	1.21	0.2726
57	Dutifulness	C	1.421	0.27	0.6008
58	Achievement Striving	C	1.422	0.76	0.3828
59	Self-Discipline	C	1.422	2.54	0.1119
60	Deliberation	C	1.422	7.87	0.0053
61	Anxiety	N	1.420	4.10	0.0436
62	Angry Hostility	N	1.420	1.86	0.1733
63	Depression	N	1.420	1.59	0.2077
64	Self-Consciousness	N	1.423	19.98	<0.0001
65	Impulsivity	N	1.422	0.05	0.8280
66	Vulnerability	N	1.423	0.55	0.4596
67	Warmth	E	1.422	2.91	0.0885
68	Gregariousness	E	1.420	5.00	0.1258
69	Assertiveness	E	1.422	0.00	0.9663
70	Activity	E	1.413	9.63	0.0021
71	Excitement-Seeking	E	1.421	0.25	0.6183
72	Positive Emotions	E	1.422	0.10	0.7485
73	Fantasy	O	1.423	0.00	0.9620
74	Aesthetics	O	1.423	4.00	0.0461
75	Feelings	O	1.421	1.71	0.1912
76	Actions	O	1.420	0.01	0.9276
77	Ideas	O	1.422	6.32	0.0123
78	Values	O	1.419	1.96	0.1626
79	Trust	A	1.422	4.50	0.0345
80	Straightforwardness	A	1.421	0.00	0.9784
81	Altruism	A	1.422	0.52	0.4696
82	Compliance	A	1.423	3.78	0.0525
83	Modesty	A	1.422	0.16	0.6899
84	Tender-Mindedness	A	1.419	4.60	0.0326
85	Competence	C	1.421	0.41	0.5200
86	Order	C	1.421	1.09	0.2980
87	Dutifulness	C	1.422	0.81	0.3678
88	Achievement Striving	C	1.423	1.23	0.2674
89	Self-Discipline	C	1.422	3.27	0.0712
90	Deliberation	C	1.422	6.89	0.0090
91	Anxiety	N	1.423	2.61	0.1072
92	Angry Hostility	N	1.422	0.21	0.6509

93	Depression	N	1.423	1.53	0.2168
94	Self-Consciousness	N	1.423	2.56	0.1104
95	Impulsivity	N	1.423	4.17	0.0417
96	Vulnerability	N	1.421	0.05	0.8303
97	Warmth	E	1.421	1.93	0.1654
98	Gregariousness	E	1.420	1.81	0.1789
99	Assertiveness	E	1.422	0.08	0.7805
100	Activity	E	1.423	5.56	0.0188
101.	Excitement-Seeking	E	1.422	2.87	0.0908
102.	Positive Emotions	E	1.422	0.00	0.9625
103.	Fantasy	O	1.420	9.23	0.0025
104.	Aesthetics	O	1.423	0.09	0.7699
105.	Feelings	O	1.416	0.34	0.5587
106.	Actions	O	1.423	0.03	0.8611
107.	Ideas	O	1.422	0.48	0.4893
108.	Values	O	1.422	5.15	0.0238
109.	Trust	A	1.423	1.50	0.2210
110.	Straightforwardness	A	1.421	0.33	0.5682
111	Altruism	A	1.422	0.86	0.3539
112	Compliance	A	1.422	3.45	0.0640
113	Modesty	A	1.423	2.39	0.1230
114	Tender-Mindedness	A	1.423	8.58	0.0036
115	Competence	C	1.419	0.89	0.3461
116	Order	C	1.420	2.33	0.1273
117	Dutifulness	C	1.416	3.03	0.0823
118	Achievement Striving	C	1.418	0.91	0.3402
119	Self-Discipline	C	1.286	14.64	0.0002
120	Deliberation	C	1.422	8.81	0.0032
121	Anxiety	N	1.409	13.75	0.0002
122	Angry Hostility	N	1.423	0.13	0.7221
123	Depression	N	1.422	0.02	0.8859
124	Self-Consciousness	N	1.423	2.95	0.0866
125	Impulsivity	N	1.419	0.11	0.7353
126	Vulnerability	N	1.421	1.17	0.2808
127	Warmth	E	1.422	2.64	0.1049
128	Gregariousness	E	1.422	0.42	0.5186
129	Assertiveness	E	1.422	4.36	0.0374
130	Activity	E	1.422	1.64	0.2011
131	Excitement-Seeking	E	1.423	0.11	0.7401
132	Positive Emotions	E	1.422	1.58	0.2093
133	Fantasy	O	1.423	1.49	0.2225
134	Aesthetics	O	1.422	0.00	0.9514
135	Feelings	O	1.422	0.13	0.7179
136	Actions	O	1.421	6.79	0.0095
137	Ideas	O	1.420	0.21	0.6467
138	Values	O	1.421	2.64	0.1048
139	Trust	A	1.419	1.52	0.2177
140	Straightforwardness	A	1.420	5.37	0.0210

141	Altruism	A	1.421	13.66	0.0002
142	Compliance	A	1.419	5.17	0.0234
143	Modesty	A	1.421	0.06	0.8058
144	Tender-Mindedness	A	1.419	27.82	<0.0001
145	Competence	C	1.421	0.81	0.3687
146	Order	C	1.423	4.99	0.0260
147	Dutifulness	C	1.419	0.00	0.9899
148	Achievement Striving	C	1.422	11.51	0.0008
149	Self-Discipline	C	1.422	0.00	0.9624
150	Deliberation	C	1.423	0.43	0.5118
151	Anxiety	N	1.423	0.04	0.8397
152	Angry Hostility	N	1.423	0.47	0.4938
153	Depression	N	1.423	2.69	0.1018
154	Self-Consciousness	N	1.422	3.12	0.0782
155	Impulsivity	N	1.421	3.42	0.0652
156	Vulnerability	N	1.421	0.00	0.9551
157	Warmth	E	1.422	9.04	0.0028
158	Gregariousness	E	1.421	0.24	0.6224
159	Assertiveness	E	1.422	1.88	0.1709
160	Activity	E	1.366	0.38	0.5397
161	Excitement-Seeking	E	1.420	18.30	<0.0001
162	Positive Emotions	E	1.421	6.50	0.0112
163	Fantasy	O	1.421	33.14	<0.0001
164	Aesthetics	O	1.421	0.29	0.5874
165	Feelings	O	1.419	0.68	0.4108
166	Actions	O	1.423	7.41	0.0068
167	Ideas	O	1.423	1.24	0.2660
168	Values	O	1.422	2.74	0.0984
169	Trust	A	1.422	8.62	0.0035
170	Straightforwardness	A	1.423	4.01	0.0458
171	Altruism	A	1.415	0.30	0.5825
172	Compliance	A	1.419	4.27	0.0394
173	Modesty	A	1.418	9.11	0.0027
174	Tender-Mindedness	A	1.421	0.49	0.4854
175	Competence	C	1.422	0.00	0.9961
176	Order	C	1.421	0.00	0.9673
177	Dutifulness	C	1.421	1.08	0.2983
178	Achievement Striving	C	1.421	0.01	0.9394
179	Self-Discipline	C	1.421	13.13	0.0003
180	Deliberation	C	1.423	0.12	0.7326
181	Anxiety	N	1.421	0.82	0.3647
182	Angry Hostility	N	1.422	0.26	0.6075
183	Depression	N	1.418	15.40	0.0001
184	Self-Consciousness	N	1.422	1.54	0.2150
185	Impulsivity	N	1.421	1.49	0.2222
186	Vulnerability	N	1.419	8.08	0.0047
187	Warmth	E	1.421	0.04	0.8445
188	Gregariousness	E	1.422	0.00	0.9820

189	Assertiveness	E	1.423	0.55	0.4575
190	Activity	E	1.419	2.20	0.1390
191	Excitement-Seeking	E	1.420	0.91	0.3400
192	Positive Emotions	E	1.421	0.12	0.7249
193	Fantasy	O	1.416	0.11	0.7457
194	Aesthetics	O	1.422	2.21	0.1382
195	Feelings	O	1.422	6.99	0.0085
196	Actions	O	1.423	0.60	0.4381
197	Ideas	O	1.421	27.38	<0.0001
198	Values	O	1.415	1.30	0.2543
199	Trust	A	1.423	6.01	0.0146
200	Straightforwardness	A	1.421	0.29	0.5906
201.	Altruism	A	1.422	0.51	0.4768
202.	Compliance	A	1.422	0.26	0.6133
203.	Modesty	A	1.419	0.55	0.4589
204.	Tender-Mindedness	A	1.422	2.26	.0.1333
205.	Competence	C	1.421	0.01	0.9399
206.	Order	C	1.422	1.40	0.2376
207.	Dutifulness	C	1.421	2.00	0.1582
208.	Achievement Striving	C	1.422	47.47	.<0.0001
209.	Self-Discipline	C	1.423	3.71	0.0549
210.	Deliberation	C	1.421	9.30	0.0024
211	Anxiety	N	1.423	0.01	0.9337
212	Angry Hostility	N	1.423	2.09	0.1493
213	Depression	N	1.421	8.66	0.0034
214	Self-Consciousness	N	1.422	2.40	0.1221
215	Impulsivity	N	1.422	0.35	0.5572
216	Vulnerability	N	1.423	5.56	0.0188
217	Warmth	E	1.423	3.69	0.5553
218	Gregariousness	E	1.422	1.02	0.3138
219	Assertiveness	E	1.410	0.00	0.9727
220	Activity	E	1.420	1.62	0.2034
221	Excitement-Seeking	E	1.421	0.60	0.4396
222	Positive Emotions	E	1.423	3.38	0.0669
223	Fantasy	O	1.421	27.38	<0.0001
224	Aesthetics	O	1.422	1.70	0.1932.
225	Feelings	O	1.423	0.07	0.7981
226	Actions	O	1.420	2.37	0.1244
227	Ideas	O	1.423	0.79	0.3760
228	Values	O	1.421	1.24	0.2652
229	Trust	A	1.421	0.01	0.9105
230	Straightforwardness	A	1.422	0.26	0.6108
231	Altruism	A	1.422	12.56	0.0004
232	Compliance	A	1.423	2.65	0.1044
233	Modesty	A	1.423	0.07	0.7954
234	Tender-Mindedness	A	1.421	4.75	0.0299
235	Competence	C	1.422	6.10	0.0139
236	Order	C	1.422	3.72	0.0544

237	Dutifulness	C	1.419	2.21	0.1379
238	Achievement Striving	C	1.374	2.27	0.1329
239	Self-Discipline	C	1.413	7.43	0.0067
240	Deliberation	C	1.422	14.15	0.0002

APPENDIX H: CHI^2 RESULTS FOR HOME LANGUAGE AND THE CPAI-2 ITEMS

Item	χ	P	Xe1	Xe2
1.	0.00	0.95	0.77	0.78
2.	3.02	0.08	0.56	0.47
3.	11.95	0.00	0.70	0.52
4.	0.00	0.95	0.11	0.10
5.	0.66	0.42	0.69	0.65
6.	2.25	0.13	0.29	0.36
7.	0.20	0.66	0.31	0.29
8.	9.27	0.00	0.87	0.75
9.	2.99	0.08	0.96	0.92
10.	3.45	0.06	0.39	0.30
11.	2.81	0.09	0.36	0.44
12.	0.28	0.60	0.28	0.25
13.	2.30	0.13	0.20	0.27
14.	7.84	0.01	0.08	0.17
15.	2.89	0.09	0.20	0.13
16.	0.45	0.50	0.69	0.72
17.	1.04	0.31	0.83	0.87
18.	3.99	0.05	0.85	0.92
19.	3.97	0.05	0.74	0.65
20.	2.84	0.09	0.80	0.87
21.	0.54	0.46	0.74	0.77
22.	0.16	0.69	0.15	0.13
23.	6.93	0.01	0.44	0.58
24.	0.01	0.91	0.63	0.63
25.	6.63	0.01	0.88	0.78
26.	0.42	0.52	0.44	0.47
27.	0.54	0.46	0.69	0.73
28.	0.35	0.55	0.49	0.52
29.	0.79	0.38	0.74	0.78
30.	1.49	0.22	0.39	0.45
31.	16.58	0.00	0.81	0.63
32.	0.87	0.35	0.23	0.19
33.	0.13	0.72	0.52	0.50
34.	3.28	0.07	0.51	0.60
35.	4.70	0.03	0.78	0.68
36.	0.15	0.70	0.28	0.26
37.	1.20	0.27	0.52	0.46
38.	1.23	0.27	0.89	0.92

39.	0.31	0.58	0.55	0.58
40.	15.83	0.00	0.37	0.57
41.	0.81	0.37	0.27	0.32
42.	6.43	0.01	0.42	0.55
43.	9.06	0.00	0.43	0.59
44.	4.86	0.03	0.75	0.65
45.	13.31	0.00	0.63	0.44
46.	0.44	0.51	0.91	0.93
47.	4.10	0.04	0.03	0.07
48.	1.38	0.24	0.37	0.43
49.	2.79	0.10	0.63	0.54
50.	4.67	0.03	0.67	0.56
51.	0.10	0.76	0.63	0.65
52.	0.01	0.92	0.94	0.95
53.	7.54	0.01	0.59	0.73
54.	0.33	0.57	0.38	0.35
55.	5.63	0.02	0.58	0.45
56.	8.39	0.00	0.23	0.37
57.	11.45	0.00	0.19	0.34
58.	0.30	0.59	0.92	0.91
59.	0.21	0.65	0.71	0.73
60.	0.85	0.36	0.95	0.93
61.	0.02	0.88	0.40	0.41
62.	0.20	0.65	0.57	0.55
63.	0.21	0.65	0.21	0.23
64.	1.03	0.31	0.74	0.69
65.	24.72	0.00	0.73	0.49
66.	0.65	0.42	0.72	0.75
67.	3.88	0.05	0.69	0.60
68.	1.27	0.26	0.51	0.57
69.	2.03	0.15	0.30	0.37
70.	4.45	0.03	0.45	0.56
71.	4.38	0.04	0.64	0.53
72.	3.35	0.07	0.27	0.36
73.	1.82	0.18	0.94	0.97
74.	0.26	0.61	0.48	0.50
75.	0.58	0.45	0.60	0.64
76.	7.92	0.00	0.40	0.54
77.	0.56	0.46	0.92	0.90
78.	4.78	0.03	0.82	0.72
79.	2.75	0.10	0.16	0.22
80.	0.31	0.57	0.34	0.37

81.	0.11	0.74	0.87	0.86
82.	0.02	0.89	0.76	0.76
83.	0.01	0.93	0.30	0.29
84.	0.03	0.87	0.40	0.40
85.	0.97	0.33	0.50	0.55
86.	1.91	0.17	0.67	0.61
87.	4.98	0.03	0.64	0.53
88.	0.34	0.56	0.63	0.65
89.	0.70	0.40	0.48	0.53
90.	0.67	0.41	0.84	0.81
91.	0.00	0.99	0.66	0.66
92.	0.07	0.79	0.80	0.79
93.	2.79	0.10	0.34	0.26
94.	2.78	0.10	0.34	0.26
95.	0.86	0.35	0.89	0.92
96.	7.57	0.01	0.21	0.33
97.	4.20	0.04	0.30	0.21
98.	4.86	0.03	0.87	0.79
99.	0.01	0.92	0.35	0.34
100.	0.90	0.34	0.14	0.17
101.	2.45	0.12	0.34	0.42
102.	0.56	0.46	0.08	0.10
103.	0.25	0.61	0.10	0.12
104.	5.28	0.02	0.56	0.44
105.	0.17	0.68	0.63	0.65
106.	9.84	0.00	0.37	0.53
107.	0.01	0.92	0.55	0.55
108.	0.02	0.90	0.91	0.91
109.	2.67	0.10	0.42	0.51
110.	5.57	0.02	0.31	0.42
111.	0.13	0.72	0.91	0.92
112.	0.09	0.77	0.13	0.14
113.	0.28	0.59	0.14	0.16
114.	0.54	0.46	0.47	0.51
115.	11.45	0.00	0.69	0.52
116.	12.33	0.00	0.73	0.88
117.	2.12	0.15	0.81	0.86
118.	1.05	0.31	0.62	0.67
119.	0.66	0.42	0.39	0.35
120.	3.19	0.07	0.46	0.55
121.	0.04	0.85	0.45	0.46

122.	0.13	0.72	0.24	0.23
123.	0.13	0.72	0.44	0.46
124.	5.26	0.02	0.30	0.42
125.	5.09	0.02	0.61	0.72
126.	1.82	0.18	0.54	0.61
127.	0.59	0.44	0.78	0.81
128.	8.19	0.00	0.77	0.64
129.	2.11	0.15	0.17	0.23
130.	9.38	0.00	0.23	0.37
131.	0.00	0.98	0.45	0.45
132.	1.38	0.24	0.34	0.40
133.	8.02	0.00	0.66	0.79
134.	0.78	0.38	0.14	0.11
135.	1.59	0.21	0.43	0.49
136.	2.99	0.08	0.68	0.60
137.	0.40	0.53	0.07	0.05
138.	0.59	0.44	0.51	0.55
139.	0.55	0.46	0.95	0.97
140.	5.59	0.02	0.46	0.58
141.	2.10	0.15	0.52	0.44
142.	3.90	0.05	0.08	0.14
143.	1.68	0.19	0.83	0.78
144.	0.02	0.88	0.04	0.04
145.	4.39	0.04	0.18	0.27
146.	0.69	0.41	0.29	0.33
147.	3.89	0.05	0.84	0.91
148.	8.58	0.00	0.70	0.84
149.	2.50	0.11	0.60	0.51
150.	1.01	0.31	0.21	0.17
151.	0.18	0.67	0.47	0.49
152.	0.46	0.50	0.68	0.71
153.	0.16	0.69	0.19	0.21
154.	0.02	0.89	0.36	0.35
155.	4.85	0.03	0.66	0.55
156.	0.48	0.49	0.43	0.39
157.	1.24	0.27	0.80	0.75
158.	1.69	0.19	0.85	0.89
159.	7.50	0.01	0.42	0.56
160.	2.92	0.09	0.16	0.23
161.	0.91	0.34	0.18	0.22
162.	0.05	0.83	0.88	0.89
163.	1.69	0.19	0.20	0.25
164.	15.72	0.00	0.26	0.45

165.	0.24	0.62	0.66	0.63
166.	23.52	0.00	0.39	0.64
167.	0.44	0.51	0.75	0.78
168.	0.00	0.95	0.81	0.80
169.	0.47	0.49	0.85	0.87
170.	4.49	0.03	0.24	0.34
171.	0.53	0.47	0.10	0.13
172.	0.87	0.35	0.28	0.33
173.	1.92	0.17	0.24	0.30
174.	0.32	0.57	0.90	0.92
175.	0.31	0.58	0.78	0.75
176.	3.03	0.08	0.22	0.30
177.	0.01	0.92	0.42	0.41
178.	0.21	0.65	0.61	0.63
179.	0.81	0.37	0.52	0.47
180.	0.92	0.34	0.81	0.85
181.	1.31	0.25	0.62	0.56
182.	1.99	0.16	0.67	0.60
183.	5.00	0.03	0.12	0.05
184.	2.12	0.15	0.69	0.61
185.	24.59	0.00	0.77	0.53
186.	5.60	0.02	0.84	0.74
187.	2.83	0.09	0.83	0.90
188.	4.57	0.03	0.86	0.77
189.	2.20	0.14	0.86	0.80
190.	2.24	0.13	0.45	0.53
191.	8.41	0.00	0.37	0.52
192.	1.40	0.24	0.40	0.46
193.	5.40	0.02	0.29	0.40
194.	2.07	0.15	0.49	0.42
195.	0.00	1.00	0.93	0.93
196.	0.56	0.45	0.47	0.51
197.	0.03	0.86	0.45	0.46
198.	0.88	0.35	0.62	0.57
199.	5.49	0.02	0.80	0.70
200.	1.13	0.29	0.39	0.44
201.	0.00	0.96	0.03	0.03
202.	11.87	0.00	0.16	0.30
203.	1.55	0.21	0.11	0.16
204.	1.17	0.28	0.65	0.59
205.	0.04	0.84	0.11	0.11
206.	1.28	0.26	0.53	0.47
207.	2.01	0.16	0.16	0.22
208.	3.66	0.06	0.34	0.25

209.	9.13	0.00	0.32	0.47
210.	1.18	0.28	0.28	0.34
211.	0.95	0.33	0.04	0.07
212.	0.27	0.60	0.52	0.49
213.	0.26	0.61	0.10	0.08
214.	0.08	0.77	0.25	0.26
215.	1.74	0.19	0.50	0.57
216.	0.08	0.78	0.68	0.69
217.	0.01	0.91	0.19	0.20
218.	0.37	0.54	0.07	0.09
219.	0.09	0.76	0.86	0.87
220.	0.35	0.55	0.21	0.19
221.	0.04	0.85	0.57	0.56
222.	7.56	0.01	0.86	0.75
223.	102.02	0.00	0.35	0.87
224.	227.67	0.00	0.89	0.14
225.	37.52	0.00	0.09	0.33
226.	28.50	0.00	0.25	0.51
227.	0.23	0.63	0.56	0.53
228.	29.59	0.00	0.62	0.34
229.	68.51	0.00	0.08	0.42
230.	10.40	0.00	0.31	0.17
231.	104.68	0.00	0.16	0.66
232.	30.05	0.00	0.61	0.32
233.	1.12	0.29	0.36	0.41
234.	103.48	0.00	0.31	0.84
235.	58.26	0.00	0.81	0.44
236.	6.80	0.01	0.44	0.31
237.	10.84	0.00	0.31	0.16
238.	18.97	0.00	0.13	0.31
239.	3.80	0.05	0.18	0.11
240.	2.55	0.11	0.12	0.07
241.	76.60	0.00	0.03	0.34
242.	14.31	0.00	0.27	0.46
243.	11.40	0.00	0.61	0.44
244.	87.75	0.00	0.36	0.85
245.	1.22	0.27	0.82	0.78
246.	14.83	0.00	0.80	0.62
247.	14.75	0.00	0.72	0.53
248.	27.02	0.00	0.53	0.26
249.	85.12	0.00	0.25	0.72
250.	76.77	0.00	0.58	0.13
251.	0.06	0.81	0.18	0.17
252.	4.28	0.04	0.14	0.07

253.	240.05	0.00	0.02	0.70
254.	16.44	0.00	0.66	0.85
255.	239.06	0.00	0.84	0.05
256.	105.01	0.00	0.03	0.43
257.	17.58	0.00	0.35	0.57
258.	0.71	0.40	0.31	0.27
259.	45.54	0.00	0.34	0.04
260.	49.91	0.00	0.05	0.30
261.	41.52	0.00	0.27	0.60
262.	33.97	0.00	0.45	0.16
263.	170.76	0.00	0.15	0.81
264.	4.21	0.04	0.72	0.81
265.	84.40	0.00	0.76	0.30
266.	9.65	0.00	0.39	0.23
267.	25.28	0.00	0.18	0.40
268.	12.35	0.00	0.21	0.08
269.	6.54	0.01	0.06	0.13
270.	146.65	0.00	0.09	0.65
271.	10.99	0.00	0.60	0.76
272.	3.62	0.06	0.70	0.60
273.	38.27	0.00	0.50	0.82
274.	56.52	0.00	0.81	0.45
275.	10.55	0.00	0.31	0.16
276.	3.18	0.07	0.23	0.31
277.	1.15	0.28	0.33	0.27
278.	5.84	0.02	0.30	0.19
279.	64.98	0.00	0.14	0.50
280.	0.05	0.82	0.44	0.45
281.	0.44	0.51	0.50	0.46
282.	36.36	0.00	0.34	0.07
283.	1.77	0.18	0.16	0.21
284.	22.36	0.00	0.23	0.46
285.	5.54	0.02	0.38	0.26
286.	143.29	0.00	0.19	0.79
287.	16.22	0.00	0.88	0.72
288.	114.46	0.00	0.69	0.13
289.	29.23	0.00	0.06	0.23
290.	1.32	0.25	0.24	0.29
291.	12.07	0.00	0.20	0.07
292.	249.31	0.00	0.04	0.77
293.	4.06	0.04	0.74	0.83
294.	95.33	0.00	0.79	0.30
295.	26.24	0.00	0.39	0.66
296.	21.98	0.00	0.71	0.92

297.	74.76	0.00	0.97	0.66
298.	9.84	0.00	0.77	0.90
299.	206.62	0.00	0.89	0.18
300.	118.74	0.00	0.14	0.66
301.	18.53	0.00	0.56	0.34
302.	0.32	0.57	0.27	0.24
303.	38.36	0.00	0.26	0.57
304.	3.06	0.08	0.60	0.51
305.	2.81	0.09	0.44	0.35
306.	1.33	0.25	0.46	0.52
307.	0.38	0.54	0.47	0.44
308.	24.44	0.00	0.47	0.72
309.	0.70	0.40	0.70	0.66
310.	14.75	0.00	0.70	0.51
311.	1.89	0.17	0.63	0.69
312.	72.89	0.00	0.69	0.25
313.	111.04	0.00	0.34	0.89
314.	256.42	0.00	0.91	0.12
315.	183.66	0.00	0.20	0.89
316.	242.09	0.00	0.90	0.14
317.	75.29	0.00	0.16	0.57
318.	1.10	0.29	0.67	0.61
319.	5.05	0.02	0.38	0.50
320.	48.65	0.00	0.39	0.06
321.	108.88	0.00	0.07	0.52
322.	15.50	0.00	0.55	0.75
323.	26.34	0.00	0.79	0.55
324.	0.24	0.62	0.50	0.48
325.	2.47	0.12	0.42	0.34
326.	122.47	0.00	0.37	0.95
327.	11.95	0.00	0.95	0.84
328.	103.11	0.00	0.69	0.16
329.	20.48	0.00	0.16	0.35
330.	0.34	0.56	0.28	0.31
331.	99.67	0.00	0.29	0.81
332.	5.83	0.02	0.88	0.79
333.	130.40	0.00	0.76	0.17
334.	87.20	0.00	0.19	0.65
335.	23.28	0.00	0.63	0.86
336.	169.80	0.00	0.86	0.21
337.	20.13	0.00	0.22	0.43
338.	77.34	0.00	0.25	0.70
339.	66.65	0.00	0.81	0.42
340.	23.54	0.00	0.57	0.81

341.	0.39	0.53	0.84	0.81