THE DEVELOPMENT OF AN EXPERIMENTAL CONSCIENTIOUSNESS MEASUREMENT INSTRUMENT WITHIN THE SAPI PROJECT

By

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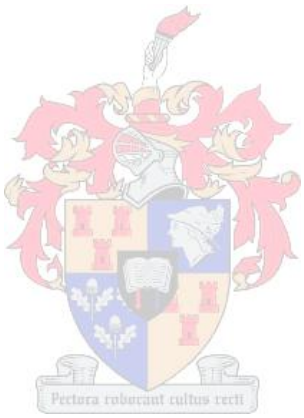

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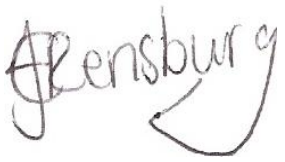
DECLARATION

I, the undersigned, hereby declare that this thesis is my own original work and that all sources have been accurately reported and acknowledged, and that this document has not previously, in its entirety not in part, been submitted at any university in order to obtain an academic qualification.

Signature: _____  _____

Charnélle Janse van Rensburg

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ABSTRACT

Charnélle Janse van Rensburg and Prof. Deon Meiring (Stellenbosch University)

THE DEVELOPMENT OF AN EXPERIMENTAL CONSCIENTIOUSNESS MEASUREMENT INSTRUMENT WITHIN THE SAPI PROJECT

In psychology literature Conscientiousness forms part of a model that describes personality. Conscientiousness is defined by characteristics such as hard-working, determined, dutiful and perseverance. Conscientiousness is also a strong indicator of work performance and is often used for psychometric assessments during selection. However, in South Africa psychometric assessment, and especially personality testing, has been scrutinised to ensure that it is fair and unbiased in a multicultural society.

This study focussed on the development of a Conscientiousness questionnaire based on a South African model of conscientiousness, which forms one factor of the South African Personality Inventory (SAPI) nine cluster model. The study aimed to investigate whether this conscientiousness questionnaire measures conscientiousness in South Africa. The study formed part of the second phase of the SAPI project (quantitative phase). An experimental conscientiousness instrument consisting of 255 items was administered to a sample of South African Police Service (SAPS) police reservists (N = 1051).

Following various analyses 88 of the 255 items were removed. The facets also increased to 26. Cronbach alpha coefficient scores showed acceptable levels of reliability for 21 of the 26 facets. Factor analysis indicated that one factor should be retained. 19 facets loaded on this factor. The findings thus confirm the underlying dimensionality of the conscientiousness cluster. However, the findings also indicate that some facets may have to be re-defined.

Keywords: *Conscientiousness, personality testing, South African Personality Inventory (SAPI) project, cross cultural testing, personality models.*

OPSOMMING

Charnélle Janse van Rensburg & Prof. Deon Meiring (Universiteit van Stellenbosch)

DIE ONTWIKKELING VAN 'N EKSPERIMENTELE KONSENSIEUSHEIDS INSTRUMENT IN DIE SAPI PROKEK

In die sielkunde literatuur is konsensieusheid deel van „n model wat persoonlikheid beskryf. Dit word gedefinieer deur eienskappe soos hardwerkendheid, determinasie, pligsgetrouheid en uithouvermoë. Konsensieusheid is ook „n sterk aanwyser van werkprestasie en word dikwels gebruik vir psigometriese assessering gedurende seleksie. Maar die gebruik van psigometriesetoetse en veral die gebruik van persoonlikheids toetse in Suid Afrika is egter onder die vergrootglas geplaas om te verseker dat hierdie toetse billik en onsydig toegepas kan word in Suid Afrika.

Hierdie studie fokus op die ontwikkeling van „n konsensieheusheids-persoonlikheidsvraelys wat gebaseer is op die Suid Afrikaanse model van konsensieusheid en wat deel uitmaak van die Suid Afrikaanse Persoonlikheids-Inventaris (SAPI) se nege faktor model. Hierdie studie is deel van die tweede fase van die SAPI projek (kwantitatiewe fase) en stel ondersoek in of hierdie persoonlikheidsvraelys wel die konstruk van konsensieusheid meet in Suid Afrika. Die eksperimentele konsensieusheidsinstrument, wat bestaan uit 255 items, was aan „n steekproef van intreevlak polisieaansoekers van die Suid Afrikaanse Polisie Dienste (*N*=1051) toegedien.

Na verskeie analises, is 88 van die 255 items verwyder. Die fasette het ook vermeerder na 26. Verder het die Cronbach Alpha koëffissiënttellings gunstige vlakke van betroubaarheid aangedui vir 21 van die 26 fasette. Faktoranalise het aangedui dat een faktor onttrek moet word en 19 fasette het hierop gelaai. Dus is die onderliggende dimensie van die konsensieusheid faktor bevestig. Daar sal egter van die fasette herdefineer moet word.

Sleutelwoorde: Konsensieusheid, Persoonlikheidstoetste, Suid Afrikaanse Persoonlikheids Inventaris (SAPI) projek, kruis-kulturele toetsing, persoonlikheids-modelle

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CHAPTER 1: RESEARCH PROBLEMS AND RESEARCH OBJECTIVES

1.1 INTRODUCTION AND JUSTIFICATION FOR THE STUDY

Psychometric assessments are often used for selection and development purposes. When used correctly they can assist in successfully selecting and placement of candidates (Van der Merwe, 2002; Van der Vijver & Rothmann, 2004). Furthermore, the use of personality measurement for the prediction of academic and job performance has also grown in importance (La Grange & Roodt, 2001; Van der Walt, Meiring, Rothmann & Barrick, 2002). Personality measurement can enhance fairness in personnel decisions (Hogan, Hogan & Roberts, 1996) especially when used in combination with information gathered from other sources (Foxcroft, 1997).

Barrick and Mount (1991) and Salgado (1997) found that the personality factor „Conscientiousness' is one of the best predictors of job performance across job categories in the United States of America (USA) and Europe. Measures of conscientiousness have been shown to predict task performance (Ones, Viswesvaran & Schmidt, 1993), contextual performance (Hogan, Rybicki, Motowidlo & Borman, 1998; Ladd & Henry, 2000) and a variety of outcomes related to adaptive social functioning (Roberts, Chernyshenko, Stark & Goldberg, 2005). These outcomes include, but are not limited to, career success (Judge, Higgins, Thoresen & Barrick, 1999), marital stability (Kelly & Conley, 1987; Tucker, Kressin, Spiro & Rusico, 1998), healthy lifestyle behaviours (Roberts & Bogg, 2004) and longevity (Friedman et al., 1993). Morgenson, Campion, Dipboye, Hollenbeck, Murphy and Schmitt (2007) questioned the use of psychometrics, especially personality tests, in personnel selection. These authors were concerned about candidates faking on self-report personality tests. They also expressed concerns regarding the low predictive validity of personality tests for job performance (Morgenson et al., 2007). However, the use of personality tests to aide in the selection and development of personnel continues to receive research support (Ones, Dilchert, Viswesvaran & Judge, in Press). Research conducted in South Africa by Rothmann, Meiring, Van der Walt and Barrick (2002) provided evidence that conscientiousness is a valid predictor for job and career success within the South African context.

South Africa is a multi-faceted, multi-cultural and multi-lingual country that has undergone many changes following the first democratic general elections in 1994. New laws and a new

constitution govern how society operates from day to day. Of particular importance to the field of psychology is the Employment Equity Act No. 55 of 1998, Government Gazette, (1998) and specifically section 8 of the act. This act has direct bearing on the use of psychometric testing in the new dispensation. Although evidence exists proving that psychometric assessments enhance decision-making (Bedell, Van Eeden & Van Staden, 1999) there are challenges involved in making use of these assessments against the backdrop of South Africa's torrid history.

Foxcroft and Roodt (2001) explain that since the first democratic elections, the control and development of assessments and measures has become a contested terrain. The ruling African National Congress (ANC) has demonstrated increased focus on issues of equality in order to redress past imbalances. This focus has lead to growing resistance to the use of assessments in both industry and education fields (Foxcroft & Roodt, 2001).

The adoption of the new Constitution and the Labour Relations Act in 1996 provided trade unions and individuals with legislative support specifically forbidding any discriminatory practices in the workplace. This protection extends to job applicants. The Employment Equity Act, section 8 (Government Gazette, 1998) refers to psychological tests and assessment and states that:

> 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.

This strict control over assessment use was welcomed, although it posed a problem in terms of current assessment tools. Foxcroft and Roodt (2005) state that the Employment Equity Act has major implications for assessment practitioners in South Africa because many of the measures currently in use, whether imported from abroad or developed locally, have not been cross-culturally validated. For example, Van de Vijver and Leung (2001, p.1012) explain that: "Imported personality instruments are more likely to run into bias problems because they may be inadequate in tapping the underlying personality outside their culture of origin". Furthermore, the norms were based on samples from abroad (such as America and the United

Kingdom) and that in reality the tests are not applicable to the South African population and culture.

Various authors (Claassen, 1997; Huysamen, 2002; Van de Vijver & Rothmann, 2004;) explain that in South Africa psychological tests were developed separately for Afrikaans and English speaking groups, but the large group of speakers of African languages was excluded. Foxcroft (2004) notes that very few new culturally relevant tests that can be applied to a diverse range of cultural and language groups have been developed.

Language presents one of the biggest problems in psychological assessment (Meiring, 2007). According to Foxcroft (2004, p.98), "language is one of the parameters along which cultures vary and may be the most important mediator of test performance, especially when the language in which the measure is administered is not the home language of the test taker". Authors such as Nell (1994) and Van Eeden and Mantsha (2007) support this statement. Problems may also arise in relation to inadequate test translation and misunderstandings and miscommunication by test-takers. These factors all influence test scores and may put the test-takers at a disadvantage (Nell, 1994; Van den Berg, 1996).

However, language is not the only problem faced by psychological assessment. Culture also plays an important role. Triandis (1997) defines culture as "a shared set of beliefs, attitudes, norms, values, and behaviour organised around a central theme and found among speakers of one language, in one time period, and in one geographic region." In South Africa, where there are eleven official languages and a multitude of cultures, ethnicity, history and differences in education and socio-political context, the influence of these factors is likely to be significant.

Van de Vijver and Leung (2001, p.1008) explain that: "Studies that employ a cultural psychological approach examine personality in a specific cultural context, whereas cross-cultural studies examine and compare personality across cultures". In cross-cultural psychology cultures have a profound influence on behaviour and thus must be included in the research design (Kim, Park & Park, 2000). For example, a South African study concerning the cross-cultural applicability of the 16PF showed that the scores obtained were strongly influenced by race (Abrahams, 1996). Abrahams (1996) found significant differences in the means, reliability co-efficients and factor structures for the different race groups. The most

notable differences were between the black and white race groups. Abrahams and Mauer (1999) also found problems with regards to the comparitabilty of items across groups.

In recent studies regarding the cross-cultural adequacy of the Fifteen Factor Questionnaire (15FQ+) Meiring, Van de Vijver and Rothmann (2006) and Meiring, Van de Vijver, Rothman and Barrick (2005) reported poor structural equivalence in various ethnic groups for both the original 15FQ+ and the adapted version of the 15FQ+. The researchers also questioned the suitability of the instrument due to low internal consistencies for some scales especially with regard to black groups.

The research above suggests that both culture and language play a major role in the debate regarding psychometric testing in South Africa. Church (2001) highlights another important factor in psychometric assessment that relates to whether a trait measure (in a psychometric instrument) is imported or indigenous. This „etic-emic debate' (Cheung & Leung, 1998; Cheung et al., 2001; Katigbak, Church & Akamine, 1996; Morris, Leung, Ames & Lickel, 1999) is a central theme in cross-culture personality psychology.

Saucier and Goldberg (2001) explain that cross-language studies have used both etic (imported) and emic (indigenous) procedures. In the etic approach, an „imported' usually Western framework is tested in the new culture to see whether it fits. According to Nel (2008), etic dominance is especially evident in studies of cross-cultural personality assessment, which has traditionally relied on translating and adapting English-language tests. These studies assumed that the traits these tests measure were adequate and sufficient representations of the personality dimensions of other cultures (Cheung et al., 2001). In contrast to the imposed-etic approach, the emic approach allows the indigenous framework to emerge without imposing constraints. In other words, this „indigenous' approach to personality attempts to develop models of personality for a specific cultural context (Van de Vijver & Van Hemert, 2008). The emic approach assumes that psychological phenomena can only be studied in their own cultural context and that applications of Western models in a non-Western context (such as China or South Africa) can easily lead to the inadequate imposition of Western models (Van de Vijver & Van Hemert, 2008).

Katigbak et al. (1996) explain that cross-cultural studies can be executed in a variety of ways but researchers usually resort to an imposed etic-emic strategy. Nel (2008) holds that emic

approaches can be used to allow the indigenous framework to emerge without constraint and thus identify the indigenous factors of personality description. An etic measure can then be used to compare these dimensions with dimensions found in other languages (Saucier & Goldberg, 2001). Various researchers (Church, 2001; Cheung et al., 2001, Van de Vijver & Leung, 2001) uphold this method and maintain that the combined etic-emic approach provides the best support for the existence and incremental validity of an indigenous dimension. This is referred to as the convergence approach.

Cheung et al. (1998) provide an excellent example of research using the convergence approach. Issues relating to test adaptation and the need for an indigenous instrument measuring personality characteristics led to the Chinese Personality Assessment Inventory (CPAI) being developed through the use of both etic and emic principles (Cheung, 2006). The researchers' main objective was "to construct an inventory suited to local needs by identifying culturally unique dimensions as well as cross cultural universals" (Cheung et al., 2001, p.408). Nel (2008) reports that the CPAI structure showed good correspondence with Costa and McCrae's (1992) Five Factor Model. The last construct, Openness to Experience, had the least relevant representation in the Chinese culture (Cheung, 2006). However, further research conducted by Cheung et al. (2008) aligned the CPAI Openness factor with the imported Western Openness factor. The CPAI adds a sixth factor, labelled Interpersonal Relatedness, which conveys the importance of social values in the Chinese collectivistic culture. This indigenous factor shows little correspondence with the Big Five factors, and is assumed to be cultural-specific (Nel, 2008).

Poortinga and Van Hemert (2001) refer to Cheung et al's. (1996, 2006) studies as providing empirical evidence for the existence of an additional „indigenous' factor in the Chinese Personality Inventory (CPAI) which is not linked to Western constructs. However, Nel (2008) reports that in a study conducted by Lin and Church (2004, cited in Nel, 2008) the Interpersonal Relatedness factor was well represented in Chinese American and European American groups. This suggests that the factor might not be specific to Chinese culture.

The studies by Cheung et al. (1996, 2006) motivated similar research in South Africa. The CPAI and its principles were used to conceptualise a similar project called the South African Personality Inventory (SAPI) project. The SAPI project aimed to overcome current problems

facing personality measurement in South Africa (Nel, 2008). To ensure that the measure covers all major aspects of personality relevant in the South African context the SAPI, as with the CPAI, began with everyday conceptualisations of personality rather than with well-know conceptualisations such as Western-imposed Costa and McCrae's Big Five Factor Model (Nel, 2008). The first stage of the SAPI project was conceptualized in 2005 and aimed to develop a new personality inventory for South Africa. The instrument was to be locally derived from indigenous conceptions of personality in all of the eleven language groups. This project involves two stages, the qualitative exploration stage and the test development stage. In the first stage of the project semi-structured interviews were conducted with 1320 participants equally distributed across the eleven language groups. 52 000 person descriptive-terms were derived. These terms were prepared for analysis, categorized and clustered towards 191 facets. The 191 total facets were then clustered to form 37 sub-clusters and nine overall clusters. These nine clusters were labelled Extraversion, Soft-heartedness, Conscientiousness, Emotional stability, Intellect, Openness, Integrity, Relationship harmony and Facilitating (Nel, 2008).

The current study will focus on the second phase of the project namely a quantitative exploration and development of an *experimental* inventory. Due to the size of the SAPI project, the scope of this study will only be on the domain of the conscientiousness cluster and the development of an experimental instrument to measure conscientiousness and its underlying facets.

1.2 RATIONALE AND OBJECTIVES OF THIS STUDY

The research questions evaluated in the present study aimed to investigate the process of developing a personality inventory measuring the cluster of Conscientiousness, as conceptualised in phase one of the SAPI project. This study should be considered a part of the first quantitative phase of the SAPI project. More refined studies will be conducted as the SAPI project evolves. Furthermore, although in the context of this research conscientiousness is treated as a separate construct with its own measuring instrument, this measuring instrument will ultimately form part of the SAPI measuring instrument. Conscientiousness is only one component of the nine factor model that will be measured by the SAPI measuring instrument. Item development and cross-culture concerns, such as translation issues, featured prominently in order to ensure optimal development of this instrument. Ultimately, fair usage of this instrument in all eleven language groups in South Africa is important and a pre

requisite in terms of the Employment Equity Act (1998). However, the validation of the conscientiousness instrument for all eleven South African language groups falls outside of the scope of this study and was therefore not accomplished by the present study.

In order to address the research questions the study included specific aims and objectives that guided the nature of the analyses.

1.2.1 General Objective

The general aim of this study was to develop an experimental Conscientiousness measuring instrument for the Conscientiousness construct of the South African Personality Inventory (SAPI) project.

1.2.2 Specific Objectives

In order to achieve this aim, the following objectives were set out:

- To clearly define the sub-facet scales of the Conscientiousness instrument along with developing an experimental item pool for the various facets of the Conscientiousness instrument;
- To draft an experimental Conscientiousness instrument with an appropriate response format scale;
- To conduct a pilot study with the experimental Conscientiousness instrument;
- To follow a hierarchical approach in analysing the data with the aim of examining the underlying dimensionality of the data to confirm the structure of the Conscientiousness cluster; and
- To develop a first draft instrument that can be applied to multi-cultural groups.

1.3 STUDY OUTLINE

Chapter 2 provides a review of the literature surrounding the personality domain. The chapter begins by defining personality and exploring the history of personality and various personality models. Specific emphasis is placed on the Big Five Personality model and its origins. Issues of cross-cultural personality assessment are also reviewed in this chapter.

In Chapter 3 the focus of the literature review shifts in order to examine the Conscientiousness personality cluster. Conscientiousness is defined and various contentiousness models are examined. The chapter makes it clear that conscientiousness is a complex cluster. The model used in the current study is presented.

Chapter 4 discusses the research design and methodology, including the development of the Conscientiousness questionnaire used in this study. Chapter 5 presents and discusses the results of the statistical analyses and Chapter 6 provides further discussion and recommendations.

1.4 SUMMARY

The use of psychometrics in South Africa is governed by various laws and statutes which promulgate and define it usage. Most psychometric instruments currently in use in South Africa have been imported from abroad. No personality test has ever been developed, normed and made available in all eleven language groups in South Africa. The SAPI project has taken up this challenge and has been exploring and developing a structure of South African personality for the past six- years. At present the SAPI project has conceptualised a nine factor model. In this study an experimental measuring instrument was developed for the Conscientiousness cluster.

CHAPTER 2: LITERATURE REVIEW- PERSONALITY

2.1 INTRODUCTION

This chapter aims to provide a comprehensive summary of the concept of personality. The chapter provides an overview of the underlying theory and concepts that were used to develop the conscientiousness inventory used in this study. Conscientiousness is one of the traits used to „measure' a person's personality. In keeping with this view of conscientiousness this chapter focuses on defining personality and presenting the history of the concept of personality through the description of various models of personality structure. Special attention is paid to the lexical approach to personality structure. The final section of the chapter discusses cross-cultural personality assessment.

2.2 DEFINING PERSONALITY

The Longman Dictionary of Psychology and Psychiatry (1984, cited in Van Niekerk, 2001, p.3) defines personality as:

> the configuration of characteristics and behaviour that comprises an individual's unique adjustment to life, including major traits, interests, drives, values, self-concept, abilities and emotional patterns. Personality is generally viewed as a complex, dynamic integration, or totality, shaped by many forces: heredity and constitutional tendencies, physical maturation, early training, identification with significant individuals and groups, culturally conditioned values and roles, and critical experiences and relationships.

Personality is viewed as present in all individuals. In order to measure personality and discover its underlying structures it is necessary to study personality traits (Ashton & Lee, 2001; Baron, 2001). Discovering the factor structure of personality characteristics is an important goal of personality psychology (Ashton & Lee, 2001).

Personality traits are specific dimensions along which individuals differ in consistent, stable ways (Baron, 2001). The basic premise of the trait approach is that once the key dimensions along which people differ are identified it becomes possible to measure how individuals differ. This in turn means that it is possible for researchers to relate these differences to

important behaviours (Baron, 2001). One method of identifying differences involves searching for clusters, or groups of traits that appear to coincide.

Personality traits have been thoroughly researched as part of personality theory, as well as for assessment purposes in Western psychology (Church, 2000; Nel, 2008). According to Neil (2003) personality traits are the distinguishing qualities or characteristics of a person. Personality traits refer to a readiness to think or act in similar fashion in response to a variety of different stimuli or situations (Neil, 2003). Various authors (Wiggens, 1997; Zuroff, 1986) point out that personality traits should be used in the study of personality.

Psychology literature contains various trait theories developed over the last century (Baron, 2001; De Raad, 2000; De Raad et al., 2008). Trait theories were initially proposed in the pioneering work of Allport and Odbert (1936) and Cattell (1943) and were guided by the idea that all significant individual differences are embodied in language (De Raad et al., 2008).

In the late 1940's Raymond Cattell proposed another trait theory. Cattell's theory focused on identifying the basic dimensions of personality through studies of peer ratings by college students. This method was later extended to both the questionnaire and objective-test realms (Digman, 1990). Cattell used factor analysis to analyse his data. Factor analysis reveals patterns showing the extent to which several traits are correlated. In this manner it helps to identify important clusters of traits. Clusters are defined as groups of traits that seem to be closely linked to one another. Cattell reasoned that identifying these clusters would enable researchers to reduce the number of key traits in human personality by retaining only those traits that are viewed as central. Cattell and his associates used this approach to identify sixteen source traits. These source traits are conceptualised as dimensions of personality that underlie differences in many other less important surface traits (Cattell, 1945).

This section above detailed the emergence of researchers aiming to identify the structure of personality. Various studies that focused on structuring personality are discussed in the following section.

2.3 PERSONALITY MODELS

2.3.1 Introduction

Allport, Odbert and Cattell were pioneers in the identification of personality traits. These researchers laid the foundation for future studies' development of models of personality. Psychology literature abounds with theories and personality models and this section identifies the main trends and discusses some of the popular models.

2.3.2 History and development of Personality Models

According to Digman (1990), efforts to replicate the early studies of Cattell began with the carefully crafted research of Fiske. Fiske was unable to find evidence for anything more complex than a five factor solution (Digman, 1990). Tupes (1957) conducted further research in an attempt to predict officer effectiveness in the American Air Force. Tupes and Christal (1961) subsequently reported their factor analyses of the 30 Cattell bipolar scales used in the earlier study. Like Fiske (1949) before them, they were unable to find anything approaching the degree of complexity reported by Cattell. Tupes and Christal (1961) supported Fiske's (1949) finding that five factors appeared to account for the observations remarkably well. Norman (1963) replicated the five factor of structure of Tupes and Christal (1961). Norman (1963) suggested that these trait dimensions could be steps toward an adequate taxonomy of personality attributes.

In the 1980s, Costa and McCrae reworked the earlier models (Digman, 1997) of Tupes and Christal (1958) and Norman (1963), which had come to be known as the Five Factor Model. This model posits that there is a structure to individual differences in human behaviour, and that the traits of personality can be reduced to five orthogonal factors of personality. These personality factors are known as the Big Five (Paunonen & Jackson, 2000).

2.3.3 The Five Factor Model

Few topics in contemporary psychology have generated as much research and theoretical interest as has the Five Factor Model of personality (Paunonen & Jackson, 2000). The Five Factor Model posits that there is a structure to individual differences in human behaviour and that the traits of personality can be reduced to five orthogonal factors of personality. These factors are referred to as the Big Five.

Digman (1990) explains how the emergence of the Five Factor Model began with two German psychologists, Klages (1926) and Baumgarten (1933), who in turn influenced Allport and Odbert (1936). Raymond Cattell was one of the first influential scientists to apply empirical procedures to the task of constructing a personality taxonomy (Goldberg, 1990). Cattell (1949) began by using English personality-descriptive terms based on the trait list compiled by Allport and Odbert (1936) to construct 171 scales. Most of these scales were bipolar and consisted of two diametrically opposed terms. Guided by the empirical correlations among the 171 scales Cattell (1943) developed a set of 35 bipolar clusters of related terms. Rating scales based on these clusters were then employed in various studies. In each of these studies the correlations among the variables were factored using oblique rotational procedures (Goldberg, 1990).

Cattell's studies repeatedly identified at least a dozen oblique factors. However, when the variables were analysed using orthogonal methods, only five factors proved to be replicable (Digman & Takemoto-Chock, 1981; Fiske, 1949; Norman, 1963; Tupes & Christal, 1961). Similar five factor structures based on other sets of variables have been reported by Borgatta (1964), Digman and Inouye (1986) and McCrae and Costa (1985, 1987). These "Big Five" factors have traditionally been numbered and labelled as follows: (I) Surgency or Extraversion, (II) Agreeableness, (III) Conscientiousness or Dependability, (IV) Emotional Stability (vs. Neuroticism) and (V) Culture. Alternatively, Factor V has sometimes been labelled Intellect (Peabody & Goldberg, 1989) or Openness (McCrae & Costa, 1987). The traits are also referred to using the acronym OCEAN which is a combination of the first letter of each of the traits; Openness, Conscientiousness, Extraversion, Agreeableness and Neuroticism (John & Srivastava, 1999).

Hence, the Five Factor Model emerged empirically from attempts to summarize measures of personality traits. The Five Factor model is designed to be comprehensive and includes affective, experiential, motivational and interpersonal traits (McCrae & Costa, 1989).

Thus, more than 20 years ago the domain of personality attributes had been successfully analysed not just once, but by five competent, independent investigators, all of whom came to the same general conclusion (Digman, 1990). The researchers all concurred that the domain of personality could be adequately described by five super-ordinate constructs. However, differences of opinion do exist regarding the interpretation of these constructs.

The Big Five factor structure was originally discovered in studies using Cattell's 35 variables and some critics have argued that the five factors have not been sufficiently generalised beyond that initial set of variables. Indeed, Waller and Ben-Porath (1987) assert that:

> Much of the evidence that has been offered in support of the five-factor model stems from an assemblage of cognate studies better thought of as demonstrating the reliability rather than the validity (or comprehensiveness) of the five-factor paradigm. In other words, we feel that many of these studies are better thought of as a series of quasi-literal replications, rather than conceptual validations of the five-factor model. (p. 887).

Despite objections such as the one raised by Waller and Ben-Porath (1987) a considerable body of research has demonstrated the summarizing power of five broad orthogonal factors in analyses of English personality trait adjectives, both in self-descriptions and in descriptions of others (Saucier & Goldberg, 1998). The Five Factor Model of personality thus represents a structure of traits that has been developed and elaborated over the last five decades (Rothmann & Coetzer, 2003). Factors are defined by groups of inter-correlated traits, referred to as facets (McCrae & Costa, 1997).

The Five Factor Model described above is the model most frequently used when developing inventories (Nel, 2008; Goldberg, 1993). The Five Factor Model of personality is usually measured by the NEO-Personality Inventory Revised (NEO-PI-R), which has five factors labelled Neuroticism, Extraversion, Openness, Agreeableness and Conscientiousness (McCrae & Costa, 1997).

Paunonen, Haddock, Forsterling and Keinonen (2003) state that the currently accepted view of personality structure is that variables related to human behaviour form a hierarchy. The levels of this hierarchy are organised in accordance with breadth of behaviour with the lowest level representing very narrow, specific, behavioural acts. In the second lowest level several of the behavioural acts combine to form broader characteristic behaviours or habits. The next level is referred to as the trait level and is the stratum of the personality hierarchy in which many characteristic behaviours have coalesced to form typical personality traits. Finally, personality factors constitute the highest level of the hierarchy. Personality factors are

defined as broad dimensions of behaviour that are presumed to represent a combination of several lower level personality traits or facets.

Paunonen et al. (2003) further state that a popular belief in contemporary personality psychology is that there are exactly five personality factors at the top of the personality hierarchy. These factors are almost always labelled Extraversion, Agreeableness, Conscientiousness, Openness to experience and Neuroticism. These factors, usually known as the Big Five, are at the core of the Five Factor Model of personality structure. Proponents of the Five Factor Model maintain that all known personality traits are firmly connected to the Big Five Factors that occupy the summit of the personality hierarchy. The Big Five Model and the Five Factor Model are both frequently used in research (Nel, 2008). The two models differ in their theoretical basis, labelling of the five factors, measurement used, inventories developed and type of inventory item used.

Although this model is widely used it has also been met with criticism (Nel, 2008). For example, Block (1995) argues that five constructs cannot fully explain the dynamics of behaviour in cultural groups. Block (1995) also argues that personality should be described in more detail than can be offered through the use of five global factors.

2.3.4. The Three Factor Model

Despite the current popularity of the Big Five model, for many years before the model's emergence the field of personality structure was dominated by two different models (Zukerman, Kuhlman, Joireman, Teta & Craft, 1993), namely H.J. Eysenck's (1947; 1967) three factor model and Cattell's (1957) 16 factor model.

Eysenck (1947, 1967) developed a model of personality based on traits that he believed were highly hereditary and psychophysiological in origin. The three main traits identified by Eysenck (1947, 1967) were Extroversion vs. Introversion, Neuroticism vs. Emotional Stability and Psychoticism. According to Eysenck (1957, cited in Jensen, Lillebæk, Mortensen & Jensen, 1999), personality disorders should be approached from the theoretical perspective that psychiatric abnormalities are essentially continuous with normality. Eysenck (1957, cited in Jensen, Lillebæk, Mortensen & Jensen, 1999) presented evidence suggesting that two orthogonal dimensions (Neuroticism and Extraversion) may account for a large portion of individual differences. In a revision of the model, the third dimension of

Psychoticism was introduced (Eysenck & Eysenck, 1975). In this model high Psychoticism is linked to antisocial behaviour, schizotypy and susceptibility to psychosis. The dimension includes aggressive, cold, egocentric, impersonal, impulsive, unempathethic and tough-minded traits. Interestingly, Jackson, Furnham, Forde and Cotter (2000) note that in the Five Factor Model, the Psychoticism factor splits into the preferred scales of Costa and McCrae (1998), namely Openness, Agreeableness and Conscientiousness.

The Eysenck Personality Questionnaire (EPQ) was developed in 1972 to measure the three constructs. The questionnaire also includes a fourth scale, known as the Lie Scale, which measures social desirability. This fourth scale was originally developed to measure faking good and faking bad (Eysenck & Eysenck, 1995).

Zuckerman et al. (1993) note that Five Three factor theorists generally agree on two points. First, Cattell's 16 factors are excessive and are not replicable across gender, age or method. Second, in all Five- and Three- factor models two of the major factors are Extroversion-Introversion and Neuroticism (or Emotional Stability). Although all models concur on the existence of these two basic factors, there is less agreement on the narrower traits comprising them, and the conformance between measures of similar traits derived from different models is open to investigation.

2.3.5 The HEXACO model

The HEXACO model, which consists of six factors, represents a fairly new addition to the field of personality research. Despite widespread acceptance of the Big Five Model as the optimal taxonomy of human personality variation, several researchers draw attention to personality traits that fall outside the Big Five space (Lee, Ogunfowora & Ashton, 2005). In addition to the recovery of several narrow personality traits that are „beyond' the Big Five space, recent years have also seen the emergence of an alternative structural model of personality characteristics. Lexical studies of personality structure conducted in several languages have suggested a six-dimensional framework, which has come to be known as the HEXACO model (Lee & Ashton, 2004). This model consists of the Big Five factors in addition to a sixth factor labelled (Lee et al., 2005). HEXACO is an acronym for all six personality factors. The factors included in the HEXACO model are Honesty-Humility, Emotionality or low ES, eXtraversion, Agreeableness, Conscientiousness and Openness to

experience. The newly developed factor, Honesty-Humility, is characterised by adjectives such as honest, fair, sincere, loyal, greedy, conceited, pretentious and sly.

According to Lee and Ashton (2008):

> The Big Five framework was well established by the 1980s and 1990s as the best available model of the structure of the personality domain, as represented by the personality lexicon of the English language. By this time, however, lexical studies of personality structure were being conducted in various languages other than English. These investigations generally involved self- or peer ratings on sets of several hundred adjectives selected on the basis of their prototypicality and/or frequency of use in personality description.

The five-factor solutions derived from these variable sets usually corresponded rather closely to the space of the Big Five factors, despite some differences in factor axis locations (Lee & Ashton, 2008). A notable exception is the Agreeableness/Emotional Stability plane in the Italian study by Caprara and Perugini (1994). However, in some cases the observed five-dimensional spaces did not include any axis corresponding to the Big Five Intellect or Imagination factor. This was true for the Hungarian study by Szirmak and De Raad (1994) and the Italian investigations of Di Blas and Forzi (1998, 1999). The most surprising finding from these non-English studies was that a common space involving six dimensions was shared among the various languages (Ashton et al., 2004). These findings implied that the dimensionality of the personality domain is larger than that observed in the English lexical studies.

The existence of this six-dimensional space had been noted as early as the late 1990s (Ashton & Lee, 2001; Ashton, Lee & Son, 2000; Boies, Lee, Ashton, Pascal & Nicol, 2001; Hahn, Lee & Ashton, 1999) and in various languages (Ashton et al., 2004). Ashton and Lee (2008) assert that the six-factor space is the largest set of dimensions that can be recovered across diverse languages. They claim that a seven-factor space has not been replicated across more than two or three languages (Ashton & Lee, 2008). In these six-factor solutions, five factors broadly resemble the Big Five. Differences include changes in axis locations involving the Big Five's Agreeableness and Emotional stability factors (Lee et al., 2005).

The content of the six cross-language replicated factors has been compared to the content of the Big Five (Ashton & Lee, 2008). Three of the six cross-language dimensions correspond closely to three of the classic Big Five factors (Ashton et al., 2004). One of the six dimensions is characterised by the same liveliness and outgoingness as the Big Five Extraversion factor. Another cross-language dimension is defined by the organization and discipline that characterizes the Big Five Conscientiousness factor. Intelligence and/or creativity constitutes one of the six cross-language factors and corresponds to the Big Five Intellect/Imagination factor. Ashton et al. (2004) suggest that this factor should be labelled Unconventionality as several language variants identify this factor in relation to nonconformity.

The three remaining cross-language dimensions have a somewhat more complex pattern of relations with the two remaining classic Big Five factors (Ashton & Lee, 2008; Ashton et al., 2004). One of the cross-language factors shares some content with Big Five Agreeableness (e.g., gentleness vs. harshness), but is also defined by patience versus ill-temper, which is usually associated with Big Five Emotional Stability (vs. Neuroticism). Ashton and Lee (2008) believe that this cross language factor should be interpreted as Agreeableness, as its content is probably even closer to the everyday meaning of the term agreeable than the content of the Big Five Agreeableness factor. In order to differentiate this cross-language dimension from the Big Five Agreeableness factor it is sometimes referred to as Agreeableness vs. Anger. One of the other cross-language factors shares some content with Big Five Neuroticism (e.g. anxiety) but lacks the „angry' aspects of that Big Five factor. This factor instead emphasizes characteristics such as sentimentality, fearfulness and emotionality. This cross-language factor is less pathological in its content than the Big Five Neuroticism factor and is therefore labelled Emotionality. The final cross-language factor is defined by terms such as sincere, honest, modest, deceitful, greedy and conceited and is labelled Honesty-Humility (Ashton et al., 2004).

The six HEXACO factors are operationalized in a self-report (or peer report) instrument called the HEXACO Personality Inventory (HEXACO-PI; Lee & Ashton, 2004, 2006). Investigations of the HEXACO-PI have shown satisfactory psychometric properties in terms of internal-consistency reliability, factor structure, scale intercorrelations and convergent and discriminant correlations with other personality traits (Lee et al., 2005). In particular, the

HEXACO-PI factor Honesty-Humility was found to correlate weakly with the lexical Big Five, suggesting that this factor is beyond the space of the Big Five.

2.3.6 The SEVEN FACTOR MODEL

Models of personality structure do not confine themselves to only six factors. Tellegen and Waller (1987, cited in Simms, 2007) developed a seven-factor model of personality. Tellegen and Waller (1987, cited in Simms, 2007) felt that the Big Five structure did not fully capture the language of personality. They argued that most psycholexical studies precluded the emergence of certain dimensions through the exclusion of evaluative and state (Tellegen & Waller, 1987). Tellegen and Waller (1987, cited in De Raad et al., 2010) applied a more liberal approach to selecting terms from the English lexicon to develop a seven-factor structure based on the ratings of their selected descriptors.

Tellegen and Waller (1987, cited in Simms, 2007) sampled 400 personality descriptors from the 1985 edition of the American Heritage Dictionary of the English Language. They did not make use of the restrictive exclusionary criteria that characterized previous natural language studies of personality and included evaluative and mood-related terms in their pool of personality descriptors (Waller & Zavala, 1993). Tellegen and Waller (1987) then collected self-ratings on the sampled terms. Their research showed that using less restrictive criteria resulted in seven higher-order dimensions. Five of their „Big Seven' factors were similar to the Big Five. These factors were labelled Negative Emotionality and Positive Emotionality and reflected the broader cognitive, emotional and behavioural aspects of the Big Five factors of Neuroticism and Extraversion. The structure also included factors labelled Agreeableness and Conscientiousness (then called Dependability), which were similar to the similarly named factors of the Big Five model. The fifth factor, labelled Unconventionality, was loosely similar to the Openness factor of the Big Five. Tellegen and Waller (1987) labelled the two new dimensions Positive Valence (PV) and Negative Valence (NV). These two dimensions reflect extremely positive (e.g. exceptional, important, smart) and extremely negative (e.g. evil, immoral, disgusting) self-evaluations.

Following Tellegen and Waller's (1987) original study, a number of researchers identified similar seven-factor structures across samples (Benet & Waller, 1995; Saucier, 1997; Waller 1999) and in a number of different languages, including Spanish (Benet & Waller, 1995),

Hebrew (Almagor, Tellegen & Waller, 1995) and Tagalog (Church, Katibak & Reyes, 1998). Recent research has tried to identify the specific facets that comprise the domain of evaluative personality descriptors (Benet-Martinez & Waller, 2002). Although these studies have not yielded identical seven-factor structures, they have all identified dimensions similar to the PV and NV factors identified by Tellegen and Waller (1987), as well as factors closely resembling four of the Big Five markers. The Openness/Unconventionality factor is the only factor that does not emerge consistently across studies and languages.

The various models described in this section have all been subjected to varying levels of support and critique (Ashton & Lee, 2008; Costa & McCrae, 1997; Simms, 2007; Zuckerman et al., 1993). Some authors maintain that these structures are only available in certain languages and are contrived using different methods. Given the breadth of the field of personality structure the models that were highlighted in this section (Eysenck's Big Three, the Five Factor Model, the HEXACO and the Big Seven Model) should be viewed as examples of the field rather than as a comprehensive overview of the literature on personality structure.

In addition to the debate concerning the number of personality factors, a second debate in relation to personality involves the possibility of developing a comprehensive list of human traits (De Raad et al., 2008; McCrae & John, 1992). This debate is closely related to the lexical hypothesis. McCrae and John (1992) state that if personality structure is universal, then it should be possible to extract the same basic factors from analyses of any natural language. In contrast, despite the psycholexical approach's assumption that a common, universal set of constructs can be identified for describing personality traits, De Raad et al. (2008) maintain that languages differ from each other, and thus trait terms might not have matching translations in different languages.

This highlights the psychological debate concerning the universality of personality models, with specific reference to the Five Factor Model (Costa & McCrae, 1997). Poortinga and Hemert (2001) indicate that studies of the Big Five suggest that these five dimensions exist in many different cultures (McCrae, 2001). Many trait psychologists view the Big Five dimensions as universal, hereditary dimensions that predict relevant behaviours in all cultures (Church, 2000; Church, Katigbak, Miramontes, Del Prado & Cabrera, 2007; McCrae, 2000).

Some authors believe that the Big Five can account for the majority of variations in human behaviour (Paunonen, Zeidner, Engvik, Oosterveld & Maliphant, 2000).

However, other researchers have questioned the universality of the Big Five (Benet-Martinez & Waller, 1997; De Raad, Sullot & Barelds, 2008; Paunonen et al., 2000). De Raad et al. (2008) state that despite an abundance of studies emphasizing the importance of the Big Five Model, clear empirical evidence exists that only three, or at best four, of the Big Five factors are cross-culturally identifiable (De Raad & Peabody, 2005; De Raad et al., 1998; Paunonen et al., 2000). Di Blas (2005) maintains that systematic comparisons among the Big Five Factor solutions of several lexical studies demonstrate the instability of the Big Five across languages and cultures. Boies, Lee, Ashton, Pascal and Nicol (2001) suggest that lexical studies enhance researchers' understanding of the cross-cultural replicability of personality structure.

2.4. THE LEXICAL APPROACH

The previous section described various models of personality found in the psychology literature. Through the years, authors have argued that the optimal number of personality factors are three (Eysenck, 1967), five (Costa & McCrae, 1993), six (Ashton & Lee, 2004) and seven (Tellegen & Waller, 1997). This section describes the process that enables researchers and psychologists to derive personality models, regardless of the number of factors.

Although there is still a debate regarding the optimal structure of personality characteristics, most researchers who investigate this topic agreed that the solution must be derived, at least in part, from lexical studies of personality structure (Ashton & Lee, 2005).

All human languages contain terms to characterise personality traits, which are defined as relative enduring styles of thinking, feeling and acting (Dixon, 1977; McCrae & Costa, 1997). Personality structure is the pattern of co-variation among these traits, usually summarised in terms of a relatively small number of factors that represent the basic dimensions of personality (Dixon, 1977; McCrae & Costa, 1997). For example, "in English-speaking cultures, people who are sociable are generally also energetic and cheerful, and

these traits together define a dimension usually called extraversion" (Eysenck & Eysenck, 1967).

Personality and its assessment are intimately connected to natural language. All human cultures include words for describing individual differences in personality, and a large part of the process of socialisation involves learning these terms and understanding how they are applied to the self and others. Unlike physical characteristics, personality traits are abstractions that cannot be directly measured and must instead be inferred from complex patterns of overt and covert behaviour (McCrae & Costa, 1997).

De Raad, Perguni, Hrebickova and Szarotza (1998) explain that personality trait factors such as the Big Five Factors of Extraversion, Agreeableness, Conscientiousness, Emotional Stability and Intellect/Autonomy/Creativity, are basic trait factors that are supposed to capture the huge array of meanings of personality characteristics. These factors summarise, from an empirical basis, the findings of an enterprise with international status that purports to give full account of the language of personality traits. The lexical hypothesis, as articulated by Goldberg (1981), states that:

> Those individual differences that are of most significance in the daily transactions of persons with each other will eventually become encoded into their language. The more important is such a difference, the more people will notice it and wish to talk of it, with the result that eventually they will invent a word for it (pp.141-142).

In other words, the lexical approach to personality structure (Goldberg, 1981) adopts the hypothesis that because personality traits are so central to human interactions all important traits are encoded in natural language. Therefore, an analysis of trait language should yield the structure of personality (McCrae & Costa, 1997).

Several good reasons exist for beginning the search for personality dimensions in natural language (McCrae & John, 1992), "For the layperson, personality is defined by such terms as friendly, high-strung, and punctual. These terms are the basic ways in which individuals understand themselves and others" (McCrae & John, 1992, p.7). A complete theory of personality must ultimately explain the phenomena to which these terms refer and the ways in

which they are used in everyday life. Psychologists must often rely on self-reports and peer ratings to gather their data, and therefore they must speak the language of their informants.

Allport and Odbert (1936) noted 4 500 trait terms in English, and McCrae and John (1992) maintain that such a wealth of vocabulary testifies to the social importance of personality traits. Conversely, if traits are important it seems likely that they will all be represented in the language. The lexical hypothesis holds that all important individual differences will have been noted by speakers of a natural language at some point in the evolution of the language and will have been encoded in trait terms. Through decoding these terms it is possible to discover the basic dimensions of personality (Goldberg, 1981; McCrae & John, 1992).

Saucier and Goldberg (1996, cited in De Raad, 1998) also provide an elaborate discussion of the rationale of the psycholexical approach. According to these authors, the explicit and ultimate aim of the psycholexical approach, in accordance with the lexical hypothesis, is to "arrive at a specification of a trait domain that virtually exhausts the universe of traits and enables a representative selection of traits for practical and theoretical usage". Therefore, the psycholexical approach is embedded in the paradigm of describing personality. The psycholexical approach is often used to explain how words and adjectives describe personality traits, especially in terms of the five robust or „universal' factors that seemed to accurately capture all dimensions of personality.

The psycholexical approach thus maintains that personality is embedded in natural language. This statement serves as the catalyst for an ongoing debate concerning the cross-cultural nature of personality. This debate looks at whether personality, which is encoded in language, is similar across various languages and cultures. It also investigates whether it is possible to measure personality equally across cultures. This has specific relevance to South Africa, where the presence of eleven official languages raises the question of whether all South Africans have the same personality structure race, culture and ethnicity. These questions are addressed by cross-cultural psychology and the next section focuses on cross-cultural personality assessment.

2.5 CROSS–CULTURAL PERSONALITY ASSESSMENT

According to Foxcroft, Patterson, Le Roux and Herbst (2004) the Sixteen Personality Factor Questionnaire (16PF) (Abrahams & Mauer, 1996), the Fifteen Factor Questionnaire Plus (15FQ+) (Psytech, 2002), NEO-PI-R (Zhang & Akande, 2002), the Jung Personality Inventory (JPI) (McGuire & Hull, 1977), the Myers-Briggs-Type Indicator (MBTI) (Coetzee, Martins, Basson & Muller, 2006) and the Occupational Personality Questionnaire (OPQ) (Saville & Holdsworth, 1993) are the most frequently used personality inventories in South Africa. These instruments are all imported from either Europe or the USA and have been adapted for local use. In a study conducted by Van der Merwe (2002) 19 out of the 20 organisations surveyed made use of psychometric testing as part of their selection procedures. Van der Merwe's (2002) study found that the 16PF was the most frequently used instrument. Second in popularity was the South African Wechsler Adult Intelligence Scale (SAWAIS), which was followed by the MMPI and the SAT (Van der Merwe, 2002).

South African society is heterogeneous in terms of factors that moderate performance on psychological tests (Van Eeden & Mantsha, 2007). Variables such as language proficiency, culture, education, socio-economic status, home environment, urbanisation and test-wiseness have been identified as factors that influence performance on psychological assessments (Van Eeden & Mantsha, 2007).

Abrahams and Mauer (1999, cited in Nel, 2008) found that African, Coloured and Asian groups were not satisfactorily represented when the 16PF was adapted for use in South Africa. Research on the 16PF5, the most recent version of the 16PF, has found that the majority of the items have inadequate inter-item correlations for indigenous African language groups (Nel, 2008).

The 16PF5 is not the only problematic imported personality inventory used in South Africa (Nel, 2008). The Occupational Personality Questionnaire (OPQ) (Saville & Holdsworth, 1999) is a competency-based questionnaire that is widely used in South Africa (Nel, 2008). The OPQ Concept Model 5.2 British questionnaire, which is used for assessment of the South African population, was found to have extremely low reliability for a sample of 193 middle-management technical officers in a large South African telecommunications organisation (Nel, 2008; Saville & Holdsworth, 1997). The study reported that language was one of the

main difficulties in the instrument and this led to the development of a South African Concept model (Nel, 2008). In addition a South African study by Meiring, Van de Vijver and Rothmann (2006) found low internal consistencies for the adapted version of the 15FQ+, especially among African respondents.

More research is thus required in order to determine the effect and extent of cultural factors and language barriers on scores on personality inventories used in South Africa (Nel, 2008). Claassen (1995, as cited in Foxcroft, 1997) comments:

> South Africa is not simply a multicultural society, it is a multicultural society in which acculturation of many kinds is taking place and in which a new nationhood is actively encouraged by political authorities. The cultural distance between cultures and subcultures vary and cultural differences are not the same for various facets of behaviour. The meanings of behaviour differ and the values attached to certain kinds of behaviour differ. (p.14).

This extract highlights the important role of cross-cultural psychology within the South African context.

Cross-cultural assessment involves all issues arising in the application of psychological instruments either in a single country in the assessment of migrant groups or in the assessment of individuals from at least two countries (Van de Vijver, 2002). According to Van de Vijver (2002), it is essential that the tests used have demonstrated their appropriateness for all cultural groups involved. Church (2008) states that personality psychology should involve the study of all human beings, not just those in a particular culture. Van de Vijver and Leung (2001) explain that cross-cultural studies examine and compare personality across cultures. Cross-cultural studies aim to establish similarities and differences in the personality structures of cultural groups, relying on structured means of data collection, such as standardised inventories (Van de Vijver & Leung, 2001). Without cross-cultural comparison psychological theory would be confined to its own cultural boundaries (Van de Vijver & Leung, 2001).

Cross-cultural assessment literature contains many different theoretical perspectives. The three dominant perspectives towards assessment are known as the cross-cultural, cultural and

indigenous perspectives (Church, 2001). The cross-cultural approach typically involves (a) comparisons of multiple cultures in the search for cultural universals or culture-specific traits amidst universals; (b) treatment of culture, or quantitative variables related to ecology and culture, as variables outside the individual that can be used to predict behaviour; (c) use of traditional and relatively context-free psychometric scales and questionnaires; (d) concern about the cross-cultural equivalence of constructs and measures; and (e) a focus on individual difference. The cultural psychological approach involves (a) a focus on contextual descriptions of psychological phenomenon in one or more cultures, with less emphasis on, or expectations of, culture universals; (b) a theoretical emphasis on the dynamic and mutually constitutive nature of culture and psychological functioning; (c) an emphasis on qualitative, ethnographic and interpretive research methods; and (d) a de-emphasis on individual differences. Finally, the indigenous approach focuses on the need to formulate theory, constructs and methods that reflect indigenous cultural context (Meiring, 2007).

Cheung (2004) describes the history of cross-cultural personality assessment in Asia. As early as the 1970s psychological instruments such as the Minnesota Multiphasic Personality Inventory (MMPI) and the Eysenck Personality Questionnaire (EPQ) were translated and used in countries such as Hong Kong, India, Japan and Taiwan. The opening of China to Western psychology in the 1980s led to the Chinese adoption of these Western psychological tests. Few local instruments were available to Asian psychologists, who then turned to Western personality tests (Cheung, 2004).

In the 1990's growth in industrial and organisational psychology in Asian countries led to increased interest in cross-cultural personality assessment and the use of evidence based and culturally relevant tests. Emphasis was placed on practices guiding the translation and adaptation of Western instruments, which has previously had no formal structure. In the past researchers would translate popular tests without consideration of the quality of the translation and then make use of the test as if it were the original test. Following the growth of cross-cultural psychology, greater attention was paid to the quality of translations, cultural relevance, psychometric equivalence and validity of the instruments. Local psychologists also started to develop indigenous personality measures (Cheung, 2004).

In addition, Singelis (2000) notes that around the world immigration, communication and ease of travel have contributed to "a multicultural milieu that is unmatched in the history of the world". Cheung, Van de Vijver and Leong (2010) state that:

> "The process of globalization with its interconnected social, political, and economic systems has made it imperative for psychologists to embrace a global perspective. Learning from colleagues who are working in different cultural contexts is now critically important for the development of a scientific knowledge-base that has cross-cultural validity and generalizability."

According to Singelis (2000), it is this multicultural atmosphere that has increased the receptivity of the academic community to culture as an essential variable in understanding human behaviour. Furthermore, research has been aided by the development of more sophisticated quantitative methodology for cross-cultural investigations (Singelis, 2000; Van de Vijver & Leung, 1997). The field of cross-cultural psychology is currently very diverse (Meiring, 2007). Some psychologists choose to work intensively within one culture, while others work comparatively across cultures and some work with ethnic groups within culturally plural societies. These researchers all seek to provide an understanding of cultural relationships.

Paunonen and Ashton (1998) list three reasons for cross-cultural study in personality. The first reason is the unavailability of local measures of the constructs within a certain culture despite the importance of being able to measure these constructs for empirical research.

A second reason for exporting personality measures to foreign cultures involves determining whether the constructs measured by the inventory are general across cultures or specific to only one or a few cultures. This is also referred to as the emic-etic approach (Berry, 1969). The last reason involves determining whether personality is normatively the same across cultures.

Katigbak, Church and Akamine (1996) explain that cross-cultural studies can be undertaken in various ways. However for convenience, efficiency, and economic reasons researchers usually resort to an imposed etic-strategy. This etic strategy is sometimes known as the "outside perspective" (Morris et al., 1999, p.781). In this approach researchers apply personality structures from an originating culture to target cultures where they have uncertain

relevance. Instruments may be imported in their original form or translated into the local language with varying degrees of local adaptation. The problem with this approach is that it describes differences across cultures in terms of a general, external standard (Morris et al., 1999). As such it is likely to miss important etic, or culture specific aspects of personality (Berry, 1969). The emic or inside perspective strives to understand culture from the native's point of view and to describe it in its own terms (Morris et al., 1999). Traditional cross-cultural psychology was the first and earliest approach to cross-cultural personality assessment and was imposed etic in nature and sought to test Western ideas and construct in other cultures in order to determine their generalizability and cultural validity (Chung, Van de Vijver & Leong, 2010). The methods used tended to be top-down and Western in origin, involving positivistic, strictly empirical and often lab based research. The second approach used was cultural Psychology, which shifted the focus to a more emic and constructivistic perspective and moved away from the comparative orientation of cross-cultural psychology.

Cultural Psychology is based on the notion that mainstream psychology pays insufficient attention to the socio-cultural context. In contrast, cultural psychology tries to understand the close ties between individual and context. From this perspective culture and psyche create each other. Indigenous psychology, the third and most recent approach in the field, seeks a bottom-up and culture-specific (typically non-western) approach to the study of culture. In a sense, the growth of Indigenous psychology can be seen as a reaction to the increasing monopoly and dominance of Western models. Current research models propose the use of a combined emic/etic approach, which allows focus to be on both the culture specific (emic) and culture general (etic) aspects of personality (Benet-Martinez & Waller, 1997).

The various perspectives and reasons for cross-cultural psychology have led to many disagreements in the field. The conceptual problem and debate regarding cross-cultural psychology involves incorporating personality research and theory (Matsumoto, Yoo & Fontaine, 2009). The controversy regarding the relationship between culture and personality is not new but dates back to the 1930s (Bock, 2000; Church, 2008; Le Vine, 2001). Some researchers propose a close correspondence between cultural configurations and the basic personality type shared by the bulk of the society's members (Benedict, 1934; Kardiner, 1939). Other researchers argue that the impact of culture could differ for each individual, resulting in considerable individual variability (Wallace, 1961). This tendency of classic

culture-and-personality studies to characterize the personality or „national character' of whole populations and ignore individual variability is referred to as the uniformity myth (Bock, 2000). Bock (2000) warns against the same mistaken assumption of uniformity in current research on personality across cultures.

This has led some researchers to argue that personality's effects on behaviour cannot be debated. In some cross-cultural studies, personality research is simply ignored. Many theorists consider trait psychology and cultural psychology to be incompatible. However, current researchers (Church, 2009; Matsumoto et al., 2009) are of the opinion that trait psychology and cultural psychology can be viewed in unity. Trait psychology has provided the theoretical basis for much of the cross-cultural research on personality and many issues involving personality are relevant to cultural psychologists.

2.6 CONCLUSION

This chapter looked at personality as a whole. It described the measurement of personality through the use of personality traits. The history of the field of personality development was also investigated. Various trait theories and personality models exist in the literature. This chapter focused on the Five Factor Model of personality, which is perhaps the most well known model. The Five Factor Model (FFM) has five factors, which are labelled Extraversion, Agreeableness, Openness, Conscientiousness and Emotional Stability (McCrae & Costa, 1998). Other well known models such as the 3 Factor model, the HEXACO model and the Seven Factor Model were also discussed.

The chapter also included a discussion of the lexical approach, which is used to derive these models. This approach assumes that people's actions and differences will ultimately be encoded in their natural language in such a way that the language will describe personality. Over time languages develop personality „markers'. Extraversion is an example of a personality marker that indicates a person who is outgoing and friendly.

However, the issue of language points to the psychological debate regarding the replicability of factors. Some authors believe that the models of personality are replicable in all languages and all cultures across the world. Other researchers maintain that each culture has its own nuances and hence cultures have different models of personality.

The current emphasis within the field of cross-cultural psychology is on the impossibility of using personality assessments in isolation from one language to the next. This isolated use would result in bias and unfairness. Furthermore, current research holds that when developing new measurements it is best to combine an approach, which merges the outside (etic) with the emic (inside) view of the particular culture.

Following the discussion of personality in this chapter, the next chapter focuses on one particular personality factor, Conscientiousness.

CHAPTER 3: LITERATURE REVIEW: CONSCIENTIOUSNESS

3.1 INTRODUCTION

In chapter two, the Big Five Model of personality was discussed. This model suggests that personality can be reduced to five orthogonal factors labelled Extraversion, Openness, Agreeableness, Neuroticism and Conscientiousness. Conscientiousness has been defined in various ways and consists of a multitude of characteristics. This chapter examines the complex construct of conscientiousness. The chapter begins by defining conscientiousness and looking at the history of the concept, as well as the role of conscientiousness in various models and measurements of personality. The chapter concludes with a discussion regarding the conscientiousness model used in this study.

3.2 DEFINING CONSCIENTIOUSNESS

After reviewing the history and the various theories of conscientiousness in the literature it is obvious that no clarity exists in defining conscientiousness. Costa and McCrae (1998) note that several authors challenge the unity of the factor conscientiousness. Hough (1992) and Paunonen and Jackson (1996) argue that the elements of conscientiousness do not cohere to define a single personality factor. According to Paunonen and Jackson (1996) "the domain is best thought of as three separate, but somewhat overlapping, dimensions related to being (a) methodical and orderly, (b) dependable and reliable, and (c) ambitious and driven to succeed. Moreover, the amount of overlap among these three facets may not be high enough to justify their inclusion in an overall Conscientiousness measure" (p.55). In contrast, Costa and McCrae (1998) state that the conscientiousness facets of the NEO-PI-R define a single factor as found in self-reports and observer ratings across various studies.

The frequently noted problem of multiple names for the same concept may be a function of the difference in emphases of similar factors. Barrick and Mount (1991) assert that the trait of conscientiousness includes both a responsibility-dependability component and an achievement-striving component. Other researchers (Ashton, 1998; Hough, 1992) argue that these are two separate constructs and should be treated as such.

Despite this disagreement regarding the definition of conscientiousness, there does seem to be agreement regarding the ways in which a conscientious person would act. According to Sutherland, De Bruin and Crous (2007) significant correlations exist between conscientiousness and employee performance (Barrick & Mount, 1991). It is reasonable to expect that employees who report a high level of conscientiousness will be more likely to engage in goal-directed, strong willed and determined behaviour then their lower level conscientiousness colleagues. Employers typically evaluate such behaviours favourably.

Furthermore, Witt, Burke, Barrick and Mount (2002) found that workers high in conscientiousness are predisposed to be organised, exacting, disciplined, diligent, dependable, methodical and purposeful. Thus, they are more likely than low-conscientious workers to thoroughly and correctly perform work tasks, take initiative in solving problems, remain committed to work performance, comply with policies and stay focused on work tasks. According to Taylor and De Bruin's (2006) definition of conscientiousness, an individual with a high level of conscientiousness acts purposefully and displays behaviour that is strong willed, determined and detail oriented. By contrast, an individual with a low level of conscientiousness has a tendency to be careless in working towards goals, is lazy and tends to be irresponsible and impulsive (Sutherland, De Bruin & Crous, 2007).

Dependability is a central component of most definitions of conscientiousness (Becker, 1998). A conscientious person is typically described as careful, responsible and organised. It is important to note that conscientiousness is a principle that reflects the general belief that carefulness, responsibility and organisation are preferable modes of conduct (Becker, 1998).

In a study conducted by Miller, Griffin and Hart (1999) conscientiousness was significantly correlated with role clarity and was a significant predictor of contextual performance. It appears that conscientious individuals are more likely to defend the organisation when it is criticised by outsiders and to help co-workers meet important deadlines (Miller et al., 1999). These contextual behaviours support the overall success of organisations and contribute to long-term effectiveness (Miller et al., 1999). These results suggest that high levels of conscientiousness may enhance organisational health (Miller et al., 1999).

As mentioned in the section above, analysing the underlying facets of conscientiousness leads to the emergence of different aspects of the factor. Jackson et al. (2009) emphasise that

different measures of conscientiousness tend to highlight different aspects of the conscientiousness domain. Some measures, such as the NEO-PI-R and the AB5C personality questionnaire, emphasise the industriousness and orderliness aspects of conscientiousness. Other measures, such as the MPQ, emphasise the self-control aspect of conscientiousness.

Roberts et al. (2005) also note that lower order facets of conscientiousness may predict different aspects of conscientiousness. In support of this argument Roberts et al. (2005) cite a study by Steward (1999, cited in Roberts et al., 2005) which found that the order facet of conscientiousness correlated strongly with newly hired employees' performance while the achievement facet of conscientiousness correlated strongly with veteran employees' performance.

As a result of the utility of facets in the prediction of meaningful criteria and the development of concepts underlying broad factors many researchers have developed personality inventories that include more than one level of personality description (Parish, 2002). These factors can be thought of as hierarchical, since they sample from more than one level of a structural hierarchy consisting of differing levels of bandwidth and fidelity. The facets designated by each of the inventories can also be considered a small subset of all possible facets (Costa & McCrae, 1995). Roberts et al. (2005) agree with these findings and suggest that more attention should be devoted to studying the lower order facets of conscientiousness.

Costa and McCrae (1998, p.131) state that "the term Conscientiousness, implying as it does a careful adherence to the dictates of conscience, is perhaps too narrow and too moralistic a label for a factor that can range in scope from simple neatness of dress to passionate and livelong devotion to a cause. Yet all of these manifestations of Conscientiousness show an inner unity grounded in the organisation and purposefulness of behaviour." As a result a replicable and widely accepted underlying structure and definition of conscientiousness may never be achieved (Cartwright & Peckar, 1993).

To summarise, conscientiousness is a complex factor and no definition exists which is widely accepted by all researchers. However, for the purposes of this study the working definition of conscientiousness included aspects such as duty, order, achievement, self-discipline, perfectionism, moralistic, self-control, determinism, virtue, obedience, responsibility, purpose, control, organisation, commitment, dependability, prudence, endurance, vigour, hard

work and ambition. Although this definition is broad it includes all facets of the model. Hogan and Ones (1997) describe conscientiousness as having enormous bandwidth. Ones and Viswesvaran (1996) concluded that broader and richer personality traits are likely to have higher predictive validity than narrower traits. Given the exploratory nature of this study a decision was taken to be „over-inclusive' instead of „under inclusive' during the initial development stage of the instrument.

3.3 HISTORY AND MODELS OF CONSCIENTIOUSNESS

Conscientiousness is a complex factor and little conceptual or empirical agreement exists among researchers with regards to its underlying structure (Roberts, Chernyshenko, Stark & Goldberg, 2005). The psychological literature contains numerous examples of researchers who have tried to examine the dimension of conscientiousness. Attempts to uncover the structure of conscientiousness have used lexical and psychological theory approaches.

Conscientiousness is most frequently defined through multivariate analyses (frequent factor analyses). Although factor analytic studies of personality descriptors consistently find approximately five broad factors, the actual names and content of these factors varies. For instance, the Conscientiousness factor has been variously described as co-variation between "conformity and socially prescribed impulse control" (Hogan & Ones, 1997, p.849), "organization, thoroughness, and reliability" (Goldberg, 1993), and "need for achievement and commitment to work, moral scrupulousness and cautiousness" (Costa, McCrae & Dye, 1991).

Furthermore, Roberts et al. (2005) point out that even though various facets (second order structure of the factor) of Conscientiousness have been identified, no conceptual or empirical solution provides coverage of all these facets and no two systems are in complete agreement. Parish (2002) goes on to explain that such divergence of interpretations suggests that the factor may not map onto a single trait and may actually represent a domain of interrelated traits.

3.3.1 The Lexical Approach for uncovering conscientiousness

Parish (2002) researched conscientiousness extensively and compared multivariate analyses from different conceptualizations based on different studies. His studies made use of the lexical approach to uncover the structure of conscientiousness. The results of these studies are discussed in the section below.

Multivariate analyses based upon Cattell's list

The complexity of the conscientiousness domain was evident in early analyses of the factor. According to Parish (2002), Cattell found two factors relevant to the conscientiousness factor domain. Cattell (1957) labeled this factors G and B. Factor G was described as „superego strength' (Cattell, 1957) and was characterized by perseverance, determination and stability. Factor B, which is described as „general mental capacity' and intelligence (Cattell, 1945), has also been occasionally classified as conscientiousness. Cattell (1957) also included the characteristics of dependability, will to achieve and conformity in this factor. These findings are illustrated in table 3.1.

Table 3.1
Characteristics of C-factors Found using Variations of Cattell's (1974) list. From: *Mapping the Lexical Conscientiousness Factor Domain: Validation of a Comprehensive Hierarchical Model.* p.119. by C.M. Parish. Unpublished PhD Thesis. University of Minnesota, USA.

Characteristic Type	Characteristics
Factor Names	Conformity Conscientiousness Dependability General Mental Capacity/Intelligence Strength of Character Superego Strength/ Positive Character Integration Will to achieve
Consistently Strong Factor Loadings	Responsible/serious Persevering, determined Conscientiousness/scrupulous

	Insistently Orderly Emotionally Stable Languid

Multivariate analyses based upon Norman's list

The Conscientiousness factors found in the Norman studies tend to share high loadings with words relating to organization, reliability and efficiency. These factors also have moderate loadings from words relating to maturity, caution and punctuality (Parish, 2002). These findings are displayed in Table 3.2. Parish (2002) found that the Conscientiousness factors in Norman based studies are remarkably similar. This is noteworthy because of the differences across studies in the nature of the words studied, the identity of the rater (self or peer) and the number of factors extracted.

Table 3.2

Characteristics of C-factors Found Using Variations of Norman's (1967.) Adapted from: *Mapping the Lexical Conscientiousness Factor Domain: Validation of a Comprehensive Hierarchical Model.* p.120. by C.M. Parish. Unpublished PhD Thesis. University of Minnesota, USA.

Characteristic Type	Characteristics
Factor Names	Active-hardworking Conscientiousness Reliable-Intelligent
Consistently Strong Factor Loadings	Organised Disorganised InefficientPractical Dependability Efficient Inconsistent Negligence Order

Multivariate Analyses Based on Other Lists

According to Parish (2002), Tellegen and Peabody's research involving systematic samplings of the lexicon found three conscientiousness like components (Peabody, 1987). McCrae and Costa (1985) also report finding similar components in their analyses. The resulting conscientiousness component is quite broad and is characterized by conscientiousness, caution, reliability, hard work, discipline, organization, stability, ambition and persistence. McCrae and Costa (1985) and Peabody's (1987) findings are presented in Table 3.3.

Table 3.3

Characteristics of C-factors Found Using Other Lexical Variables. Adapted from*: Mapping the Lexical Conscientiousness Factor Domain: Validation of a Comprehensive Hierarchical Model.* p.121. by C.M. Parish. Unpublished PhD Thesis. University of Minnesota, USA.

Study	Factor Name	Highest Factor Loadings	Other Substantial Loadings
McCrae & Costa (1985) Second Analysis	Conscientiousness	Negligent vs. conscientious Careless vs. careful Undependable vs. reliable Lazy vs. hardworking Disorganised vs. organised Lax vs. scrupulous Weak-willed vs. self-disciplined Sloppy vs. neat Late vs. punctual Impractical vs. practical Thoughtless vs. deliberate	Helpless vs. self-reliant Playful vs. business like Ignorant vs. knowledgeable Quitting vs. persevering Stupid vs. intelligent Unfair vs. fair Imperceptive vs. perceptive Uncultured vs. cultured
Peabody (1987)	Conscientiousness	Orderly-disorderly Thorough-careless Responsible-irresponsible Practical-impractical Logical-illogical Organised-disorganised	Perceptive-imperceptive Skeptical-gullible Polite-rude Peaceful-quarrelsome Fair-unfair

		Self-controlled-impulsive Cautious-rash Serious-frivolous Hardworking-lazy Stable-unstable Persistent-non-persistent	

3.3.2 The theoretical approach for uncovering conscientiousness

Another method of exploring conscientiousness involves conceptualizing the factor by examining theories in the personality domain. This approach moves beyond the simple lexical framework. Conscientiousness can be explained by using psychoanalytic theory, role taking and folk concepts and socioanalytic theory (Hogan & Ones, 1997).

Psychoanalytic theory

Freud's personality psychology provides an important early discussion of the construct of conscientiousness. Freud explained conscientiousness in terms of the super-ego or conscience, which forms part of the basic personality structure. Van Niekerk (1996) explains that the main purposes of the superego, which represents the social component of the psyche, are to restrain the urges of the id, entice the ego to strive towards moralistic goals and strive to perfection. Furthermore, according to Van Niekerk (1996) Freud viewed the superego as the moral, ethical arm of the personality. Baron (2001) describes this as "the portion of human personality representing the conscience" (p. 455).

Hogan and Ones (1997) explain that the superego determines an individual's attitude toward authority. According to Freud, the superego plays a crucial role in development through the process of having to come to terms with authority. Freud suggests that conscientiousness is a product of the superego and develops from resolving conflict between childhood sexuality and parentally guided forces of socialization. Conscientiousness thus begins in the process of resolving conflicts with authority. Relations with the parents determine relations with most other authority figures in life. These authority figures may include teachers, military supervisors, employers, mentors and experts (Hogan & Ones, 1997).

Role taking and Folk concepts

Gough (1960) proposes that people are normally distributed along a continuum of socialization so that some individuals are unusually scrupulous and conscientious, most people are normally rule-compliant, and some individuals are hostile to society's rules and conventions. This forms part of the theory of role taking and folk concepts. Excessive hostility is empirically linked to criminal and delinquent behavior. However, Gough's (1960) explains criminal and delinquent behavior as a „psychopath's' failure to anticipate social expectations. This failure leads the psychopath to exhibit a deficient role taking capacity during social interactions. Insensitivity to expectations and rules is seen as resulting from an egotistical inability to understand the effects of one's behavior on others (Hogan & Ones, 1997).

Socioanalytic Theory

The last theory used to explain conscientiousness is based on socioanalytic theory (Hogan, 1983). Authors have reconciled the socioanalytic theory of conscientiousness with the Big Five model through the use of two definitions of personality. In this view personality must be viewed from the perspectives of both the actor and the observer. Personality from the view of the actor is a personal, intrapsychic evaluation of what a person is like "way down deep" (Hogan, 1983). This personality consists of goals, intentions, fears, motives and beliefs. Much of this content is not observable and is therefore not easily amendable to scientific study. Personality from the view of the observer is based on an actor's behavior and coded in terms of trait words that describe that person's reputation. Reputations are reasonably reliable across observers and time. Observers describe actors' behavior using trait terms such as responsible, dependable, careful, irresponsible, chaotic and careless. Reputation is encoded in trait words and trait words have a well-defined mathematical structure. These trait words are the substance of the Big Five Model (Hogan & Ones, 1997). Trait words can be organized in terms of the Big Five personality factors and reflect the qualities and contributions that an individual can be expected to bring to the group. The Big Five Conscientiousness dimension is concerned with a person being responsible and trustworthy, characteristics that are fundamental for maintaining a group (Hogan & Ones, 1997). These socioanalytic theories are uncommon within the psychology literature, but they help to create an empirical

understanding of a domain that seems too complex to simply be described with descriptive traits.

Psychological literature abounds with attempts to deconstruct conscientiousness in order to discover its underlying components or sub- facets and form a model or hierarchy of the factor.

Parish's (2002) analysis of conscientiousness extracted eight factors that accounted for 35.1% of the variance. Her research found eight dimensions that underlie the conscientiousness factor domain. Six of these dimensions made up a higher order factor. These six facets were considered facets of a general C-Factor and were labelled Responsibility, Inhibition, Bull-headedness, Ego-control, Socialisation, Undefensiveness and Order and Perceptiveness.

Roberts et al. (2005) examined the factor structure of scales that measure the Big Five trait of Conscientiousness. This approach's main assumption was that the most important lower-order conscientiousness factors have been identified in some form by the different theoretical perspectives and are thus embedded in the corresponding personality inventories. Roberts et al.'s (2005) study made use of seven personality inventories, which had various perspectives on conscientiousness. The inventories used were the NEO-PI-R, the 16PF, the California Psychological Inventory (CPI), the Multidimensional Personality Questionnaire (MPQ), the Jackson Personality Inventory – Revised (JPI – Revised), the Hogan Personality Inventory (HPI) and the AB5C scales from the International Personality Item Pool. The study consisted of three phases. In phase one, the authors identified scales in each of the seven personality inventories that were conceptually related to the conscientiousness domain. In phase two 2 the authors derived a lower-order structure of conscientiousness by factor analysing scale scores for individuals who had completed all seven inventories. In phase three a confirmatory factor analysis was used to examine the convergent and discriminant validity between the resulting lower-order conscientiousness facets and the global measures of the Big Five. Factor analysis of scales drawn from the seven different personality inventories, which all developed using different theoretical and empirical approaches to scale construction, resulted in a six factor solution. This solution includes, order, virtue, traditionalism, self-control, responsibility and industriousness. The authors note that these six lower-order factors or facets formed a single higher-order latent factor labelled Conscientiousness. The lower-order facets showed good convergent validity as well as adequate discriminate validity.

Taylor and De Bruin (2006) identified five facets that comprise conscientiousness in the South African context. The facets identified were order (the tendency to be neat, tidy and methodical), self-discipline (the tendency to start and carry through tasks to their completion), effort (the tendency to set and attain ambitious goals), dutifulness (the tendency to keep one's principles, moral obligations and to be reliable and dependable) and prudence (the tendency to check facts and think through tasks and actions).

In summary, a review of the history of conscientiousness makes it clear that there has never been unity concerning the basic structure of the factor. Hogan and Ones (1997) tried to reconcile the Conscientiousness factor of the Five Factor Model with psychology by proposing three psychological theories of conscientiousness. However, this approach was not widely accepted. Various researchers have tried to deconstruct the factor by reducing it to sub-factors and creating a model of conscientiousness. There is currently no single model of conscientiousness that is widely accepted by researchers.

3.4 THE MEASUREMENT OF CONSCIENTIOUSNESS

The debate regarding the application and usability of conscientiousness (Costa & McCrae, 1998) is an extension of the debate regarding the use of broad or narrow personality traits (Ashton, 1998; Ones & Viswesvaran, 1996; Schneider, Hough & Dunnette, 1996). Some researchers have demonstrated the utility of conscientiousness as a broad trait (Barrick & Mount, 1991). In contrast, other researchers have demonstrated the utility of using narrow traits or sub-factors of conscientiousness in predicting dependent variables of interest (Ashton, 1998; Hough, 1992).

Christopher, Zabel and Jones (2008) explain that the benefits of facet-level analyses, in lieu of or to complement aggregate scores, have been applied to investigations of the Big Five personality factors. It has been suggested that analysing the facets of the five factors has predictive validity (Paunonen & Ashton, 2001).

Bogg and Roberts (2004) found "that increases in predictive validity can be achieved when specific facets of conscientiousness are used rather than pooling all measures into one large domain measure" (p.911). Thus, by analysing facets instead of factors it is possible to achieve

a greater understanding of the nomological network underlying related but conceptually distinct constructs (Paunonen, Haddock, Fosterling & Keinonen, 2003).

Analysis of the underlying facets on conscientiousness allows different aspects of the factor to come to light. Different measures of conscientiousness tend to highlight different aspects of the conscientiousness domain (Jackson et al., 2009). Some measures such as the NEO-PI-R and the AB5C personality questionnaires emphasise the industriousness and orderliness aspects of conscientiousness, whereas other measures, such as the MPQ, emphasise the self-control aspect of conscientiousness.

According to Parish (2002) many researchers have developed personality inventories that include more than one level of personality description. These multi-level inventories are a result of the utility of facets in the prediction of meaningful criteria and the development of concepts underlying broad factors. These factors are hierarchical, and sample from more than one level of a structural hierarchy consisting of differing levels of bandwidth and fidelity. The facets designated by each of the inventories can also be considered a small subset of all possible facets (Costa & McCrae, 1995). A few of these hierarchical personality questionnaires are described in the paragraphs below.

The NEO-PI-R is probably the most well known personality questionnaire. It consists of a 240-item questionnaire designed to assess the Big Five and contains five domain scales labelled Neuroticism, Emotional Stability, Extraversion, Openness to Experience and Conscientiousness (Costa, McCrae & Dye, 1991). Each domain includes six subscales or „facets'. When the 30 facets are subjected to factor analysis, five factors clearly emerge (Costa & McCrae, 1992). Throughout the inventory a five-point Likert format ranging from „strongly agree' to „strongly disagree' is used. Internal consistency reliability coefficients are reported to range from 0.86 to 0.95 for domain scales and from 0.62 to 0.82 for facet scales (Costa & McCrae, 1994; Roberts et al., 2005).

Costa et al. (1991) conceptualised the Conscientiousness factor as "having both proactive and inhibitive aspects" (p.887). Proactive behaviours involve behaviours related to success at work such as the need for achievement, whereas inhibitive aspects relate to self-control and cautiousness. Six facets, labelled dutifulness, achievement striving, competence, order, self-discipline and deliberation, encompass these aspects. Dutifulness reflects the propensity to

honour and uphold commitments to social justice and social obligations. This facet is often found in the work context. Achievement striving reflects the propensity to be hard working and driven. Competence refers to an individual's sense of being capable, effective and sensible. Order refers to the tendency to be well organised, neat and clean. Self-discipline is the ability to begin tasks and carry them through to completion despite boredom and other distractions. Finally, deliberation reflects impulse control, patience and maturity.

According to Christopher et al. (2008) the 48 items in the six subscales of the NEO-PI-R Conscientiousness domain can be used to measure conscientiousness. Sample items from the various facets are listed below.

- Competence: I'm known for my prudence and common sense ($\alpha = 0.74$).
- Order: I keep my belongings clean and neat" (revised $\alpha = 0.55$).
- Dutifulness: When I make a commitment, I can always be counted on to follow through ($\alpha = 0.74$).
- Achievement striving: I have a clear set of goals and work towards them in an orderly fashion ($\alpha = 0.72$).
- Deliberation: I think things through before coming to a decision (revised $\alpha = 0.54$).

The six conscientiousness facets combine to form a composite variable ($\alpha = 0.88$).

The Sixteen Personality Factor Questionnaire (16 PF) also measures conscientiousness and was originally developed through the factor analytic research of Cattell (1945). The fifth edition of the 16PF (Conn & Rieke, 1994) consists of 185 items measuring 16 personality traits, better known as „primary scales', and one intellectual reasoning trait. A three-response category format is used throughout the inventory. Coefficient alpha values for the primary scales are reported to range from 0.68 to 0.87 (Chernyshenko, Stark & Chan, 2001). Second order factor analysis of the 16 personality scales consistently reveals a clear five-factor structure. These factors are termed „global' and closely resemble the Big Five. The global factor of self-control is conceptually related to conscientiousness. In Cattell's (1945) original writings this domain is described as reflective of the ideal self. This is the self that an individual wishes to be and encompasses all moral behaviour (Cattell, 1965). Individuals with high desire to achieve this ideal are persevering, responsible, ordered and attentive (Cattell, 1965). In other words, these individuals exercise a high degree of control over their thoughts, feelings and behaviour. Two of the 16PF scales are closely associated with the global factor

of self-control. These scales are rule consciousness (formerly called superego strength) and perfectionism (Roberts et al., 2005).

The California Psychological Inventory (CPI) was originally published in 1956 and aims to assess everyday interpersonal themes in behaviour called folk concepts (Roberts et al., 2005). The 1987 revision, known as Form 462 (Gough, 1987), includes 462 true-false items that form twenty folk scales, three structural scales and a number of special purpose scales and indices. Alpha coefficients for the folk scales range from 0.62 to 0.84 with a median of 0.77 (Gough & Bradley, 1996). Reliability coefficients for the structural scales are generally higher. In the CPI technical manual, both conceptual framework and factor structure point to six scales potentially relating to the domain of conscientiousness. These scales responsibility, socialisation, self-control, good impression, well being and achievement via conformance. These scales concern following rules, being socially appropriate and working hard in well structured environment (Roberts et al., 2005).

The Hogan Personality Inventory (HPI) was developed in the context of socioanalytic theory (Hogan & Roberts, 2000). The revised 1992 edition consists of seven higher-order primary scales and a validity scale (Hogan & Hogan, 1992). The primary scales are labelled adjustment, ambition, sociability, likeability, prudence, intellectance and school success. Each primary scale can be further divided into subscales known as Homogeneous Item Composites (HICs). The 1992 edition of the HPI contains a total of 206 items in 41 HICs. Internal consistency reliabilities for the primary scales range from 0.71 to 0.89 (Hogan & Hogan, 1992). Reliabilities for the HICs are lower, because they consist of only 305 items. The HPI was initially constructed to reflect the Big Five dimensions of personality (Hogan & Hogan, 1992). Items in the prudence scale assess the Big Five Conscientiousness factor (Roberts et al., 2005). According to Hogan and Hogan (1992) the prudence dimension is designed to measure the degree to which a person is conscientious, conforming and dependable. This dimension currently contains seven HICs, labelled moralistic (adheres to conventional values), mastery (hard working), virtuous (perfectionistic), not autonomous (concerned about others opinions), not spontaneous (predictable), impulse control (lack of impulsivity) and avoids trouble (probity).

The Jackson Personality Inventory (JPI), originally developed in 1976, was designed to provide measures of personality traits relevant to the prediction of behaviour in a range of

contexts, especially in industrial settings (Roberts et al., 2005). The inventory was revised in 1994 to address more recent research in personality measurement (Jackson, 19994). The new Jackson Personality Inventory – Revised (JPI-R) is a 300-item questionnaire composed of 15 scales (Jackson, 1994). These scales can be grouped into five „higher-order' clusters that closely resemble the Big Five. Scale reliabilities range from 0.66 to 0.87 with a median of 0.79. The JPI-R item cluster labelled dependable closely resembles the dimension of Conscientiousness. This cluster includes organisation, traditional values and responsibility scales. The organisation scale is concerned with planning and completing projects on schedule. The traditional values scale assesses the degree to which an individual adheres to conservative, „old fashioned' customs and beliefs and resists more liberal or radical values. The responsibility scale denotes feelings of moral obligation to be honest and upright with others and society at large (Roberts et al., 2005).

The Multidimensional Personality Questionnaire (MPQ) includes 300 true/false items. The 11 primary scales, which were originally derived from a series of exploratory factor analyses, consist of 272 items. The length of each scale was determined by the number of items needed to ensure adequate reliability. Consequently the scale reliabilities of the MPQ scales are somewhat higher than those of other personality inventories and generally exceeded 0.80. The 11 primary scales can be collapsed into three or four higher-order dimensions (Tellegen, 1982). One of these higher order dimensions, known as the constraint factor, is related to conscientiousness. The constraint factor includes such primary scales as control, harm avoidance and traditionalism. People with high scores on the constraint factor are described as cautious, planful and conventional and also have a tendency to avoid danger. The control scale reflects the tendency to be careful, rational and not impulsive. The harm avoidance scale reflects the tendency to avoid excitement, adventure and danger. The traditionalism scale taps moral standards, religious values and strict social norms (Roberts et al., 2005).

AB5C scales from the International Personality Item Pool (AB5C-IPIP) were derived based on the assumption that most trait adjectives are multidimensional and can be represented as a blend of two higher order Big Five dimensions (Hofstee et al., 1992). Each of the 10 unique Big Five pairings defines a circumplex plane, upon which the trait adjectives can be located. For example, the dimensions of Extraversion and Agreeableness form the basis of a circumplex of interpersonal traits. Traits that are pure Extraversion lie on the Extraversion dimension, whereas traits that reflect blends of Extraversion and Agreeableness lie between

the poles of the two dimensions. Each circumplex can be divided into 12 slices of 30 degrees each. The six lines demarcating the boundaries between the slices represent bipolar subcomponent factors. Thus, each circumplex has two „pure' subcomponent factors representing the Big Five dimensions. The axes defining these subcomponent factors are located at 0-180 and 90-270 degrees. In addition, there are two „high loadings' subcomponent factors for each Big Five dimension, located at about 30 degrees from the „pure' axes. Based on this representation nine narrow traits can be derived rationally for each Big Five dimension (Roberts et al., 2005).

There are a total of 45 bipolar dimensions in the AB5C model of the Big Five proposed by Hofstee et al. (1992). To measure each of these dimensions, Goldberg (1999) developed a 45-scale AB5C-IPIP measure, which is available for public use on the Internet at http://ipip.ori.org/. The scales consist of 9-13 items and have internal consistency reliabilities ranging from 0.67 to 0.90 with an average of 0.80 (Goldberg, 1999). The Big Five factor of Conscientiousness in the AB5C-IPIP has nine facets. These facets are labelled conscientiousness (pure Conscientiousness), efficiency (high Conscientiousness, high Extraversion), cautiousness (high Conscientiousness, low Extraversion), dutifulness (high Conscientiousness, high Agreeableness), rationality (high Conscientiousness, low Agreeableness), purposefulness (high Conscientiousness, high Emotional Stability), perfectionism (high Conscientiousness, low Emotional Stability), organisation (high Conscientiousness, high Intellect) and orderliness (high Conscientiousness, low Intellect).

Lastly, The Basic Traits inventory or BTI developed by Taylor and De Bruin (2004) is a cross-culturally valid Five Factor model personality inventory for use with the South African population. Items were written to take local conditions and cultural variation in South Africa into account. The BTI yields similar factor structures and reliabilities for the five factors across black and white population groups (Taylor & De Bruin, 2005) and across different indigenous African language groups (Ramsay, Taylor & De Bruin, 2008). The inventory consists of 173 items that are grouped according to the facets of Extraversion, Neuroticism, Openness to Experience Agreeableness and Conscientiousness. Items are rated on a five-point Likert scale with response range varying from strongly disagree to strongly agree. The BTI's Conscientiousness scale consists of 41 items and includes items that measure the following facets of Conscientiousness: effort in setting and attaining goals; the tendency to keep everything neat and tidy (order); the tendency to keep to principles, moral obligations

and reliability (dutifulness); the tendency to think issues through carefully and check facts (prudence); and the ability to start a task and carry it through to its completion (self-discipline).

The discussion above illustrates that various conscientiousness instruments measure different aspects of conscientiousness. In the next section the manner in which conscientiousness in conceptualised within the SAPI project is discussed.

3.5 CONSCIENTIOUSNESS IN THE SAPI FRAMEWORK

This section begins by providing an overview of the SAPI project. The section then focuses on conscientiousness within the SAPI framework and how it corresponds to other conscientiousness models.

The overall aim of the South African Personality Inventory (SAPI) project is to develop a comprehensive inventory to assess personality in all official South African language groups (Nel, 2008). The SAPI project has two main stages with each stage consisting of numerous phases. The first stage was broadly conceptual and attempted to unravel the implicit personality structure reflected in natural language by speakers of all eleven official languages in South Africa. During this stage a qualitative, comparative research design was used. Personality structure was derived from interviews in all language groups and these structures were then compared across the languages. The second stage of the study is quantitative in nature and aims to develop and test instruments for each of the language groups.

Nel's (2008) study constituted the first stage of the project and aimed to uncover the personality structure of each of the eleven language groups in South Africa. The study also aimed to identify the shared and unique personality dimensions of the different language groups. The structure identified by Nel (2008) will be used to develop an instrument to measure personality that meets the criteria laid out in the Employment Equity Act (Nel, 2008). The development of this instrument constitutes stage two of the SAPI project.

Nel's (2008) research made use of a qualitative methodology and included over 1300 participants. The participants were drawn from all of the eleven official language groups and differed from each other with regards to age, gender and socio-economic status.

In keeping with the lexical approach structured interviews were conducted in the participants' native language. These interviews were designed to gather information about personality descriptive terms. The interviews were then transcribed and captured in Microsoft Excel. These transcripts were sent to language experts for language editing and translation into English. Through this process more than 50 000 personality descriptive terms were identified. Content analysis was utilised in order to convert the personality descriptive terms to personality dimensions. Language and cultural experts helped to validate the initial interpretation. The 50 000 descriptive terms were then reduced to 190 personality dimensions through the use of cluster analysis. The analysis included the grouping of synonyms and antonyms and the use of dictionaries, literature and knowledge about content. The 190 dimensions were also divided into those that are common (shared by all language groups), semi-common (shared by 7-10 of the language groups), semi-specific (shared by 2-6 of the language groups) and language specific (unique to a particular language group) (Nel, 2008).

These 190 dimensions were then clustered further in order to construct the indigenous personality structure. The methods used were similar to those used during the initial clustering phase. This second clustering phase produced nine overall clusters, which were labelled Extraversion, Soft-heartedness, Conscientiousness, Emotional Stability, Intellect, Openness, Integrity, Relationship harmony and Facilitating.

Nel (2008) explains how the South African Personality Structure of conscientiousness was defined: "Semantic cluster analysis was used to arrive at the final structure. The aim of the semantic cluster analysis was to come up with applicable and broad clusters that validly encompass the facets" (p.119). Furthermore, Nel (2008) also explains that an extensive literature review was undertaken in order to assist with constructing an adequate structure for the conscientiousness factor. The facets were then clustered in sub-constructs in accordance with shared behavioural styles or content. These sub-constructs were then given collective labels such as helpfulness to helpful. Following the initial clustering the sub-constructs were further analysed and clustered according to similarities or shared inherent behaviour styles. The 37 sub-constructs were reduced to nine main constructs. Conscientiousness is one of these nine main constructs.

In the SAPI project conscientiousness consists of five sub-clusters, namely achievement orientation, dedication, orderliness, self-disciplined and thoughtless (Nel, 2008).

Conscientiousness is described as being painstaking and careful. Alternate definitions of conscientiousness include the quality of acting according to the demands of conscience; accomplishing something through great effort or inner drive; the opposite of being reckless and uncaring with own or others' safety; behaving according to certain social standards, attitudes and practices; being devoted to reach certain goals; and arranged or disposed in a neat or tidy manner or in a regular sequence.

Nel (2008) discusses conscientiousness in the South African context by explaining that is consists predominantly of organisationally desirable and undesirable facets. The sub-clusters of achievement oriented, dedication, orderliness and self-discipline comprise most of the desirable attributes. These attributes refer to the facets that are needed to perform and attain job or organisational goals. The last sub-cluster, thoughtless, corresponds more with undesirable attributes for important decisions or attaining organisational goals. Figure 3.1 is a graphic representation of the Conscientiousness factor as conceptualised in the SAPI framework.

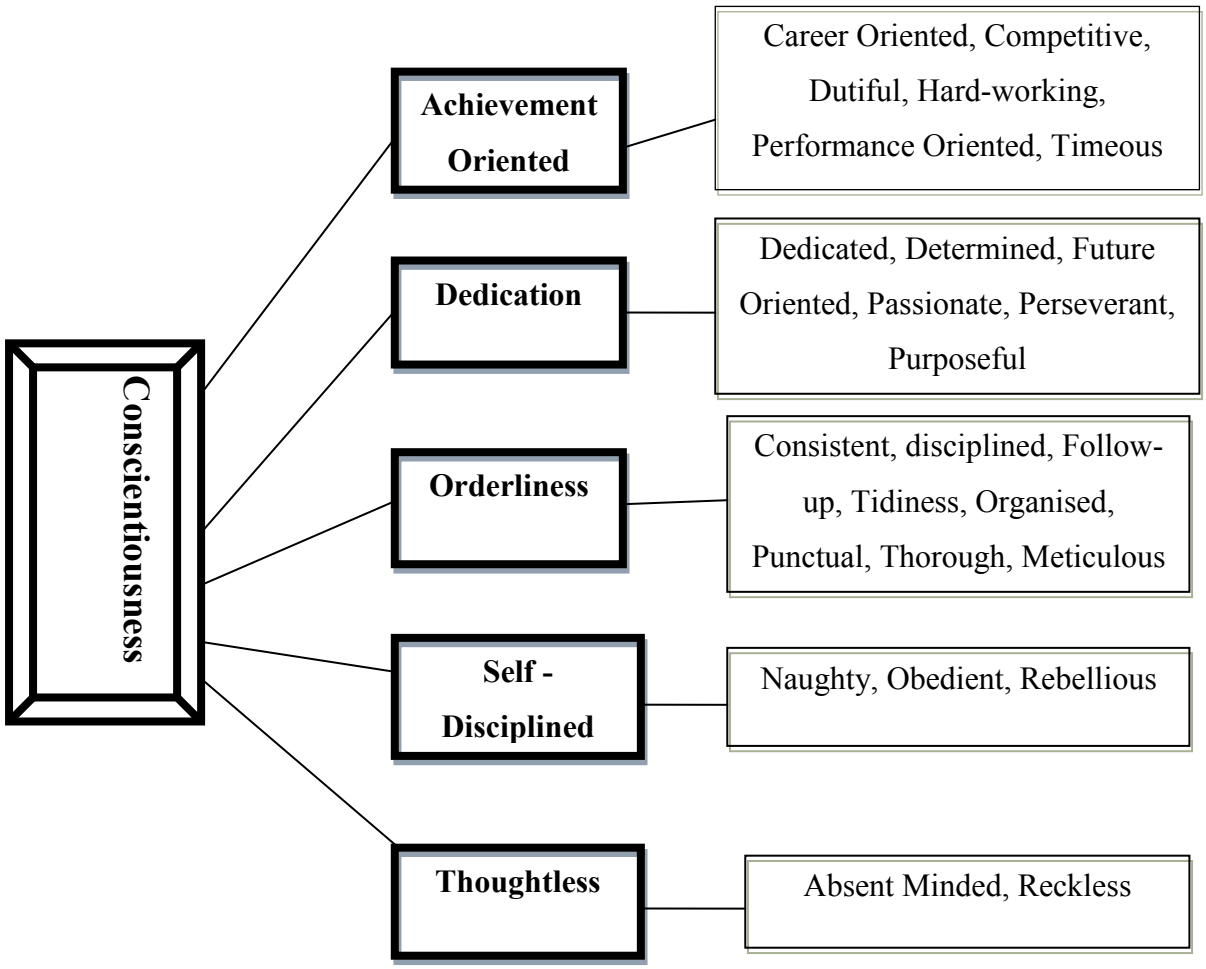

Figure 3.1

Graphic Representation of Conscientiousness in the SAPI framework

According to Nel (2008), Conscientiousness in the South African Personality Inventory corresponds well with the Five Factor Model or Big Five. Hard work, punctuality, and reliable behaviour are the overall characteristics of the conscientiousness factor (Langford, 2003) and Nel (2008) found all of these attributes in the data. Furthermore, Goldberg (1990) states that being organised, neat and meticulous are desirable traits when scoring conscientiousness. Less desirable traits are associated with being careless and sloppy. All these traits were well represented in the SAPI conscientiousness cluster, especially in the sub-clusters of orderliness and thoughtlessness. Despite the strong correspondence, Nel (2008) does identify some differences. In particular, the SAPI Conscientiousness cluster includes competitiveness, a trait that has traditionally formed part of the Extraversion factor (Goldberg, 1990). The reason for the inclusion of competitiveness in the Conscientiousness cluster was the development of the sub-cluster Achievement oriented. Competitiveness was added to this sub-cluster as it corresponds well with the other components of the sub-cluster.

Nel (2008) also claims good correspondence between the SAPI conscientiousness factor and the Big Seven model's conscientiousness factor, which includes tidy, organised, orderliness, punctual and cautious behavioural traits. However, the SAPI conscientiousness factor also covers aspects of achievement and dedication not covered by the Big Seven model. There is a very good fit between the SAPI conscientiousness cluster and the conscientiousness factor of the HEXACO model (Nel, 2008). According to Nel (2008), the conscientiousness factor of the HEXACO model consists of all the facets that are included in the SAPI conscientiousness cluster, with the exception of the sub-cluster dedication.

The SAPI conscientiousness model is also comparable with other models and analyses of conscientiousness (Nel, 2008). For example, Roberts et al.'s (2005) conscientiousness consists of order, virtue, traditionalism, self-control, responsibility and industriousness facets. This is similar to the SAPI conscientiousness cluster's facets of orderliness and self-discipline. Furthermore, Hough and Ones (2001) conceptualise conscientiousness in terms achievement, dependability, impulse-control, order, moralistic and persistence facets. This corresponds to the SAPI conscientiousness cluster's facets of achievement orientation, dedication and orderliness.

The similarities mentioned above make it clear that some overlap does exist between various models of conscientiousness. However, the models are not identical and do include different sub-factors and facets. Most models include the themes of achievement, order, dedication, self-discipline, virtue, responsibility and industriousness.

3.6. CONCLUSION

This chapter examined the various ways in which conscientiousness is defined. It became evident that no clarity exists with regards to the definition of conscientiousness. However, there is a general consensus regarding the themes and attributes possessed by a conscientious person.

This chapter discussed the various ways in which conscientiousness can be conceptualised and it was argued that two possible conceptualisations exist. The first conceptualisation involves a lexical approach that looks at the most frequently referenced factor models of personality structures. The second conceptualisation involves a theoretical approach in which conscientiousness is explained by psychological theory.

Even though conscientiousness is difficult to define most researchers agree that the construct does exist. Various personality measures measure a factor labelled conscientiousness. These measures include the NEO-PI-R, 16PF, California Psychological Inventory, Hogan Personality inventory, Jackson Personality Inventory and the Basic Traits Inventory. Each of these personality measurements conceptualises conscientiousness differently, although considerable overlap exists between the facets.

In the South African Personality Inventory (SAPI) project's qualitative phase Conscientiousness was conceptualised as consisting of 5 sub-clusters and 24 facets. Initial research indicated that this conceptualisation corresponded with various models in the literature (including the Big Five, the Big Seven and the HEXACO) and that there were definite similarities in construction.

The next chapter explores the manner in which the SAPI conscientiousness cluster was tested within the South African context.

CHAPTER 4: RESEARCH DESIGN AND METHODOLOGY

4.1 INTRODUCTION

Chapter four outlines the specific research process followed in this study. The chapter includes the research design, sample and procedures, measuring instruments and the statistical analysis that was followed.

4.2 RESEARCH DESIGN

For the purposes of this research, a quantitative research design was used in order to reach a large number of participants. Trochim and Donnelly (2001) define quantitative data as "the numerical representation of some object. A quantitative variable is any variable that is measured using numbers" (p. 11). Quantitative research can also be defined as "a form of conclusive research involving large representative samples and fairly structured data collection procedures" (Struwig & Stead, 2001).

Struwig and Stead (2001) identify five characteristics of quantitative research:

a) *Constructs and their measurement* – Quantitative research examines constructs (variables) based on hypotheses by means of questionnaires and/or some form of structured observation.
b) *Causality* – Establishing causal relationships (cause and effect relationships) between constructs by using independent and dependent variables.
c) *Generalisation* – Establishing that findings can be legitimately generalised beyond the confines of the research sample.
d) *Replication* - Provides a way of determining the extent to which findings are applicable to other contexts, and also serves as a means of examining the biases of the investigator.
e) *The individual as focus* – Survey instruments are administered to individuals and the individual's (not the group's) responses are required and collected to form overall measures for the sample.

The SAPI experimental conscientiousness measure used an exploratory research approach to develop and clarify ideas and research questions regarding unexplored territory by

investigating a problem about which little is currently known. In this study an experimental conscientiousness measuring instrument was developed. The study involved a cross-sectional questionnaire design where the conscientiousness of a sample of entry-level police applicants in the South African Police Service (SAPS) was assessed. A pilot study was conducted first, followed by the application of the experimental conscientiousness instrument to a larger group of entry-level police applicants.

4.3 PARTICIPANTS AND PROCEDURES

A sample is described as a small collection of units from a population that is used to determine the truth about the population (Fields, 2005). Struwig and Stead (2001) identify two groups of sampling methods, namely non-probability sampling techniques and probability sampling techniques. For the purpose of this study, focus was placed on non-probability techniques. In non-probability sampling, "the probability of any particular member of the population being chosen is unknown" (Struwig & Stead, 2001, p. 111). Struwig and Stead (2001) identify four non-probability sampling techniques:

a) Convenience sampling – the sample is selected based purely on availability.
b) Judgement sampling – The sample is selected on the basis of expert judgement.
c) Quota sampling – The sample is selected based on their characteristics (for example, age, income, socio-economic status and gender).
d) Snowball sampling – A variety of procedures in which initial respondents are selected by probability methods, but additional respondents are obtained from information provided by the initial respondents.

In this study convenience sampling was used for both the pilot and main studies.
Worthington and Whittaker (2006) highlight sample size as an issue that has received considerable discussion in the literature. These authors identify two central risks related to the use of two few participants (Worthington & Whittaker, 2006).

a) Patterns of co-variation may be unstable because chance can substantially influence correlations among items when the ratio of participants to items is relatively low.
b) The development sample may not adequately represent the intended population (De Vellis, 2003).

Other authors have also commented on sample size. For example, Comrey (1973) classifies a variety of sample sizes from very poor (N = 50) to excellent (N = 1,000) based solely on the

number of participants in the sample. Comrey (1973) recommends that a sample must consist of at least 300 cases in order to be considered appropriate for factor analysis. Furthermore, Gorsuch (1983) proposes guidelines for minimum ratios of participants to items (5:1 or 10:1). This criterion has been widely cited in counselling psychology research. However, some authors point out that these general guidelines may be misleading (MacCallum, Widaman, Zhang & Hong, 1999; Tabachnick & Fidell, 2001; Velicer & Fava, 1998).

In general, researchers agree that larger sample sizes are likely to result in more stable correlations among variables and greater replicability of EFA (exploratory factor analyses) outcomes (Worthington & Whittaker, 2006). Velicer and Fava (1998) produced evidence indicating that any ratio less than a minimum of three participants per item is inadequate. There is additional evidence that factor saturation (the number of items per factor) and item communalities are the most important determinants of adequate sample size (Guadagnoli & Velicer, 1988; MacCallum et al., 1999).

The following guidelines should therefore apply:

a) Sample sizes of at least 300 are generally sufficient in most cases.
b) Sample sizes of 150 to 200 are likely to be adequate with data sets containing communalities higher than 0.50 or with 10:1 items per factor with factor loadings at approximately |.4|.
c) Smaller samples sizes may be adequate if all communalities are 0.60 or greater or with at least 4:1 items per factor and factor loadings greater than |.6|.
d) Sample sizes less than 100 or with fewer than 3:1 participant-to-item ratios are generally inadequate (Reise, Waller & Comrey, 2000; Thompson, 2004).

4.3.1 Pilot Study

The pilot study was conducted with members of the public who applied for administrative clerical positions at the firearm registrar department of SAPS in Pretoria. These positions were advertised in the media. Table 4.1 provides a description of the demographic composition of the pilot sample.

Table 4.1

Demographics of the Pilot Sample (N=176)

Item	Category	Frequency	Percentage
Gender			
	Male	145	82.3
	Female	31	17.6
Race			
	Black	146	82.9
	White	7	3.9
	Coloured	16	9.0
	Indian	7	3.9
Language			
	Afrikaans	22	12.5
	Sepedi	55	31.2
	South Sotho	11	6.2
	Zulu	15	8.5
	English	6	3.4
	Tshivenda	9	5.1
	Xitsonga	16	9.0
	Xhosa	6	3.4
	SeTswana	28	15.9
	Swati	1	0.5
	Ndebele	7	3.9
	Other	0	0.0
Education level			
	Grade 12	70	39.7
	Certificate	65	36.9
	Diploma	38	21.5
	B Degree	1	0.5
	Honours or Equivalent	0	0.0
	Masters	0	0.0
	Doctorate	0	0.0
	Other	2	1.1

The total sample consisted of 176 members of the public. 82.3% of the participants were male and the remaining 17.6% were female. Black respondents (82.9%) represented the majority of the sample. The racial groups with the smallest representation were the Indian (4%) and white (4%) groups. The sample consisted of various language groups. Sepedi (31.2%) and SeTswane (15.9%) were the most commonly spoken languages and Swati (0.5%) was the lowest, with only one respondent. In terms of education, 39.7% of the sample had a Grade 12 educational level followed by 36.9% who had some form of certificate course and 21.5% had a diploma. The age mean of the sample was 25 years.

The purpose of the pilot study was to standardise the testing procedure by experimenting with a pilot instrument. One of the objectives of the pilot study was to develop clear, unambiguous administration instructions for the experimental try-out of the items. An additional objective involved pre-testing the experimental version of the measure. A third objective was to gather information about how test-takers responded to the stimulus materials, the ordering/sequencing of the items and the length of the measurement.

The pilot instrument was administered to various language groups, consisting of approximately 25 participants per language group. Participants were given standardised instructions and had 60 minutes to complete the questionnaire. The questions and answers were presented in the same booklet. The participants in the pilot study provided positive feedback and indicated that they understood the test instructions and the rating scale used and experienced no problems with the items. The main recommendation from the pilot study was to separate the question booklet from the answer sheet. The benefits associated with the recommendation are that less paper is used, the booklets can be reused and the data capturing is simplified as all the answers are on one sheet.

4.3.2 Experimental Conscientiousness Sample

Based on the recommendations made in the pilot study the experimental conscientiousness questionnaire was developed and administered to police members who were selected into the SAPS in July 2009. Table 4.2 provides a description of the demographic composition of the (experimental) sample.

Table 4.2

Demographics of the Experimental Conscientiousness Instrument Sample (N=1051)

Item	Category	Frequency	Percentage
Gender			
	Male	489	47.0
	Female	561	53.3
Race			
	Black	1018	97.0
	White	7	0.6
	Coloured	17	1.6

	Indian	2	0.1
Language			
	Afrikaans	16	1.5
	Sepedi	7	0.6
	South Sotho	220	20.8
	Zulu	296	28.1
	English	78	7.4
	Tshivenda	79	7.5
	Xitsonga	41	3.9
	Xhosa	154	14.6
	SeTswana	42	3.9
	Swati	81	7.7
	Ndebele	30	2.8
	Other	3	0.2
Education level			
	Grade 12	794	75.4
	Certificate	161	15.3
	Diploma	81	7.7
	B Degree	6	0.5
	Honours or Equivalent	1	0.1
	Masters	0	0.0
	Doctorate	0	0.0
	Other	4	0.3

The total sample consisted of 1051 police entrants. 47% of the participants were male and the remaining 53.3% were female. The majority of respondents (97%) identified themselves as black. The Indian race group had the least representation (0.2%). The sample consisted of various language groups. Zulu (28.1%) and South Sotho (20.8%) were the languages most represented. 75.4% of the sample had a Grade 12 educational level, 15.3% had some form of certificate course and 7.7% had a diploma. The age mean of the sample group was 26 years.

4.4 MEASURING INSTRUMENT

The researcher followed several steps in the development of the experimental conscientiousness measuring instrument. A brief discussion of these steps and the related operational considerations follows.

4.4.1 Step 1: Aim of the Instrument and Construct Domain

The main aim of the experimental conscientiousness measure was to investigate the construct of conscientiousness as conceptualised in the first phase of the SAPI project.

The conscientiousness domain consisted of 24 facets, which were defined for the study (see table 4.3 below). Target behaviour on the items was used as a guide in defining the facets.

Worthington and Whittaker (2006) maintain that in scale development the first step is to define your construct clearly and concretely, using both existing theory and research to provide a sound conceptual foundation. This endeavour is sometimes more difficult than it may initially appear because it requires researchers to distinctly define the attributes of abstract constructs. It is virtually impossible to measure an ill-defined construct because this results in the inclusion of items that may be only peripherally related to the construct of interest or in the exclusion of items that are important components of the content domain (Worthington & Whittaker, 2006). In the current study, the researcher made use of an Excel spreadsheet containing „utterances' obtained from Nel's (2008) study. These „utterances' were clustered into sub-clusters and facets of the conscientiousness cluster.

Table 4.3

Definitions of the Conscientiousness Cluster

CONSCIENTIOUSNESS CLUSTER	
Achievement Oriented Sub Cluster	
Facets	**Definitions**
Career oriented	Being career-oriented or business-minded; enjoying doing business or working in a company.
Competitive	Liking to compete with others; challenging others. Enjoying being in contest.
Hard working	Working hard; enjoying working. Working long, beyond what is expected. Working to achieve one's goals.
Performance Oriented	Aiming high, striving to achieve and achieving one's goals; performing well.
Timeous	Doing things in your own time and without haste

Dedication Sub-Cluster	
Dedicated	Being dedicated and committed in whatever one does. Being involved and interested in one's work. Being committed to one's family, activities, and interpersonal relationships.
Determined	Knowing what one wants and working with determination to achieve it. Wanting to be successful in life and working toward it.
Future Oriented	Being concerned about one's future and ambitious; having goals and dreams in life and thinking about tomorrow. Planning for the future. Foreseeing things.
Passionate	Being passionate and enjoying what one does in life; being passionate about different topics and activities.
Perseverant	Persevering and not giving up in the face of hardships or difficulty. Facing challenges successfully and putting problems behind oneself. Continuing with what one is doing until it has been completed.
Purposeful	Having goals and direction in life - knowing what you want and being driven to achieve that. Focusing on tasks that will help you reach your goal.
Orderliness Sub-cluster	
Consistent	Being consistent in one's actions across time and situations. Having a match between one's words and one's actions.
Disciplined	Having self-discipline, liking rules, staying within defined borders.
Follow-up	Following up on things.
Meticulous	Paying attention to details, being precise; being a perfectionist and wanting things to be done in a certain way.
Organised	Devising and following plans; preparing for things in advance. Organizing things for oneself and for others. Liking order.
Punctual	Doing things on time and expecting from others to be on time. Sticking to allocated time, keeping track of time and doing things according to a time

	schedule.
Tidiness	Being clean, neat, and tidy - with respect to personal hygiene, the clothes one wears, and one's environment. Liking to keep the place where one lives neat, to wash, clean, and tidy up.
Thorough	Being conscientious and thorough in one's work.
Self-Disciplined Sub-Cluster	
Naughty	Acting mischievously, doing things one is not supposed to be doing.
Obedient	Obeying elders and people in authority, doing what is asked and expected of oneself. Being well-disciplined, obeying the rules and being a person who can be reprimanded.
Rebellious	Not conforming to traditional customs and values; having a contradictory attitude, being against things in principle. Making one's own rules and regulations.
Thoughtless Sub-Cluster	
Absent-minded	Habitually being unaware of what is going on around oneself and not paying attention; daydreaming, habitually being forgetful and confused.
Reckless	Not being cautious and careful, not considering possible dangers and consequences.

4.4.2 Step 2: Writing of the Items

Two sets of items were developed. A pool of 240 conscientiousness related items was created. Fifteen social desirability items were also constructed.

Worthington and Whittaker (2006) explain that the ultimate objective is to arrive at a set of items that clearly represent the construct of interest so that factor-analytic, data-reduction techniques can yield a stable set of underlying factors that accurately reflect the construct. Items that are poorly worded or not central to a clearly articulated construct introduce potential sources of error variance, reducing the strength of correlations among items and diminishing the overall objectives of scale development

In general, researchers should write items that are clear, concise, readable, distinct, and reflect the scale's purpose. In other words, items should always produce responses that can be scored in a meaningful way in relation to the construct definition (Worthington & Whittaker, 2006). They emphasise that researchers should not take the quality of the item pool lightly. A carefully planned approach to item generation is a critical starting point for scale development research (Worthington & Whittaker, 2006). Items should be reviewed by one or more groups of knowledgeable people (experts) to assess item quality on a number of different dimensions. At the very least, expert review should involve an analysis of content validity, defined as the extent to which a set of items reflects the content domain. Experts can also evaluate items for clarity, conciseness, grammar, reading level, face validity and redundancy. Finally, it is also helpful at this stage for experts to offer suggestions regarding adding new items and length of administration.

The current study employed some of these techniques in developing the item pool. The study made use of a four-step procedure. The overall process was guided by the SAPI collaborators, who developed the various procedures and techniques used in the methodology during their own work on the project. The first step involved considering the original responses for each facet. This involved gathering the original Conscientiousness cluster responses for all eleven language groups from data files stored in MS excel. The second step involved establishing a definition of the factor. This step involved working through all eleven languages' original responses for a given facet and using these responses to establish a definition. This step also involved extraction of content-representative responses. Before the definition could be established responses that were representative of the content of a specific facet had to be extracted. Step three involved developing item stems. This step was based on step two but the items were presented in a more neutral and abstract form For example, if an original response was "she is motivated by work" then it was reformulated into "being motivated by work". The final item writing took place in step four. This step involved the development of final items by making use of the neutral and abstract items generated in step three. In this step final items were formulated by making use of the following criteria:

- Items had to be short, simple and clear.
- Items were written in the first person, starting with "I" followed by concrete behaviours, the object and the context.

- Negations were excluded in the first part of an item. A clear statement had to be made by using a negative statement in the second part of an item, but not in the third part.
- Items described a single activity, habit or preference (terms such as like/dislike were avoided).
- Temporal qualifiers such as often, always and sometimes were excluded.
- Items had to be formulated in the direction of the construct. More specifically, items that dealt with the negative pole of the construct were used (a) if there were many utterances in the original responses or (b) if a significant item dealt with the negative pole. Double-barrelled items were excluded.
- Items had to refer to concrete behaviours and not beliefs, values or orientations.
- Psychological trait terms had to be avoided.
- Items had to exclude the use of idioms and expressions/sayings in order to avoid confusion.
- Items had to be written with the view to their translatability.

The steps listed above were all conducted in collaboration with the SAPI collaborators and the students from different universities participating in the project. During 2009 and 2010 various workshops were held with the aim of aiding the research process. In late 2009 Skype meetings took place weekly to provide assistance and guidance in writing the items.

4.4.3 Step 3: Inclusion of other items

In this step items from other personality instruments (for example, the International Personality Item Pool, IPIP of Goldberg, 1999) were evaluated for inclusion in some of the conscientiousness facets. This was done because some of the conscientiousness facets did not contain enough items. The target, as established by the SAPI collaborators, was for each facet to contain ten to twenty items. Table 4.4 highlights the additional items that were transformed and reformulated under the conscientiousness facets.

Table 4.4

Additional Personality Instrument Items Transformed

Personality Instrument	**Personality Instrument Items**	**Facet**	**Personality Instruments Items Transformed**	**Conscientiousness Item**
International Personality Item Pool (IPIP; Goldberg, 1999)	Do just enough to get by	Hardworking	I do the minimum work	36
	Accomplish my work on time	Timeous	I finish my work on time	47
	Put little time and effort into my work	Dedicated	I put a lot of time and effort into the things I do	59
	Carry out my plans	Determined	I carry out my plans	75
	Think ahead	Future oriented	I think ahead	95
	Get chores done right away	Disciplined	I do things when I am told to	143
	Find it difficult to get down to work	Disciplined	I find it difficult to start with my work	144
	Am careful to avoid mistakes	Meticulous	I am careful to avoid mistakes	159
	Pay attention to details	Meticulous	I take care of detail	160
	Demand quality work	Meticulous	I expect quality work	161
	Set high standards for myself and others	Meticulous	I set high standards for myself	162
	Like to plan ahead	Organised	I plan ahead	177
	Am always prepared	Organised	I am always prepared	178

	Do things at the last minute	Organised	I do things at the last minute	179
	Want things to proceed according to plan	Organised	I want things to proceed according to plan	180
	Work according to a routine	Organised	I keep to a routine	181
	Often forget to put things back in their proper place	Tidiness	I put things back in their proper place	204
	Keep myself well groomed	Tidiness	I keep myself well groomed	205
	Leave my belongings around	Tidiness	I leave my belongings lying around	206
	Leave a mess in my room	Tidiness	I leave a mess in my room	207
	Leave my work undone	Thorough	I leave my work undone	211
	Am exacting in my work	Thorough	I am precise in my work	212
	Check over my work	Thorough	I check my work	213
	Behave properly	Obedient	I behave properly	226
	Do things by the book	Obedient	I follow the rules	227
	Do improper things	Rebellious	I do improper things	235

	Disregard rules	Rebellious	I disregard rules	236

4.4.4 Step 4: Development of Social Desirability items

The Marlowe-Crowne Social Desirability scale (MCSD; Crowne & Marlowe, 1960) is one of the more well-known measures of social desirability (Robinson et al., 1991). This scale contains 33 items with a true/false response scale. These items include behaviours that are desirable but rare, or undesirable but common. The behaviours focus on ordinary personal and interpersonal behaviour and not psychopathology. 15 of the 33 items were selected, modified and distributed across the conscientiousness measuring instrument (see Table 4.5). The MCSD scale was selected because its items are similar to that of the conscientiousness measuring instrument in that they focus on ordinary, everyday behaviour.

Table 4.5

MCSD Items Modified

MCSD Items (Original)	MCSD Items (Modified)	MCSD Item	Conscientiousness Item
1. Before voting I thoroughly investigate the qualifications of all the candidates.	1. I think about my options before I make a choice	1	10
2. I never hesitate to go out of my way to help someone in trouble	2. I help others in trouble	2	37
3. It is sometimes hard for me to go on with my work if I am not encouraged	3. I continue with my work if I am motivated	3	48
4. On occasion I have had doubts about my ability to succeed in life	4. I have doubts about my ability to succeed in life	5	76
5. I sometimes feel resentful when I don't get my way	5. I am satisfied when I get my way	6	102
6. I am always careful about my manner of dress	6. I am careful about my way of dressing	7	121
7. I like to gossip at times	7. I gossip	11	135
8. No matter who I'm talking to, I'm always a good listener	8. I am a good listener	13	147
9. I sometimes try to get even, rather than forgive and forget	9. I forgive others for their wrongdoings	19	182
10. When I don't know something I don't at all	10. I admit when I do not know something	20	208

mind admitting it			
11. At times I have really insisted on having things my own way	11. I do things my way	22	219
12. I would never think of letting someone else be punished for my wrongdoings	12. I let someone else be punished for my wrongdoings	24	237
13. There have been times when I was quite jealous of the good fortune of others	13. I am jealous of others with good fortune	28	253
14. I am sometimes irritated by people who ask favours of me	14. I am irritated by people who ask favours	30	254
15. I have never deliberately said something that hurt someone's feelings	15. I say things that hurt others' feelings	33	255

For the purposes of this study a SD scale (more specifically, the MCSD scale) was adapted and used as part of the developmental phase of the experimental conscientiousness instrument. The purpose of the study was to confirm the factor structure of the conscientiousness cluster and therefore no analysis was carried out on the SD scale results. The broader SAPI project will make use of this data to conduct further analyses.

4.4.5 Step 5: Assembling of the Experimental Conscientiousness Measuring Instrument

The experimental conscientiousness measuring instrument is a paper-based test with a cover page followed by directions on how to complete the measuring instrument. A test item example was also included along with the response scale for respondents to practice. The instructions followed on the third page. The 255 items were displayed in two columns per page. The entire test booklet was seven pages long. The response scale was provided at the top of each page in order to make it convenient for participants. The items were distributed in a non-random, fashion. The Achievement oriented facet was presented first and the Thoughtless facet was presented last. The sub-clusters were included in the order presented in Table 4.6. The selected SD items were distributed across the conscientiousness measuring instrument. Appendix A contains the complete experimental conscientiousness measuring instrument used in this study.

Table 4.6

Distribution of Conscientiousness Items

CONSCIENTIOUSNESS CLUSTER	ITEM NUMBERS
Achievement Oriented Sub-cluster	
Career oriented	1-9
Competitive	11-17
Hard working	18-36
Performance Oriented	38-42
Timeous	43-47
Dedication Sub-Cluster	
Dedicated	49-59
Determined	60-75
Future Oriented	77-95
Passionate	96-101
Perseverant	103-120
Purposeful	122-128
Orderliness Sub-cluster	
Consistent	129-134
Disciplined	136-144
Follow-up	145-146
Meticulous	148-162
Organised	163-181
Punctual	183-190
Tidiness	191-207
Thorough	209-213
Self-Disciplined Sub-Cluster	
Naughty	214-218
Obedient	220-227
Rebellious	228-236
Thoughtless Sub-Cluster	
Absent-minded	238-244
Reckless	245-252

4.5 STATISTICAL ANALYSIS

Mellenbergh (1996) explains that classical psychometrics includes models at the level of the observed test score. Classical test theory (CTT; Lord & Novick, 1968) and its extension, generalisability theory (Cronbach, Gleser, Nanda & Rajaratnam, 1972), specify models for the observed test score. In these models the test score is considered to be a continuous variable. CTT was used in the data analysis of the experimental conscientiousness measuring instrument and different statistical techniques were employed. Classical test analysis has several benefits (Schumacher, 2005). First, in contrast to item response theory (IRT) models,

analyses can be performed with smaller representative samples. This is particularly important when field-testing a measuring instrument. Secondly, classical test analysis employs relatively simple mathematical procedures and model parameter estimations are conceptually straightforward. Thirdly, classical test analysis is often referred to as a weak model because the assumptions are easily met by traditional testing procedures (Schumacher, 2005).

Before starting any analyses it is always a good idea to get a feel for the data (Rouse, 2007). This involves looking at the data to see if there are any values that look discrepant and check whether there is any variation among the parameters that would make the analysis worthwhile. For this study the initial investigation therefore involved analysing the descriptive statistics of the data set in order to describe and summarise the basic characteristics of the data set. In this study, the data set was inspected for unexpected responses, extreme skewness and kurtosis, outliers and missing values. Skewness is defined as a measure of deviation from symmetry (Lui, Parelius & Singh, 1999).

Kurtosis is defined as the ratio of the fourth central moment to the square of the second central moment, and it is interpreted as an inverse of the peakedness of a distribution or as a measure of the overall spread relative to the spread in the tails.

Secondly, the items in the questionnaire were analysed and negatively phrased items, such as Item 27 “I am lazy”, were flagged. These items were recoded in a positive direction. The result of this recoding was that all the items were now facing in the same direction.

The two main categories of factor analysis are named exploratory and confirmatory factor analysis (Kahn, 2006). Factor analysis can be used for a range of reasons, but one of the most prevalent uses of factor analytic techniques is to support the validity of newly developed tests or scales. Factor analysis is thus used to determine whether a newly developed test or scale measures the intended construct(s). The application of factor analysis to a set of items helps researchers understand how many factors or constructs underlie the particular set of items. Factor analysis also helps researchers identify the defining features or dimensions of the factors or constructs underlying the set of items (Tabachnick & Fidell, 2001).

Thirdly, each sub-cluster of the experimental conscientiousness measuring instrument was verified through Exploratory Factor Analysis (EFA). Factor analysis is a technique used to

identify or confirm a smaller number of factors or latent constructs from a large number of observed variables (or items) (Worthington & Whittaker, 2009). EFA is often used to assess construct validity during the initial development of an instrument (Worthington & Whittaker, 2009). After developing an initial set of items, researchers can apply EFA to examine the underlying dimensionality of the item set. In this way researchers can group a large item set into meaningful subsets that measure different factors (Worthington & Whittaker, 2009). EFA is primarily used because it allows items to be related to any of the factors underlying examinee responses. Developers can thus easily identify items that do not measure an intended factor or that simultaneously measure multiple factors. These items are seen as poor indicators of the desired construct and are eliminated from further consideration (Worthington & Whittaker, 2009).

In this study principal axis factor analysis was used as the factor extraction method. This was chosen by the SAPI collaborators; however, research supports the usage of this method. Principal Components Analysis (PCA) is the default method of extraction in popular statistical software packages such as SAS and SPSS (Costello & Osborne, 2005). However, the authors argue that PCA is not a true method of factor analysis and there is disagreement among researchers about when it should be used. Some prefer a true factor analysis method (Gorsuch, 1990) whilst others explain that there is almost no difference between PCA and FA. However, Costello and Osborne (2005) suggest that FA is preferable to PCA. The reason is that PCA is only a data reduction method. According to the authors it is computed without regard to any underlying structure caused by latent variables; components are calculated using all of the variance of the manifest variables, and all of that variance appears in the solution. The aim of factor analysis is to reveal any latent variables that cause the manifest variables to co-vary. During factor extraction the shared variance of a variable is partitioned from its unique variance and error variance to reveal the underlying factor structure; only shared variance appears in the solution. PCA does not discriminate between shared and uniqe variance. When the factors are uncorrelated and communalities are moderate it can produce inflated values of variance accounted for by the components. Furthermore, the authors agree that when choosing a factor extraction method “Principal Axis Factoring (PAF) will give you the best results” p.2 (Costello & Osborne, 2005).

The number of factors was decided on the basis of the scree-plot, parallel analysis and theoretical expectation. Factors were rotated in accordance with the oblique Direct Quartimin

criterion. A second-order factor analysis was performed on the correlations of the first-order factors. Following this procedure a Schmid-Leiman transformation was then applied to obtain a hierarchical orthogonal solution. Finally, the reliability of the scores obtained with the scale was calculated by means of Cronbach's coefficient alpha. Cronbach's Coefficient alpha (α) is a commonly used index of reliability (Miller, 1995) and can be used for any test in which total scores are produced by summing the scores of two or more test items (Miller, 1995).

4.6 CONCLUSION

This chapter outlined the research design and methodology. A description of the participants and procedures was provided and the five steps involved in developing the conscientiousness measuring instrument were outlined. The chapter concluded with a description of the statistical procedures followed. The results of the data analysis are discussed in chapter five.

CHAPTER FIVE: RESEARCH RESULTS

5.1 INTRODUCTION

This chapter presents the statistical findings obtained from the experimental conscientiousness instrument used in the study. The instrument was administered to a sample (*N=1051*) of police reservists. The statistical procedures followed were the standard procedures followed in the broader SAPI project. Both the SPSS and SAS statistical programmes were utilised to perform the analysis. The data was initially screened for skewness and kurtosis. The results of these analyses are presented. The results for the principal components analyses of the items and facets are also presented. In addition the reliability coefficients of the facets and various factor analyses are presented. The final section of the chapter examines the Schmidt-Leiman solution.

5.2 DATA PREPARATION

5.2.1 Data screening and unexpected responses

Before data analysis commences it is essential that the dataset is checked for errors (Pallant, 2007). It is easy to make mistakes when entering data and these errors can yield very misleading results. These errors must be identified and dealt with before any other analyses are performed.

In this study the data was initially screened for errors and outliers. Each variable was checked for scores that were out of range or not within the range of possible scores. The items in the conscientiousness questionnaire all made use of a 5-point response scale and all values in the file therefore had to be between 1 and 5. Other values would indicate typing errors that occurred during the data capturing process. In this study all of the values were between 1 and 5.

5.2.2 Missing values

It is not uncommon for test-takers to fail to answer an item (De Bruin, 2010). Missing data can occur for a variety of reasons (Field, 2000). In long questionnaires participants sometimes accidentally fail to answer questions. In experimental procedures mechanical

faults can lead to data not being recorded. In research focusing on delicate topics subjects may exert their right not to answer a certain question.

In the case of random missing data it is possible to use the overall pattern of responses to predict how a person would have responded to the missing item. The missing value is then replaced with the predicted value. Alternatively a regression approach may be used or the missing value may be replaced with the mean of that particular individual's responses to the other items. When there are few missing responses these approaches all yield satisfactory results. If the missing responses are non-random or if an individual left relatively large parts of the questionnaire unanswered it is best to eliminate those questionnaires from the dataset. There are a wide variety of possible reasons for individuals not completing questionnaires. Usually an arbitrary criterion that persons with 5% or more missing values should not be included in further analyses is set. This corresponds to missing values for 10 items in a 200 item questionnaire (De Bruin, 2010).

In this study's dataset missing values presented a slight problem as a few respondents failed to respond to some of the items. These missing items were addressed prior to the evaluation of the data. All missing values were replaced with the mean of that particular person's responses to the other items. This approach was in keeping with the methods prescribed by the SAPI collaborators.

5.2.3 Descriptive statistics

Descriptive statistics explain how well an item corresponds to the content of a scale (Taylor, 2009). Items' means and standard deviations convey important information. The mean indicates the participants' general selection tendency for an item, while the standard deviation points towards the average deviation of responses from the mean of the item (Taylor, 2009). Pallant (2007) explains that descriptive statistics also provide information concerning the distribution of scores on continuous variables (skewness and kurtosis). The skewness variable provides an indication of the symmetry of the distribution. Kurtosis provides information about the „peakedness' of the distribution. In a perfectly normal distribution skewness and kurtosis values would be zero. Skewed distributions are characterised by a piling up of scores at either end of the distribution. A distribution in which most of the scores are high (i.e. piled to the right) is described as negatively skewed while a distribution in which most of the

scores are low (i.e. piled to the left) is described as positively skewed. Kurtotic distributions describe the way in which scores cluster together (leptokurtic distribution) or are widely dispersed (platykurtic distribution). Skewness and kurtosis values ranging from –1.50 to +1.50 are considered to approximate a normal distribution (Muthén & Kaplan, 1985).

The data was inspected for extreme skewness and kurtosis. Conscientiousness may be the single best personality predictor of work performance and it is therefore also very susceptible to faking (McFarland & Ryan, 2000, cited in Komar, Brown, Komar, & Robie, 2008). It was thus anticipated that skewness might occur in some items. Most of the items in the dataset were normally distributed. However, an arbitrary guideline of considering variables problematic if they had skewness > 2 or kurtosis > 4 led to the identification of several items that did not work well in the questionnaire. These items were consequently rejected from the dataset and did not form part of any further analyses. Seven of the excluded items demonstrated unexpected skewness values greater than 2, while 29 of the excluded items demonstrated kurtosis values greater than 4.

Table 5.1 displays the means, standard deviations, skewness and kurtosis of the 255 conscientiousness items. Those items with extreme scores are indicated in bold. The Social Desirability (SD) items are in italics.

Table 5.1

Descriptive statistics of the 255 items of the Conscientiousness construct (N = 1051)

Item	Description	**Mean**	**SD**	**Skewness**	**Kurtosis**
	ACHIEVEMENT ORIENTED				
	Career Oriented				
1	Career Oriented item	4.55	0.54	-0.85	1.19
2	Career Oriented item	4.41	0.57	-0.59	1.24
3	Career Oriented item	4.07	0.94	-1.17	1.20
4	Career Oriented item	3.84	0.94	-0.88	0.50
5	Career Oriented item	4.06	0.80	-1.11	1.84
6	Career Oriented item	3.16	1.11	-0.06	-0.98
7	Career Oriented item	4.10	0.75	-1.17	2.64
8	Career Oriented item	4.31	0.65	-1.09	3.48
9	Career Oriented item	4.52	0.55	-0.86	1.79
10	*SD Item*	4.47	0.58	-0.84	1.35
	Competitive				

11	Competitive item	3.19	1.19	-0.26	-0.92
12	Competitive item	2.53	1.21	0.47	-0.80
13	Competitive item	4.19	0.81	-1.38	2.83
14	Competitive item	3.39	1.09	-0.47	-0.62
15	Competitive item	2.57	1.21	0.45	-0.84
16	Competitive item	4.14	0.86	-1.43	2.84
17	Competitive item	3.38	1.10	-0.43	-0.68
	Hardworking				
18	Hardworking item	4.45	0.66	-1.36	3.29
19	Hardworking item	2.83	1.04	0.25	-0.67
20	Hardworking item	3.77	0.86	-0.53	-0.06
21	Hardworking item	4.10	0.76	-0.71	0.50
22	Hardworking item	3.90	0.78	-0.99	1.65
23	Hardworking item	3.08	1.07	-0.02	-0.92
24	Hardworking item	4.42	0.63	-1.20	3.41
25	Hardworking item	4.37	0.63	-1.02	2.93
26	Hardworking item	3.36	1.23	-0.46	-0.80
27	Hardworking item	1.33	0.63	**2.26***	**6.06***
28	Hardworking item	1.67	0.87	1.70	3.36
29	Hardworking item	4.57	0.67	**-2.14***	**6.69***
30	Hardworking item	3.01	1.11	-0.05	-0.69
31	Hardworking item	3.70	0.88	-0.57	0.06
32	Hardworking item	4.08	0.72	-1.31	3.89
33	Hardworking item	1.75	0.78	1.39	3.08
34	Hardworking item	2.91	1.03	0.18	-0.62
35	Hardworking item	4.32	0.67	-1.26	3.60
36	Hardworking item	2.52	1.09	0.49	-0.70
37	*SD item*	4.05	0.74	-0.83	1.62
	Performance oriented				
38	Performance oriented item	4.32	0.56	-0.30	0.70
39	Performance oriented item	4.56	0.55	-1.16	3.42
40	Performance oriented item	4.15	0.78	-1.23	2.54
41	Performance oriented item	4.20	0.73	-1.28	3.24
42	Performance oriented item	4.35	0.76	-1.53	3.35
	Timeous				
43	Timeous item	4.30	0.62	-0.58	1.03
44	Timeous item	4.26	0.67	-0.83	1.54
45	Timeous item	3.47	1.16	-0.47	-0.74
46	Timeous item	3.55	1.10	-0.61	-0.43
47	Timeous item	4.27	0.65	-0.94	2.54
48	*SD item*	3.91	0.93	-1.15	1.28
	DEDICATION				
	Dedicated				
49	Dedicated item	4.27	0.57	-0.85	**4.40***
50	Dedicated item	4.21	0.69	-1.12	2.86

51	Dedicated item	4.41	0.55	-0.41	0.93
52	Dedicated item	4.35	0.60	-0.87	2.66
53	Dedicated item	4.36	0.59	-0.73	2.11
54	Dedicated item	4.43	0.66	-1.16	2.09
55	Dedicated item	4.16	0.84	-1.05	1.38
56	Dedicated item	4.04	0.83	-0.87	0.78
57	Dedicated item	4.23	0.79	-0.84	0.41
58	Dedicated item	4.16	0.79	-1.04	1.68
59	Dedicated item	4.24	0.77	-1.60	**4.58***
	Determined				
60	Determined item	1.67	0.93	1.74	3.01
61	Determined item	3.91	0.87	-1.06	1.38
62	Determined item	4.45	0.57	-0.62	0.91
63	Determined item	4.64	0.50	-0.89	0.01
64	Determined item	4.37	0.62	-0.86	1.66
65	Determined item	4.57	0.53	-0.90	2.21
66	Determined item	4.36	0.56	-0.45	1.26
67	Determined item	4.51	0.53	-0.52	0.29
68	Determined item	4.31	0.58	-0.28	-0.13
69	Determined item	4.40	0.58	-0.63	1.28
70	Determined item	4.63	0.55	-1.81	**6.50***
71	Determined item	4.44	0.75	-1.96	**5.60***
72	Determined item	1.92	1.01	1.21	1.04
73	Determined item	3.71	1.09	-0.88	0.19
74	Determined item	4.08	0.77	-1.30	3.27
75	Determined item	3.95	0.95	-1.36	1.94
76	*SD item*	1.62	0.93	1.91	3.62
	Future Oriented				
77	Future oriented item	4.30	0.63	-0.87	2.38
78	Future oriented item	4.46	0.58	-0.68	0.51
79	Future oriented item	4.33	0.62	-0.75	1.62
80	Future oriented item	4.35	0.61	-0.63	0.94
81	Future oriented item	4.30	0.67	-1.13	2.90
82	Future oriented item	4.40	0.62	-0.90	1.84
83	Future oriented item	3.80	0.93	-0.86	0.65
84	Future oriented item	4.55	0.54	-0.91	1.72
85	Future oriented item	4.51	0.55	-0.82	1.70
86	Future oriented item	4.25	0.70	-1.01	2.17
87	Future oriented item	4.51	0.56	-0.95	2.16
88	Future oriented item	4.57	0.52	-0.76	0.91
89	Future oriented item	4.56	0.53	-0.85	1.26
90	Future oriented item	4.50	0.61	-1.52	**5.45***
91	Future oriented item	4.48	0.57	-0.77	1.66
92	Future oriented item	4.25	0.76	-1.29	2.75

93	Future oriented item		2.76	1.16	0.24	-0.77
94	Future oriented item		3.94	0.83	-1.19	2.17
95	Future oriented item		4.31	0.58	-0.50	1.36
		Passionate				
96	Passionate item		4.35	0.60	-0.50	0.60
97	Passionate item		4.43	0.59	-0.84	2.28
98	Passionate item		4.40	0.58	-0.71	1.83
99	Passionate item		3.98	0.74	-0.94	1.99
100	Passionate item		4.24	0.61	-0.72	2.35
101	Passionate item		4.12	0.64	-0.46	0.82
102	*SD item*		4.25	0.65	-0.84	2.13
		Perseverant				
103	Perseverant item		4.14	0.86	-1.34	2.30
104	Perseverant item		4.14	0.87	-1.47	2.74
105	Perseverant item		1.70	0.97	1.69	2.61
106	Perseverant item		3.76	0.88	-0.49	0.30
107	Perseverant item		4.11	0.84	-1.35	2.63
108	Perseverant item		3.79	0.95	-0.63	-0.06
109	Perseverant item		4.09	0.75	-0.75	-0.80
110	Perseverant item		4.37	0.56	-0.44	1.08
111	Perseverant item		4.19	0.74	-1.01	1.76
112	Perseverant item		4.43	0.73	-1.91	**5.94***
113	Perseverant item		2.07	1.03	1.08	0.83
114	Perseverant item		4.25	0.69	-1.21	3.54
115	Perseverant item		3.92	1.02	-1.23	1.25
116	Perseverant item		4.23	0.69	-0.87	1.75
117	Perseverant item		4.36	0.67	-1.35	**4.15***
118	Perseverant item		2.30	0.89	0.51	0.13
119	Perseverant item		1.71	0.88	1.78	3.83
120	Perseverant item		3.72	0.94	-0.79	0.46
121	*SD item*		4.39	0.57	-0.56	1.21
		Purposeful				
122	Purposeful item		4.03	0.73	-0.99	1.99
123	Purposeful item		4.41	0.57	-0.59	1.21
124	Purposeful item		4.40	0.62	-1.41	**5.82***
125	Purposeful item		4.58	0.54	-1.12	2.88
126	Purposeful item		4.44	0.57	-0.68	1.31
127	Purposeful item		4.35	0.55	-0.33	0.93
128	Purposeful item		4.34	0.58	-0.64	1.89
		ORDERLINESS				
		Consistent				
129	Consistent item		3.80	0.87	-0.62	0.23
130	Consistent item		3.37	1.10	-0.40	-0.68
131	Consistent item		3.96	0.76	-0.84	1.38
132	Consistent item		3.94	0.84	-1.05	1.66

133	Consistent item		2.19	1.02	0.81	0.11
134	Consistent item		1.81	0.80	1.27	2.39
135	*SD item*		1.97	1.06	0.88	-0.09
		Disciplined				
136	Disciplined item		3.94	0.87	-1.09	1.59
137	Disciplined item		4.24	0.62	-0.61	1.34
138	Disciplined item		4.21	0.64	-0.86	2.57
139	Disciplined item		4.29	0.60	-0.44	1.08
140	Disciplined item		4.19	0.69	-0.94	2.23
141	Disciplined item		4.50	0.58	-1.11	3.11
142	Disciplined item		4.01	0.84	-1.16	2.08
143	Disciplined item		3.51	1.10	-0.48	-0.52
144	Disciplined item		1.98	0.94	1.32	1.84
		Follow up				
145	Follow up item		4.01	0.72	-1.25	3.52
146	Follow up item		3.66	1.04	-0.90	0.20
147	*SD item*		4.35	0.58	-0.40	0.59
		Meticulous				
148	Meticulous item		4.18	0.56	-0.38	2.15
149	Meticulous item		4.21	0.66	-1.24	**4.33***
150	Meticulous item		3.68	0.89	-0.70	0.34
151	Meticulous item		4.32	0.61	-0.82	2.61
152	Meticulous item		4.22	0.64	-0.70	1.85
153	Meticulous item		4.24	0.60	-0.45	1.10
154	Meticulous item		4.19	0.60	-0.32	0.50
155	Meticulous item		4.37	0.54	-0.19	0.29
156	Meticulous item		3.93	0.75	-0.74	1.07
157	Meticulous item		3.05	1.02	-0.07	-0.61
158	Meticulous item		2.91	1.10	0.08	-0.80
159	Meticulous item		4.13	0.72	-1.68	**5.72***
160	Meticulous item		4.20	0.55	-0.50	3.20
161	Meticulous item		4.31	0.56	-0.41	1.99
162	Meticulous item		4.25	0.70	-1.01	2.03
		Organised				
163	Organised item		4.29	0.58	-0.53	1.86
164	Organised item		4.26	0.59	-0.48	1.37
165	Organised item		4.30	0.57	-0.38	1.22
166	Organised item		4.28	0.56	-0.54	2.21
167	Organised item		4.25	0.59	-0.41	1.30
168	Organised item		4.08	0.70	-0.66	1.23
169	Organised item		4.20	0.60	-0.67	2.83
170	Organised item		4.20	0.57	-0.54	3.01
171	Organised item		4.23	0.59	-0.53	2.18
172	Organised item		4.26	0.62	-0.63	1.36

173	Organised item	4.25	0.62	-0.64	1.76
174	Organised item	4.32	0.58	-0.62	2.37
175	Organised item	4.20	0.63	-0.59	1.71
176	Organised item	4.17	0.59	-0.40	1.36
177	Organised item	4.29	0.61	-0.69	1.98
178	Organised item	4.07	0.75	-0.96	2.05
179	Organised item	1.79	0.92	1.49	2.32
180	Organised item	4.17	0.70	-1.50	**5.16***
181	Organised item	3.95	0.79	-1.12	2.30
	Punctual				
182	*SD item*	4.17	0.75	-0.93	1.74
183	Punctual item	4.23	0.63	-0.59	1.27
184	Punctual item	4.25	0.59	-0.64	2.56
185	Punctual item	4.29	0.60	-0.80	3.32
186	Punctual item	4.22	0.63	-0.87	3.07
187	Punctual item	3.91	0.92	-1.24	1.63
188	Punctual item	1.69	0.81	1.53	3.03
189	Punctual item	1.68	0.81	1.70	3.95
190	Punctual item	3.85	0.96	-1.20	1.36
	Tidiness				
191	Tidiness item	4.58	0.56	-1.39	**4.25***
192	Tidiness item	4.54	0.57	-1.19	3.17
193	Tidiness item	4.21	1.05	-1.80	2.92
194	Tidiness item	4.57	0.54	-1.12	2.83
195	Tidiness item	4.58	0.57	-1.63	**6.21***
196	Tidiness item	4.58	0.54	-1.31	**4.45***
197	Tidiness item	4.32	0.81	-1.56	3.31
198	Tidiness item	4.10	1.12	-1.38	1.08
199	Tidiness item	4.41	0.78	**-2.07***	**6.00***
200	Tidiness item	1.36	0.74	**2.92***	**10.09***
201	Tidiness item	3.36	1.17	-0.39	-0.78
202	Tidiness item	4.07	0.82	-1.51	3.42
203	Tidiness item	4.14	0.84	-1.49	3.04
204	Tidiness item	4.38	0.59	-0.90	3.25
205	Tidiness item	4.14	0.85	-1.75	**4.36***
206	Tidiness item	1.47	0.79	**2.32***	**6.36***
207	Tidiness item	1.51	0.90	**2.27***	**5.15***
208	*SD item*	4.15	0.90	-1.64	3.38
	Thorough				
209	Thorough item	4.29	0.61	-1.04	**4.55***
210	Thorough item	3.92	0.91	-1.32	1.97
211	Thorough item	1.71	0.94	1.73	2.98
212	Thorough item	4.05	0.71	-1.40	**4.51***
213	Thorough item	4.16	0.80	-1.83	**5.26***

	SELF-DISCIPLINED				
	Naughty				
214	Naughty item	1.69	0.84	1.46	2.61
215	Naughty item	1.76	0.84	1.26	1.88
216	Naughty item	1.90	0.87	0.90	0.55
217	Naughty item	1.45	0.66	1.82	**4.83***
218	Naughty item	1.63	0.80	1.54	2.93
219	*SD item*	2.80	1.14	0.01	-0.85
	Obedient				
220	Obedient item	4.22	0.76	-1.47	3.93
221	Obedient item	4.37	0.62	-0.96	2.88
222	Obedient item	4.22	0.67	-0.84	1.95
223	Obedient item	4.25	0.79	-1.49	3.43
224	Obedient item	2.18	1.20	0.86	-0.37
225	Obedient item	3.88	1.05	-1.24	1.11
226	Obedient item	4.32	0.60	-0.96	**4.03***
227	Obedient item	4.27	0.72	-1.56	5.11
	Rebellious				
228	Rebellious item	2.65	1.21	0.14	-1.02
229	Rebellious item	2.83	1.18	0.02	-1.00
230	Rebellious item	1.75	0.91	1.55	2.49
231	Rebellious item	1.65	0.70	1.21	2.64
232	Rebellious item	1.81	0.87	1.30	2.01
233	Rebellious item	2.02	1.10	1.09	0.40
234	Rebellious item	2.38	1.12	0.54	-0.59
235	Rebellious item	1.78	0.88	1.52	2.66
236	Rebellious item	1.63	0.66	1.14	2.94
237	*SD item*	1.49	0.72	**2.07***	**6.09***
	THOUGHTLESS				
	Absent minded				
238	Absent minded item	2.34	0.95	0.35	-0.46
239	Absent minded item	2.77	1.19	0.03	-1.13
240	Absent minded item	2.17	1.04	0.83	0.06
241	Absent minded item	2.02	1.09	1.23	0.90
242	Absent minded item	1.92	0.81	0.86	1.10
243	Absent minded item	1.85	0.79	1.10	1.89
244	Absent minded item	1.83	0.77	1.08	2.15
	Reckless				
245	Reckless item	1.58	0.79	1.96	**4.97***
246	Reckless item	4.23	0.90	-1.69	3.40
247	Reckless item	3.07	1.15	-0.28	-0.85
248	Reckless item	4.08	0.68	-0.93	2.50
249	Reckless item	4.34	0.54	-0.20	0.36
250	Reckless item	4.34	0.59	-0.82	3.42

251	Reckless item	4.38	0.62	-1.27	**4.82***
252	Reckless item	3.23	1.08	-0.19	-0.73
253	*SD item*	1.53	0.68	1.53	3.56
254	*SD item*	2.45	1.11	0.43	-0.56
255	*SD item*	1.59	0.78	1.51	2.74

* High skewness and kurtosis

- SD Items Indicated in Italics.

This experimental measure was administered to a group of newly hired police reservists and it is therefore likely that they would want to maintain a positive image of themselves, even though it was explained to them that their supervisors would not see the results. Hence, none of the participants agreed with the statements in items 27 (I am lazy) and 200 (I leave my clothes on the floor) and therefore these items have no interpretive value. Most of the participants agreed with item 199 (I clean up the kitchen after working in it) and the findings for this item thus demonstrated extreme skewness.

All 7 items with extreme skewness loadings also had high kurtosis loadings (in excess of 0.4). An additional 22 items also had kurtosis loadings >0.4. These items (27, 29, 49, 59, 70, 71, 90, 112, 117, 124, 149, 159, 180, 191, 195, 196, 199, 200, 205, 206, 207, 209, 212, 213, 217, 226, 237, 245, 251) were eliminated from further analyses. It is possible that some of these items were seen as too vague, for example item 49 (I am involved in my work), item 70 (I know what I want in life), item 71 (I strive towards success) and item 90 (I have a mission in life), and therefore yielded extreme results. Some of the other items asked the participants to view themselves negatively and it seems that the participants did not respond well to these items. Examples of these negative items include item 245 (I am careless), item 217 (I misbehave) and item 207 (I leave a mess in my room).

It is unusual for all the initial research items to be retained and item deletion is a common and expected part of the research process (Worthington & Whittaker, 2006). Unnecessarily retaining items that fail to contribute meaningfully to any of the potential factor solutions would make it more difficult to arrive at a final decision regarding the number of factors to retain. Worthington and Whittaker (2006) recommend retaining only potentially meaningful items early in the process in order to optimise scale length after the factor solution is clear (Worthington & Whittaker, 2006).

5.2.4 Item Recoding

The next step in the analysis process involved reading through the experimental conscientiousness questionnaire and identifying questions that are phrased negatively. These items (26, 28, 33, 36, 60, 72, 105, 113, 118, 119, 130, 133, 144, 179, 188, 189, 211, 214, 215, 216, 218, 224, 228, 229, 230, 231, 232, 233, 234, 235, 236, 238, 241, 242, 243, 244, 247) were all recoded in the positive direction.

5.2.5 Removal of items

Items with extreme skewness and kurtosis as well as the Social Desirability Items (SD) were then eliminated from further analyses (see Table 5.1). The following items were eliminated: 10, 27, 29, 37, 48, 49, 59, 70, 71, 76, 90, 102, 112, 117, 121, 124, 135, 147, 149, 159, 180, 182, 191, 195, 196, 199, 200, 205, 206, 207, 208, 209, 212, 213, 217, 219, 226, 237, 245, 251, 253, 254, 255.

5.3 FACTOR ANALYSIS

The qualitative stage of the SAPI project identified several clusters within personality structure. These clusters were divided into sub-clusters, which in turn consist of various facets. In order to model this structure and obtain evidence to justify the scoring on the cluster and sub-cluster levels a hierarchical factor analysis was conducted. This analysis made use of the entire dataset. The first step in this analysis involved conducting Exploratory Factor Analysis (EFA) on each of the sub-clusters of the conscientiousness factor.

Factor analysis aims to identify all the psychologically meaningful major factors that account for the covariances/correlations of the items. Researchers use numerous criteria to estimate the number of factors for a given item set (Worthington & Whittaker, 2006) and many different criteria and rules of thumb exist for deciding on the number of factors to retain. These criteria include the scree plot, the eigenvalues-greater-than-one-criterion, parallel analysis, minimum average partial test and root mean square residual. The most widely known approaches are those of Kaiser (1958) and Cattell (1966), which are based on eigenvalues. These criteria help determine the importance of a factor and indicate how much of the variance in the entire set of items is accounted for by a given factor. The iterative process of factor analysis produces successively less useful information with each new factor

extracted in a set. Each factor extracted after the first is based on the residual of the previous factor's extraction. The eigenvalues produced are therefore successively smaller for each new factor extracted. These new factors also account for successively smaller proportions of variance. As successive factors are extracted the values will eventually become virtually meaningless. According to the criterion established by Kaiser (1958) eigenvalues less than 1.0 are believed to reflect potentially unstable factors.

Exploratory Factor Analysis was conducted to test the validity of each sub-cluster. The sub-clusters were then subjected to a laborious process of identifying relevant items, inspecting communalities and generally following personality theory and seeing if the factors make sense. The eigenvalues >1 criterion and the scree plot were used to determine the number of factors or facets to be retained in each sub-cluster. Principal axis factoring and Quartimin rotation techniques were used to analyse the factor structure of the various sub-clusters of the Conscientiousness scale.

5.3.1 Results: Achievement Oriented Sub-cluster

The results of the factor analysis of the Achievement Oriented sub-cluster are presented in Appendix A.

The initial exploratory factor analysis indicated that 10 factors should be retained. Themes were then identified for the groupings of individual items. These themes were developed with reference to the original model but were also designed to provide a logical explanation for the factors. The researcher tried to match the loadings to the original facets, but this was not always possible. In some instances new facets or factors were identified. The communalities between the items were also identified (items with loadings > 0.30 were regarded as meaningful).

Items with the following characteristics received special treatment:

- Items that did not load meaningfully (loading < 0.30) on any factor were discarded
- Items with a low communality (< 0.30) were discarded
- Items that loaded on more than factor were either placed with only one factor (if it made sense theoretically) or disregarded

An item analysis was conducted on the final proposed groupings following the discarding of items detailed above. This item analysis was used to indicate the reliability of the grouping of items and further refine the groupings.

Following this process the factor analysis was re-run (using only the items that were retained) to confirm the structure. The results of the eigenvalues and scree plot are presented in Table 5.2.

Table 5.2

Eigenvalues of the Achievement Oriented sub-cluster

Number	Eigenvalue	Percent	Percent	Cum
1	7.2868	33.122		33.122
2	2.0632	9.378		42.500
3	1.6915	7.689		50.189
4	1.3398	6.090		56.279
5	1.1208	5.094		61.373
6	0.8153	3.706		65.079
7	0.7377	3.353		68.432
8	0.6797	3.089		71.522
9	0.6659	3.027		74.548
10	0.6165	2.802		77.351
11	0.5779	2.627		79.977
12	0.5457	2.480		82.458
13	0.5006	2.275		84.733
14	0.4717	2.144		86.877
15	0.4647	2.112		88.989
16	0.4439	2.018		91.007
17	0.4057	1.844		92.851
18	0.4016	1.825		94.677
19	0.3518	1.599		96.276
20	0.3303	1.501		97.777
21	0.2708	1.231		99.008
22	0.2183	0.992		100.000

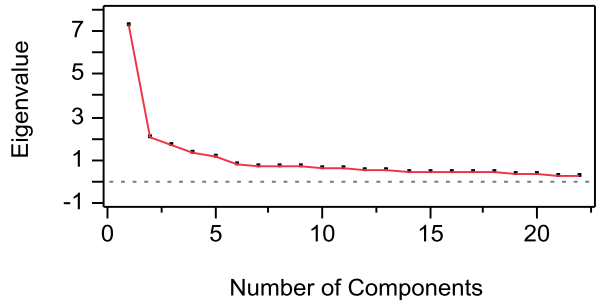

Figure 5.1

Scree plot of Achievement Sub-cluster

Table 5.2 shows that there were 5 eigenvalues >1 and this suggests that 5 facets should have been retained. These five facets explain 61.4% of the variance in the data. All 47 questions in the Achievement sub-cluster can thus be reduced to 5 meaningful facets. The item loadings are presented in Table 5.3

Table 5.3

Individual Rotated factor loadings for the Achievement Oriented sub-cluster

ITEM	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5
Item 1	**0.91**	0.00	-0.0	-0.0	-0.1
Item 2	**0.57**	0.10	0.03	0.02	0.05
Item 9	**0.90**	-0.0	-0.0	-0.0	-0.0
Item 18	**0.79**	-0.0	-0.0	0.00	-0.0
Item 21	**0.42**	0.04	0.17	0.06	0.01
Item 24	**0.79**	-0.1	-0.0	-0.0	0.06
Item 25	**0.48**	0.09	0.09	0.04	0.09
Item 39	**0.50**	0.05	0.13	-0.0	0.11
Item 5	-0.0	**0.72**	-0.0	-0.0	-0.0
Item 7	-0.0	**0.71**	0.04	-0.0	0.01
Item 22	0.00	**0.66**	-0.0	0.08	0.07
Item 41	0.03	**0.70**	0.07	-0.0	-0.0
Item 11	0.01	-0.0	-0.0	**0.71**	-0.0
Item 12	-0.1	0.03	-0.0	**0.59**	-0.0
Item14	0.04	-0.0	0.04	**0.60**	0.03
Item43	0.02	0.05	**0.76**	0.01	-0.0
Item44	-0.0	-0.0	**0.84**	-0.0	-0.0
Item47	0.08	0.02	**0.58**	0.01	0.12
Item28 2	-0.0	0.01	0.01	0.02	**0.41**

Item32	0.10	0.16	-0.1	0.07	**0.44**
Item33 2	0.00	-0.0	0.01	-0.1	**0.60**
Item35	0.10	-0.0	0.24	0.01	**0.43**

Table 5.3 presents the individual rotated factor loadings. According to De Bruin (2010) items with loadings higher than 0.3 can be regarded as meaningful. Dr de Bruin is a collaborator on the SAPI project and it was therefore considered appropriate to make use of his criterion. All remaining items thus loaded successfully on the original facets. The initial sub-cluster contained 5 facets and 47 items.

Following EFA the facet names remained the same (hard working, career-oriented, competitive, timeous and performance oriented) but the number of items was reduced to 22. In some instances items were moved from one facet to another because they appeared to be more related to the second facet. For example, items 1, 2, 9 were originally in the ‚career-oriented' facet but following EFA they were placed in the ‚hard working' facet.

5.3.2 Results: Dedication Sub-cluster

The results of the initial factor analysis of the Dedication sub-cluster are presented in Appendix B.

The initial Exploratory Factor Analysis of this sub-cluster indicated that 11 factors should be retained. Themes were identified for the groupings of individual items. These themes were developed with reference to the original model but were also designed to provide a logical explanation for the factors. The researcher tried to match the loadings to the original facets, but this was not always possible. In some instances new facets or factors were identified. The communalities between the items were also identified (items with loadings > 0.30 were identified as meaningful).

Items with the following characteristics were given special consideration:

- Items that did not load meaningfully (loading < 0.30) on any factor were discarded
- Items with a low communality(< 0.30) were discarded
- Items that loaded on more than factor were either placed with only one factor (if it made sense theoretically) or disregarded

An item analysis was conducted on the final proposed groupings after the processes described above. This item analysis was designed to indicate the reliability of the grouping of items and further refine the groupings.

Following this process the factor analysis was re-run (using only the items that were retained) to confirm the structure. Table 5.4 indicates the results.

Table 5.4

Eigenvalues of the Dedication sub-cluster

Number	Eigenvalue	Percent	Percent	Cum Percent
1	18.4145	40.032		40.032
2	2.0293	4.411		44.443
3	1.6687	3.628		48.071
4	1.3510	2.937		51.008
5	1.1927	2.593		53.600
6	1.0969	2.385		55.985
7	1.0437	2.269		58.254
8	0.9221	2.005		60.259
9	0.8678	1.887		62.145
10	0.8358	1.817		63.962
11	0.7661	1.665		65.628
12	0.7613	1.655		67.283
13	0.7313	1.590		68.872
14	0.7087	1.541		70.413
15	0.6901	1.500		71.913
16	0.6810	1.480		73.393
17	0.6515	1.416		74.810
18	0.6021	1.309		76.119
19	0.5900	1.283		77.401
20	0.5826	1.267		78.668
21	0.5452	1.185		79.853
22	0.5311	1.155		81.008
23	0.5271	1.146		82.153
24	0.5182	1.126		83.280
25	0.4978	1.082		84.362
26	0.4903	1.066		85.428
27	0.4544	0.988		86.416
28	0.4509	0.980		87.396
29	0.4407	0.958		88.354
30	0.4232	0.920		89.274

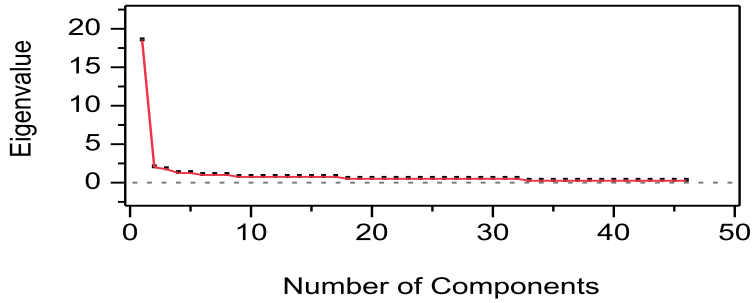

Figure 5.2

Scree plot of Dedication sub-cluster

Table 5.4 indicates that seven factors contain eigenvalues >1. These 7 facets explain 58.2% of the variance in the data. This means that all the items in the Dedication sub-cluster can be reduced to these 7 meaningful facets. The factor loadings are presented in table 5.5

Table 5.5

Individual Rotated factor loadings for the Dedication Sub-Cluster

ITEM	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5	FACTOR 6	FACTOR 7
Item 50	0.05	0.02	0.12	0.09	0.10	0.16	**0.34**
Item51	0.06	0.15	0.23	-0.0	0.21	-0.1	**0.44**
Item52	0.05	0.12	0.21	0.05	0.11	-0.0	**0.41**
Item53	-0.0	0.14	0.15	0.12	0.19	-0.0	**0.45**
Item54	0.08	0.03	-0.0	**0.58**	0.10	-0.1	0.07
Item55	-0.1	0.04	0.00	**0.83**	-0.0	-0.1	-0.1
Item56	-0.0	0.02	-0.0	**0.39**	-0.0	0.22	0.19
Item57	0.17	-0.1	-0.0	**0.51**	0.00	0.08	0.02
Item58	-0.0	0.02	0.01	**0.78**	-0.0	-0.0	-0.0
Item62	0.10	0.12	0.10	0.03	**0.39**	0.09	0.08
Item63	**0.50**	-0.0	-0.1	0.13	**0.32**	-0.0	0.05
Item64	0.26	0.02	-0.1	0.04	**0.32**	0.19	0.22
Item65	**0.46**	0.01	-0.1	0.06	**0.32**	0.01	0.14
Item66	0.13	0.12	0.03	0.06	0.28	0.12	**0.34**
Item67	0.24	-0.0	0.17	0.07	**0.43**	-0.0	0.21
Item68	-0.1	0.14	0.11	0.07	**0.49**	0.18	0.05
Item69	-0.0	0.13	0.17	0.09	**0.48**	0.06	0.10
Item77	0.01	**0.48**	0.05	0.05	0.08	0.07	0.09
Item78	0.17	**0.61**	0.06	0.04	0.08	-0.0	-0.1
Item79	0.05	**0.64**	-0.0	0.10	0.04	0.04	0.01
Item80	0.04	**0.58**	0.05	0.08	0.05	0.05	0.11
Item81	0.15	**0.42**	-0.1	0.02	-0.1	0.20	0.23
Item82	0.29	**0.35**	-0.0	0.03	-0.1	0.21	0.10
Item84	**0.58**	0.09	0.04	0.01	0.01	0.05	0.01
Item85	**0.50**	0.09	0.04	0.03	0.04	0.10	0.10
Item87	**0.56**	0.03	0.08	0.11	-0.0	0.12	0.04

Item88	**0.61**	0.20	0.17	0.06	-0.0	-0.0	-0.1
Item89	**0.52**	**0.34**	0.11	0.08	-0.0	-0.1	-0.1
Item91	**0.36**	**0.33**	0.22	0.08	0.02	-0.0	-0.1
Item96	0.12	-0.0	**0.51**	0.08	0.12	0.05	0.03
Item97	0.14	-0.1	**0.57**	0.03	0.21	0.06	-0.1
Item98	0.11	0.09	**0.46**	0.09	0.11	0.10	0.03
Item99	0.01	-0.0	0.21	0.15	-0.1	0.21	0.12
Item100	0.16	0.00	0.26	0.10	-0.1	**0.30**	0.22
Item101	0.03	0.00	0.29	0.09	-0.1	0.25	0.13
Item103	0.11	-0.0	0.10	0.01	0.10	**0.31**	-0.1
Item108	0.03	0.01	-0.0	0.08	-0.0	**0.42**	0.07
Item109	-0.1	0.19	-0.0	0.00	0.08	**0.56**	0.06
Item110	0.04	0.23	0.14	0.00	0.23	**0.39**	-0.1
Item111	-0.0	0.19	0.20	-0.0	0.20	**0.36**	-0.2
Item114	0.06	0.12	0.16	0.06	-0.0	0.26	0.02
Item123	0.27	0.22	0.23	0.10	0.01	0.07	0.13
Item125	**0.51**	0.12	0.23	-0.0	0.09	-0.1	0.05
Item126	**0.31**	0.17	**0.30**	-0.0	-0.1	0.05	0.24
Item127	0.07	0.21	**0.55**	-0.0	0.03	0.01	0.20
Item128	0.01	0.16	**0.59**	0.03	0.04	-0.0	0.19

Table 5.5 presents the individual rotated factor loadings. In accordance with De Bruin's (2010) criterion all items with loadings higher than 0.3 were regarded as meaningful. All the remaining items thus loaded successfully on the original facets. The initial sub-cluster contained 6 facets and 80 items.

Following EFA several changes were made to this sub-cluster. In the initial model the Dedication sub-factor consisted of factors labelled Dedicated, Determined, Future-oriented, Passionate, Perseverant and Purposeful. However, EFA indicated the presence of 7 facets. The Dedication facet is clearly related to dedication to both work and family. The new facets were therefore labelled Dedication (Work), Dedication (Family), Determined, Future Oriented, Passionate, Perseverant and Purposeful. The number of items was also reduced to 46 items.

5.3.3 Results: Orderliness Sub-cluster

The results of the initial factor analysis of the Orderliness sub-cluster are presented in Appendix C.

The initial exploratory factor analysis of this sub-cluster indicated that 11 factors should be retained. Themes were then identified for the groupings of individual items. These themes were developed with reference to the original model but were also designed to provide a logical explanation for the factors. The researcher tried to match the loadings to the original facets, but this was not always possible. In some instances new facets or factors were identified. The communalities between the items were also identified (items with loadings > 0.30 were identified as meaningful).

Items with the following characteristics were given special consideration:

- Items that did not load meaningfully (loading < 0.30) on any factor were discarded
- Items with a low communality (< 0.30) were discarded
- Items that loaded on more than factor were either placed with only one factor (if it made sense theoretically) or disregarded

An item analysis was conducted on the final proposed groupings after the process described above. This item analysis aimed to indicate the reliability of the grouping of items and further refine the groupings.

After this process, the factor analysis was re-run (using only the items that were retained) to confirm the structure. Table 5.6 indicates the results.

Table 5.6
Eigenvalues of the Orderliness Sub-cluster

Number	Eigenvalue	Percent	Percent	Cum Percent
1	18.2035	40.452		40.452
2	1.8506	4.112		44.565
3	1.4698	3.266		47.831
4	1.3722	3.049		50.880
5	1.2837	2.853		53.733
6	1.2038	2.675		56.408
7	1.1384	2.530		58.938
8	1.0755	2.390		61.328
9	0.9988	2.220		63.547

10	0.8429	1.873		65.420
11	0.8001	1.778		67.198
12	0.7731	1.718		68.917
13	0.7402	1.645		70.562
14	0.7148	1.589		72.150
15	0.7016	1.559		73.709
16	0.6580	1.462		75.171
17	0.6348	1.411		76.582
18	0.6109	1.358		77.940
19	0.5738	1.275		79.215
20	0.5695	1.266		80.480
21	0.5292	1.176		81.656
22	0.4926	1.095		82.751
23	0.4811	1.069		83.820
24	0.4594	1.021		84.841
25	0.4538	1.009		85.850
26	0.4495	0.999		86.849
27	0.4377	0.973		87.821
28	0.4169	0.927		88.748
29	0.4052	0.900		89.648
30	0.3948	0.877		90.526

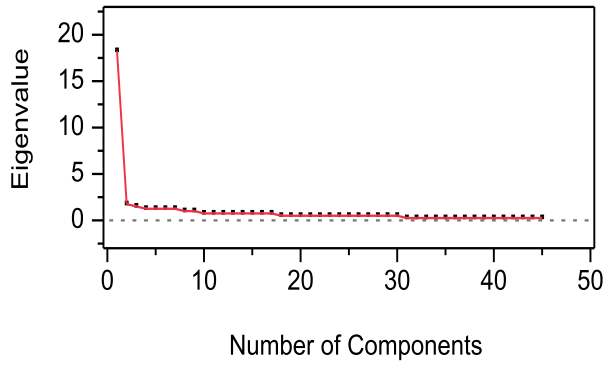

Figure 5.3

Scree plot of the Orderliness Sub-cluster

Table 5.6 indicates that eight factors contain eigenvalues >1. These 8 facets explain 61.3% of the variance in the data. This means that all the remaining items in this sub-cluster (85) can be reduced to these 8 meaningful facets. The individual rotated factor loadings for the Orderliness sub-cluster are presented in table 5.7.

Table 5.7

Individual rotated factor loadings of the Orderliness sub-cluster

ITEM	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5	FACTOR 6	FACTOR 7	FACTOR 8
Item131	0.03	0.05	-0.0	-0.0	0.03	-0.0	**0.65**	0.05
Item132	-0.0	-0.0	-0.0	0.01	-0.0	0.01	**0.67**	0.03
Item1343	0.00	0.18	0.06	0.07	0.07	0.08	0.10	-0.0
Item136	0.02	**0.35**	0.01	0.01	-0.0	0.24	0.07	-0.1
Item137	0.05	**0.66**	0.08	0.07	0.01	-0.0	-0.0	0.07
Item138	0.03	**0.61**	-0.0	0.03	0.07	0.03	0.08	0.03
Item139	0.09	**0.72**	0.07	0.07	0.00	-0.1	0.01	0.05
Item140	0.05	**0.63**	0.06	-0.0	0.07	-0.0	0.06	-0.0
Item151	0.10	0.08	**0.39**	0.05	0.03	0.03	-0.0	0.21
Item152	-0.0	0.07	**0.69**	0.00	0.03	0.06	0.04	-0.1
Item153	0.00	0.03	**0.71**	0.04	0.02	0.06	0.04	-0.0
Item154	0.27	0.06	**0.32**	0.14	0.05	-0.1	0.07	-0.0
Item155	0.11	0.09	**0.47**	0.04	0.14	-0.0	0.02	0.17
Item160	0.17	0.16	**0.35**	0.07	-0.0	0.03	0.00	0.16
Item161	0.19	0.10	**0.36**	0.10	0.06	0.02	0.00	0.15
Item183	0.05	0.17	-0.1	**0.59**	0.03	0.08	-0.0	-0.0
Item184	0.22	0.02	0.01	**0.66**	-0.0	-0.0	0.02	0.02
Item185	0.13	-0.0	0.10	**0.64**	0.04	-0.0	0.00	0.00
Item186	0.05	-0.0	0.13	**0.42**	0.04	0.05	0.08	0.03
Item1882	-0.1	0.05	0.02	**0.48**	0.07	0.02	0.03	0.08
Item192	0.06	-0.0	0.01	0.11	0.70	-0.0	-0.0	0.01
Item194	-0.0	0.04	-0.0	0.06	0.76	-0.0	0.06	0.04
Item197	0.04	0.04	0.08	-0.1	0.43	0.05	-0.0	-0.0
Item193	-0.0	0.05	-0.0	-0.0	0.25	**0.40**	-0.1	0.05
Item202	0.06	-0.0	0.03	0.05	-0.1	**0.68**	0.03	0.05
Item203	0.02	-0.0	0.05	0.03	0.02	**0.65**	0.02	0.00
Item210	0.03	0.02	0.01	-0.0	-0.0	0.04	0.11	**0.46**
Item2112	0.01	-0.0	0.00	0.09	0.03	0.02	-0.0	**0.46**
Item162	**0.39**	0.03	0.10	-0.0	0.08	0.04	0.05	0.10
Item163	**0.74**	0.03	-0.0	0.03	0.03	0.04	-0.0	0.08
Item164	**0.80**	0.04	-0.0	0.04	0.00	0.09	-0.1	0.00
Item165	**0.78**	-0.0	-0.0	-0.0	0.07	0.02	-0.1	0.14
Item166	**0.68**	0.09	0.06	-0.0	-0.0	0.00	-0.0	0.15
Item167	**0.63**	0.10	0.11	-0.0	0.02	-0.1	0.04	0.03
Item168	**0.61**	0.02	-0.1	0.04	0.05	-0.0	0.11	0.02
Item169	**0.59**	0.08	0.04	0.11	-0.0	0.03	-0.0	0.12
Item170	**0.76**	0.05	0.04	-0.0	-0.0	0.07	-0.0	0.01
Item171	**0.73**	0.10	-0.0	0.03	-0.0	-0.0	0.03	-0.0
Item172	**0.69**	-0.1	0.09	-0.0	0.07	-0.0	0.09	-0.1
Item173	**0.58**	-0.0	0.09	0.08	0.08	0.02	0.11	-0.1
Item174	**0.38**	0.00	0.24	0.06	0.13	0.04	0.03	-0.0
Item175	**0.47**	0.05	0.02	0.29	0.03	-0.0	0.05	-0.0
Item176	**0.53**	0.15	0.04	0.10	-0.0	0.05	0.10	-0.0
Item177	**0.56**	-0.0	0.10	0.06	0.05	0.06	0.07	-0.1
Item178	**0.35**	0.02	0.07	0.16	0.03	0.03	0.12	-0.0

Table 5.7 presents the individual rotated factor loadings. In accordance with De Bruin's (2010) criterion all items with loadings higher than 0.3 were regarded as meaningful. All the remaining items thus loaded successfully on the original facets. The initial sub-cluster contained 8 facets and 84 items.

Following EFA some changes were made to this sub-cluster. In the initial model the Orderliness sub-cluster consisted of 8 facets: Consistent, Disciplined, Follow up, Meticulous, Organised, Punctual, Tidiness and Thorough. EFA also indicated the presence of 8 facets, but the facet Follow Up was not confirmed and was therefore discarded. The original Tidiness cluster was divided into personal and environmental tidiness. The new facets are: Consistent, Disciplined, Meticulous, Organised, Punctual, Tidiness (Personal), Tidiness (Environment) and Thorough. The sub-cluster now contains 45 items.

5.3.4 Results: Self-disciplined Sub-cluster

The results of the factor analysis of the Self-disciplined sub-cluster are presented in Appendix D.

The initial Exploratory Factor Analysis indicated that 5 factors should be retained. The same process was followed as for the previous sub-cluster and themes were identified for the groupings of individual items. These themes kept the original model in mind but also followed a logical explanation. The loadings were matched to the original facets as far as possible, but that was not always achievable. In some instances new facets or factors were identified.

Following this process the factor analysis was re-run (using only the items that were retained) to confirm the structure. Table 5.8 indicates the results.

Table 5.8

Eigenvalues of the Self-disciplined Sub-cluster

Number	Eigenvalue	Percent	Percent	Cum Percent
1	4.2447	28.298		28.298
2	1.6232	10.821		39.120
3	1.2069	8.046		47.166
4	1.1226	7.484		54.650
5	0.9222	6.148		60.798

6	0.8566	5.710		66.509
7	0.7179	4.786		71.295
8	0.6628	4.419		75.713
9	0.6526	4.350		80.064
10	0.6122	4.082		84.145
11	0.5722	3.815		87.960
12	0.5560	3.706		91.666
13	0.5175	3.450		95.116
14	0.4046	2.697		97.813
15	0.3280	2.187		100.000

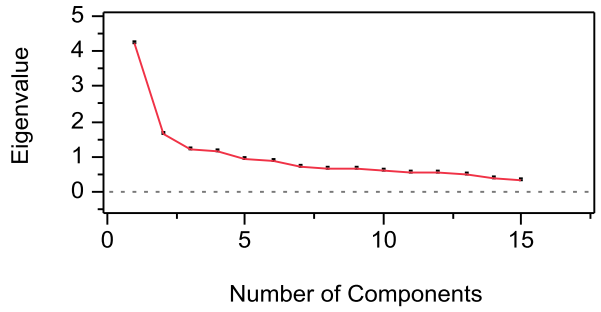

Figure 5.4

Scree plot of Self-disciplined Sub-cluster

Table 5.8 shows that there were 4 factors with eigenvalues >1. This suggests that 4 facets should be retained. These four facets explain 54.7% of the variance in the data. All 22 questions in the Self-discipline sub-cluster can therefore be reduced to 4 meaningful facets. The individual factor loadings are presented in table 5.9.

Table 5.9

Individual rotated factor loadings of the Self-disciplined Sub-cluster

Item	Factor 1	Factor 2	Factor 3	Factor 4
Item220	**0.64**	-0.0	0.02	-0.0
Item221	**0.74**	0.10	0.08	-0.1
Item222	**0.64**	0.03	0.03	-0.0
Item223	**0.62**	-0.1	-0.1	0.16
Item214 2	-0.0	**0.43**	-0.0	0.22
Item215 2	0.02	**0.62**	-0.0	-0.0
Item216 2	-0.1	**0.61**	0.06	-0.0
Item218 2	0.20	**0.41**	0.00	0.02
Item224 2	0.11	0.05	-0.2	**0.43**
Item228 2	-0.1	0.01	0.09	**0.34**
Item229 2	-0.0	-0.0	**0.49**	0.02
Item230 2	0.19	0.15	0.12	**0.35**
Item234 2	0.01	0.05	**0.50**	-0.0
Item235 2	0.11	0.12	**0.32**	0.32
Item236 2	0.23	0.19	**0.32**	0.30

Table 5.9 presents the individual rotated factor loadings. In accordance with De Bruin's (2010) criterion all items with loadings higher than 0.3 were regarded as meaningful. All the remaining items loaded successfully on the original facets. The initial sub-cluster contained 3 facets and 22 items.

This sub-cluster was changed somewhat following EFA. In the initial model the Self-disciplined sub-cluster consisted of three facets labelled Naughty, Obedient and Rebellious. Following EFA 4 facets were identified: Naughty, Obedient, Rebellious and Rule-conscientious. The sub-cluster now contains 15 items.

5.3.5 Results: Thoughtlessness Sub-cluster

The results of the factor analysis of the Thoughtlessness sub-cluster are presented in Appendix E.

The initial Exploratory Factor Analysis indicated that 5 factors should be retained. The same process was followed as for the previous sub-clusters and themes were identified for the groupings of individual items, keeping the original model in mind but also following a logical explanation. The loadings were matched to the original facets as far as possible, but this was not always achievable. In some instances new facets or factors were identified. The communalities were also investigated (items with loadings > 0.30 were identified as meaningful).

Items with the following characteristics were given special consideration:

- Items that did not load meaningfully (loading < 0.30) on any factor were discarded
- Items with a low communality (< 0.30) were discarded
- Items that loaded on more than factor were either placed with only one factor (if it made sense theoretically) or disregarded

An item analysis was conducted on the final proposed groupings after the process described above. This item analysis was designed to indicate the reliability of the grouping of items and further refine the groupings.

Following this process, the factor analysis was re-run (using only the items that were retained) to confirm the structure. Table 5.10 indicates the results.

Table 5.10

Eigenvalues of the Thoughtlessness Sub-cluster

Number	Eigenvalue	Percent	Percent	Cum Percent
1	2.5468	28.298		28.298
2	1.6400	18.222		46.520
3	1.0427	11.586		58.106
4	0.9436	10.484		68.590
5	0.7876	8.751		77.341
6	0.7196	7.995		85.337
7	0.5588	6.209		91.546
8	0.4260	4.734		96.280
9	0.3348	3.720		100.000

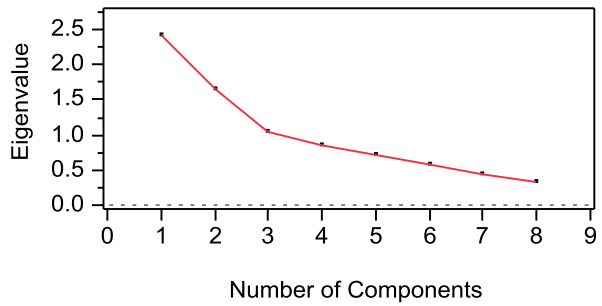

Figure 5.5

Scree plot of the Thoughtlessness Sub-cluster

Table 5.10 shows that there were 3 factors with eigenvalues >1. This suggests that 3 facets should be retained. These 3 factors explain 58.1% of the variance in the data. This means that all the 9 questions in the Thoughtlessness sub-cluster can be reduced to 3 meaningful factors. The individual factor loadings are presented in table 5.11.

Table 5.11

Individual Rotated factor loadings of the Thoughtlessness Sub-cluster

Item	Factor 1	Factor 2	Factor 3
Iem238 2	0.08	0.02	**0.41**
Item239 2	-0.0	-0.0	**0.40**
Item241 2	**0.38**	-0.0	-0.0
Item242 2	**0.65**	-0.0	0.04

Item243 2	**0.70**	0.02	-0.0
Item244 2	**0.62**	-0.0	0.05
Item248	**0.32**	0.01	0.05
Item249	-0.0	**0.74**	0.03
Item250	-0.0	**0.74**	-0.0

Table 5.11 presents the individual rotated factor loadings. In accordance with De Bruin's (2010) criterion all items with loadings higher than 0.3 were regarded as meaningful. The remaining items all loaded successfully on the original facets. The initial sub-cluster contained 2 facets and 22 items.

Following EFA this sub-cluster was changed slightly. The initial model of Thoughtlessness consisted of 2 facets (Absent-minded and Reckless). Following EFA 3 facets were identified: Absent-minded, Reckless and Planful. However, only two items loaded on the facets Reckless and Planful, respectively. These factors are not clearly defined. It was decided to discard the facet Reckless and to add an item (248) to the second factor. The facets retained are thus Absent-minded and Planful. This sub-cluster now contains 7 items.

5.4 RELIABILITY

Coefficient alpha (α) is a commonly used index of test reliability (Miller, 1995). Coefficient alpha can be used with scores that are produced by summing the scores of two or more test items. Miller (1995) defines the alpha coefficient (α) as follows: "Test score reliability is a variance ratio equal to the true-score variance of the test scores divided by the total variance of the test scores" (p. 256).

The reliability of a test is not a property of the actual test but a property of a test administered to a particular population of examinees under certain conditions (Miller, 1995). Test scores have higher reliability when there is a large genuine variation in the population of examinees. For example, a mathematics test designed for use with Grade 3 students will show a higher reliability when administered to all of the students in Grades 1 through 5 than when administered to only Grade 3 students.

Internal Cronbach's coefficient alphas were calculated for each facet in the study. The calculation of a reliability coefficient is based on the assumption of unidimensionality within the facet. The results are presented in table 5.12. The entire sets' Cronbach coefficients can

be viewed in Appendix F. This appendix indicated how some items have been discarded to increase the overall reliability.

Table 5.12

Cronbach Alpha Coefficients (N = 1051)

Facet	α
Career Oriented	0.81
Competitive	0.70
Hardworking	0.89
Performance Oriented	0.62
Timeous	0.8
Dedication (Family)	0.78
Dedication (Work)	0.81
Determined	0.89
Future oriented	0.92
Passionate	0.80
Perseverant	0.71
Purposeful	0.89
Consistent	0.72
Disciplined	0.81
Meticulous	0.88
Organised	0.95
Punctual	0.82
Tidiness Personal	0.81
Tidiness Environment	0.73
Thorough	0.54
Naughty	0.66
Obedient	0.76
Rebellious	0.45
Rule conscientious	0.49
Absent minded	0.75
Planful	0.79

Table 5.12 indicates that the sub-scales reflect normal distributions. Five of the facets had Cronbach alpha coefficient scores below the acceptable levels of reliability of $\alpha > 0.70$. These facets were Performance Oriented (0.62), Thorough (0.54), Naughty (0.66), Rebellious (0.45) and Rule Conscientious (0.49).). The Cronbach alpha coefficients recorded acceptable levels of reliability ($\alpha > 0.70$; Nunnally & Bernstein, 1994) for 21 of the (new) 26 facets. The actual scores varied from 0.70 to 0.95. This level of reliability is satisfactory for the preliminary test development stages. However, a reliability score of 0.95 or greater is required if important decisions are to be made based on individuals' specific test scores (Nunnally & Bernstein, 1994).

5.5 FIRST ORDER FACTOR ANALYSIS

5.5.1 Calculation of scores

The next step involved calculating the averages of the items per facet. The use of a mean rather than the item total was indicated because the facets do not contain the same number of items. The use of the mean facilitated easy comparison of facets. For example, the means of items 1, 2, 9, 18, 21, 24, 25 and 39 were used to calculate the average for the first facet (Hard working) of the Achievement sub-cluster.

5.5.2 Factor analyses

Following the calculation of mean scores a factor analysis was conducted for all the facets. The initial factor analysis indicated that 4 sub-clusters should be retained. The results are presented in table 5.13.

Table 5.13

Eigenvalues of the 26 facets of the Conscientiousness cluster

Number	Eigenvalue	Percent	Percent	Cum Percent
1	10.6830	41.089		41.089
2	1.5211	5.850		46.939
3	1.2221	4.700		51.639
4	1.0905	4.194		55.833
5	0.9849	3.788		59.621
6	0.9067	3.487		63.109
7	0.8321	3.201		66.309
8	0.8197	3.153		69.462
9	0.7946	3.056		72.518
10	0.7369	2.834		75.353
11	0.6583	2.532		77.885
12	0.6260	2.408		80.292
13	0.5865	2.256		82.548
14	0.5613	2.159		84.707
15	0.5211	2.004		86.711
16	0.4860	1.869		88.580
17	0.4573	1.759		90.339
18	0.3794	1.459		91.798
19	0.3587	1.380		93.178
20	0.3333	1.282		94.459
21	0.3133	1.205		95.665
22	0.2934	1.129		96.793
23	0.2724	1.048		97.841
24	0.2272	0.874		98.714
25	0.1716	0.660		99.374
26	0.1627	0.626		100.000

Table 5.13 indicates that there are 4 eigenvalues >1. This suggests that 4 factors should be retained. These 4 sub-clusters explain 55.8% of the variance in the data. The factor loadings are presented in table 5.14.

Table 5.14

Oblique factor pattern matrix of the 26 (new) facets of the Conscientiousness cluster (N=1051) – retaining 4 factors

	Factor 1	Factor 2	Factor 3	Factor 4
Hard working	0.32	**0.48**	-0.0	0.26
Career oriented	0.15	**0.34**	0.23	0.08
Competitive	-0.0	0.25	-0.0	-0.0
Timeous	**0.61**	0.25	-0.3	0.16
Performance Oriented	0.18	0.26	0.13	**0.34**
Dedicated Work	0.32	**0.51**	0.19	0.05
Dedication Family	**0.30**	0.24	0.29	-0.2
Determined	0.35	**0.52**	0.17	0.10
Future oriented	0.36	**0.49**	0.24	-0.0
Passionate	**0.56**	0.33	0.14	-0.1
Purposeful	**0.46**	0.42	0.16	0.06
Perseverant	**0.43**	0.25	0.29	-0.1
Consistent	**0.50**	0.05	0.03	-0.1
Disciplined	**0.69**	0.02	0.07	0.11
Meticulous	**0.76**	0.08	-0.0	0.16
Organised	**0.86**	0.05	-0.1	0.12
Punctual	**0.80**	0.02	-0.2	0.15
Tidiness Personal	**0.47**	0.09	0.05	0.11
Tidiness Environment	**0.38**	-0.0	0.24	-0.1
Thorough	**0.32**	-0.0	0.19	0.02
Obedient	**0.54**	-0.0	0.27	0.06
Naughty	0.28	-0.1	**0.34**	0.32
Rebellious	-0.1	0.03	**0.54**	0.20
Rule conscientious	-0.0	-0.0	0.01	**0.38**
Absent-minded	0.27	0.00	0.11	**0.39**
Planful	0.05	-0.0	0.03	0.10

Table 5.14 shows that 4 factors were extracted. A cut-off value of >0.30 was used for the inclusion of a variable. The Competitive facet and the Planful facet were the only two facets that did not load on any of the factors. The variables clustered in the first factor include Timeous, Dedicated (family), Passionate, Purposeful, Perseverant, Consistent, Disciplined, Meticulous, Organised, Punctual, Tidiness (personal), Tidiness (environment), Thorough and Obedient. The facets Hard-working, Career oriented, Dedication (work) and Future-oriented loaded on the second factor. Finally, Naughty and Rebellious loaded on the third factor, while Performance, Rule conscientious and Absent minded loaded on the fourth factor. This finding suggests that the third factor was poorly defined as only two facets (Naughty and Rebellious) had meaningful loadings on this factor.

After inspection of the findings a decision was taken to discard the Competitive and Planful facets as they did not load on any of the factors. The analysis was then conducted again. The Dedication (family), Tidiness (environment), Thorough and Rule conscientious facets were also excluded from the analysis. The decision to exclude these facets was based on a combination of various criteria:

- The facet had severely low communalities <.30
- The facet loaded low on the factors
- Removal of the facet increased the reliability
- It made „theoretical' sense

The results of the factor analysis with the remaining 20 facets are presented in table 5.15.

Table 5.15

Eigenvalues for the 20 facets of the Conscientiousness cluster

Number	Eigenvalue	Percent	Percent	Cum Percent
1	10.0307	50.153		50.153
2	1.3133	6.566		56.720
3	1.0214	5.107		61.827
4	0.8675	4.337		66.164
5	0.8063	4.032		70.195
6	0.6605	3.302		73.498
7	0.6105	3.053		76.550
8	0.5829	2.914		79.465
9	0.5379	2.689		82.154
10	0.5328	2.664		84.818
11	0.4654	2.327		87.145
12	0.3968	1.984		89.129
13	0.3681	1.840		90.969
14	0.3395	1.698		92.667
15	0.3151	1.575		94.242
16	0.3075	1.538		95.780

17	0.2740	1.370		97.150
18	0.2317	1.159		98.308
19	0.1747	0.873		99.182
20	0.1636	0.818		100.000

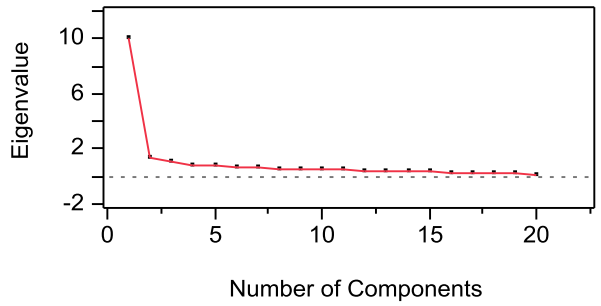

Figure 5.6 Scree plot

Table 5.15 indicates that there are 3 eigenvalues >1. This suggests that 3 factors should be retained. These 3 factors explain 61.8% of the variance in the data. The loadings are presented in table 5.16.

Table 5.16

Rotated factor loadings – retaining 3 factors

Facet	Factor 1	Factor 2	Factor 3
Hard working	**0.67**	0.02	0.15
Career oriented	**0.51**	0.11	-0.1
Timeous	**0.47**	-0.0	0.43
Performance Oriented	0.29	**0.31**	0.09
Dedicated Work	**0.86**	-0.0	-0.0
Determined	**0.89**	-0.0	-0.0
Future oriented	**0.95**	-0.1	-0.1
Passionate	**0.88**	-0.1	0.01
Purposeful	**0.88**	0.01	-0.0
Perseverant	**0.68**	0.10	-0.1
Consistent	**0.39**	0.01	0.13
Disciplined	**0.41**	0.31	0.24
Meticulous	**0.47**	0.25	0.33
Organised	**0.49**	0.23	0.40
Punctual	0.35	0.15	**0.49**
Tidiness Personal	**0.39**	0.16	0.17
Obedient	0.36	**0.38**	0.08

Naughty	-0.0	**0.63**	0.06
Rebellious	0.06	**0.52**	-0.3
Absent-minded	0.00	**0.53**	0.18

Table 5.16 shows that 3 factors were extracted. A cut off criteria of >0.30 was used for the inclusion of a variable. The variables clustered in the first factor include Hard working, Career oriented, Timeous, Dedicated (work), Determined, Future oriented, Passionate, Purposeful, Perseverant, Consistent, Disciplined, Meticulous, Organised and Tidiness (personal). Performance oriented, Obedient, Naughty, Rebellious and Absent minded loaded onto the second factor. Punctual was the only variable that loaded meaningfully on the third factor. This indicates that the third factor may be poorly defined. The cluster may actually consist of less than 3 factors.

Parallel analysis, an alternative method for determining how many factors to retain, was then used. Parallel analysis is based on the rationale that factors are worth retaining must account for more variance than can be attributed to chance alone (Horn, 1965). The parallel analysis procedure requires that the eigenvalues of the reduced correlation matrix (with communalities in the main diagonal) and the eigenvalues of parallel random data be jointly plotted against the roots (De Bruin, 2006). Factors with actual eigenvalues greater than the eigenvalues of the parallel random dataset are retained (Hayton, Allen, & Scarpello, 2004). In this study the results of the parallel analysis of the reduced intercorrelation matrix showed that 2 eigenvalues from the sample data were greater than the eigenvalues of the parallel random data. This result indicated that two factors should be retained. However, the large difference between the first and second eigenvalues indicated the presence of a single strong factor. The results of the parallel analysis are displayed in Figure 5.7

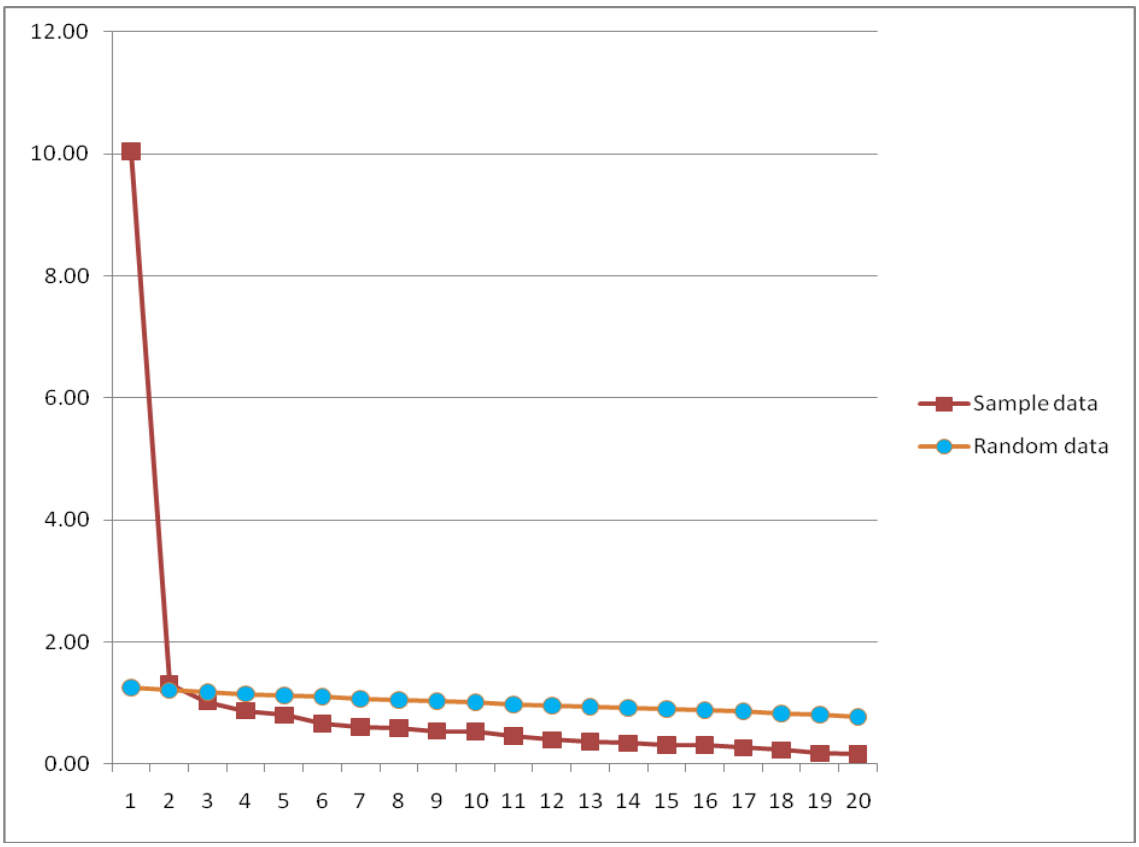

Figure 5.7

Scree plot and parallel analysis for the Conscientiousness cluster

The results of the parallel analysis and the eigenvalue greater than 1 criteria (which resulted in the three factor model) resulted in a decision to retain only two factors for continued analysis. When the two-factor solution was analysed the results indicated that the first factor was loading on the second factor (rebellious). This second factor was therefore poorly defined. These results suggested that a one-factor solution was feasible. The results of the factor analysis retaining only one factor are indicated in table 5.17

Table 5.17

Oblique Factor Pattern Matrix of the 20 facets of the Conscientiousness cluster

Facet	Factor 1
Hard working	**0.75**
Career oriented	**0.54**
Timeous	**0.69**
Performance Oriented	**0.56**
Dedicated Work	**0.78**
Determined	**0.84**
Future oriented	**0.82**

Passionate	**0.79**
Purposeful	**0.86**
Perseverant	**0.71**
Consistent	**0.47**
Disciplined	**0.76**
Meticulous	**0.83**
Organised	**0.87**
Punctual	**0.72**
Tidiness Personal	**0.59**
Obedient	**0.68**
Naughty	**0.47**
Rebellious	0.28
Absent-minded	**0.49**

Table 5.17 shows that one factor was extracted with a cut off criteria of >0.30 for inclusion of a variable. With the exception of the Rebellious facet, all the facets loaded meaningfully on the single factor. This could be an indication that the Rebellious facet should be removed from the SAPI's Conscientiousness cluster. However, the results indicate that the other facets definitely measure the higher order factor of Conscientiousness. This finding is very encouraging for the SAPI project.

5.6 SECOND ORDER FACTOR ANALYSIS

Second-order factor analysis is conducted in order to identify higher or second-order factors. This analysis is performed on the factor correlation matrix obtained in the first-order factor analysis and makes use of the Schmid-Leiman solution.

The Schmid–Leiman solution (SLS; Schmid & Leiman, 1957) is used to calculate direct relationships between variables and higher order factors. This simple transformation of higher order factor analysis orthogonalizes first-order and higher order factors and thereby allows the interpretation of the relative impact of factor levels on variables. The Schmid–Leiman solution can also be used to facilitate theorizing and scale development (Wolff & Preissing, 2005). Table 5.18 presents the findings of the Schmid-Leiman solution.

Table 5.18

Hierarchical Schmid-Leiman factor solution for the 20 facets of the Conscientiousness cluster (N=1051)

Sub-cluster	Conscientiousness (higher order factor)	Factor 1	Factor 2	Factor 3
Hardworking	**0.69**	**0.32**	0.07	-0.02
Career-oriented	**0.50**	0.22	-0.02	0.08
Timeous	**0.66**	0.29	0.25	-0.07
Performance	**0.56**	0.15	0.07	0.16
Dedication (work)	**0.70**	**0.39**	-0.05	-0.01
Determined	**0.75**	**0.41**	-0.05	0.00
Future oriented	**0.73**	**0.44**	-0.12	-0.02
Passionate	**0.71**	**0.38**	0.00	-0.05
Purposeful	**0.78**	**0.41**	-0.03	0.01
Perseverant	**0.66**	0.29	-0.01	0.09
Consistent	**0.44**	0.17	0.09	0.00
Disciplined	**0.78**	0.19	0.20	0.17
Meticulous	**0.85**	0.22	0.27	0.11
Organised	**0.89**	0.23	**0.31**	0.19
Punctual	**0.74**	0.18	**0.34**	0.02
Tidiness Personal	**0.58**	0.21	0.09	0.06
Obedient	**0.70**	0.16	0.11	0.24
Naughty	**0.55**	0.01	0.09	**0.39**
Rebellious	**0.33**	0.01	-0.17	**0.43**
Absent minded	**0.55**	0.02	0.18	0.29

The Schmid-Leiman transformation produced one distinct second-order factor that explained 78% of the variance. It also produced three defined group factors that accounted for 22 % of the variance.

All the facets had their highest factor pattern coefficient on the second-order factor. Coefficients for these factor patterns ranged between 0.33 and 0.89. The majority of the facets (Career-oriented, Timeous, Performance oriented, Perseverant, Consistent, Disciplined, Meticulous, Tidiness (personal), Obedient, Absent minded) only loaded on the higher order factor Conscientiousness. The other facets (Hard working, Dedication (work), Determined, Future oriented, Passionate, Purposeful, Organised, Punctual, Naughty and Rebellious) loaded on both the higher order factor and another factor. This procedure was deemed extraneous but does provide evidence supporting the retention of a single factor.

5.7 CONCLUSION

This chapter aimed to report the results obtained in this study. The first step of the analysis involved identifying items with extreme skewness and kurtosis and excluding these items from the dataset. Items that were negatively phrased were then scored positively in the dataset. Exploratory Factor Analysis resulted in the discarding of 1 of the initial facets and the addition of 3 new facets. The internal Cronbach's coefficient alphas of the 21 retained facets reflected normal to good distributions. However, 5 of the 26 facets yielded low reliabilities.

After running various analyses a decision was taken to retain three factors. Further analyses showed that two of these factors were weakly defined and thus only one factor was ultimately retained. This single factor solution is indicative of the presence of a higher order factor. It would seem that this higher order factor is Conscientiousness. Seven facets (Dedication (family), Tidiness (environment), Thorough, Rule-conscientious, Planful, Competitive and Rebellious) failed to load on the higher order factor and can therefore be excluded from the SAPI's conceptualisation of Conscientiousness. The next chapter presents an in-depth discussion of the general conclusions drawn from the research. Recommendations for future research are also provided.

CHAPTER SIX: DISCUSSION AND RESULTS

6.1 INTRODUCTION AND FINDINGS

This chapter presents the combined research findings of this study. It also discusses the ways in which these findings relate to previous research (as described in Chapter 2 and 3) and the initial objectives of the study. The chapter also offers comments regarding the limitations of the study and recommendations for future research.

The South African Personality Inventory (SAPI) project was founded in 2005 with the aim of uncovering the personality dimensions in eleven different language groups in South Africa. The project's ultimate aim is to develop a personality inventory that would be available in all eleven languages.

Various factors contributed to the conceptualisation of this project. The increasingly recognised fact that using psychometric instruments developed within one cultural context to assess human attributes in another cultural context is rife with difficulties (MacLachlan, Mapundi, Zimba & Carr, 1995) was definitely a factor in the development of the project. In addition, the Employment Equity Act clearly stipulates that all psychometric measuring instruments should be proven bias free, equivalent and fair (Nel, 2008). Most of the inventories currently in use in South Africa are imported from abroad and do not meet the criteria laid out by the Employment Equity Act. Collaborators from various international and local universities have risen to the challenge of uncovering South Africa's own model of personality, without imposing an external or etic approach.

Singelis (2000) states that the increasing interest in cross-cultural psychology can be attributed to various factors. This interest also seems likely to grow in the future. Around the world immigration, communication and ease of travel have contributed to a multi-cultural milieu that is unparalleled in the history of the world (Singelis, 2000). This multicultural atmosphere has increased the academic community's receptivity to culture as an essential variable in understanding human behaviour. In addition the increasing sophistication of qualitative methodology available to cross-cultural research has fuelled the interest in the field (Van de Vijver & Leung, 1997).

The history of personality assessment in Asia serves as an example of the increasing focus on cross-cultural research. The introduction of personality assessment in industrial and organisational psychology in Asia lagged behind the development of personality assessment in clinical psychology (Cheung, 2004). The tests which were available were simple measures for which relatively little research evidence existed. Practices guiding the translation and adaptation of Western instruments also varied greatly during the early days of test importation (Cheung, 2004). Tests were translated and used as substitutes for the original tests, with little consideration given to the equivalence of the structure (Cheung, 2004). In South Africa the situation was also dire, leading one commentator to state that: "if the discipline of personality assessment in general is in a state of crisis, then its status in South Africa can only be described as catastrophic" (England, 1991, p. 52).

In the 1970s the indigenization movement was founded by psychologists in the Philippines who wanted to remedy the personality assessment situation in that country (Cheung, Van de Vijver & Leong, in press). Psychologists in China and Korea soon became part of the movement. New constructs were derived and many of the indigenous Asian personality constructs reflect the relational nature of human experience in a social and interpersonal context. However, these early indigenization movements are not without critique. The local psychologists had a tendency to emphasise cultural uniqueness and mainstream psychology viewed this as peripheral to the scientific understanding of human behaviour.

From a cross-cultural perspective, western psychology is a culture-specific approach that has guided most research. However, studies in non-western cultures provide a new perspective that can help to identify both human universals and cultural specifics in personality. As Cheung et al. (in press) explain: "We need a combined perspective to expand our understanding of universal personality constructs" (p.17).

The Chinese Personality Assessment Inventory (CPAI) made use of a combined emic-etic development approach. Indigenous personality traits deemed important in Chinese culture were generated in a bottom-up approach. These traits were then combined with universal personality traits in order to develop a set of normal personality and clinical scales for comprehensive personality assessment. The developers investigated new methods for finding description of personality. These methods included the use of Chinese literature, Chinese proverbs and focus groups from diverse populations. These methods supplemented the

traditional approaches of simply translating imported measures or using adjectives from the dictionary. Thus, the use of a combined approach meant that the researchers did not ignore the existing literature on emic personality.

Extensive research was conducted during test development and various versions of the CPAI were standardised and normed. Some of the indigenously constructed scales eventually loaded on factors that are etic in nature. However, there was also an emic personality factor consisting of more indigenously derived scales.

The collaborators in the SAPI project made use of the same principles used by the Chinese researchers. However, the SAPI project differs from the CPAI in that it focuses on eleven languages. The SAPI project followed a combined emic-etic approach. Everyday conceptualisations of personality were used to construct a nine factor structure. The current study focused on one of these factors, namely, Conscientiousness.

The psychological literature concerning conscientiousness made it clear that this concept does not have a simple definition (Roberts et al., 2005). Parish (2002) notes that although a number of rationally based facets for conscientiousness exist there is little agreement as to their number and identity. Roberts et al. (2005) identified nine unique facets of conscientiousness that appear in a number of studies. These facets are order, achievement, responsibility, impulse control, moralistic, persistence, traditionalism, formalness and decisiveness. However, no conceptual or empirical solution was found that provides comprehensive coverage of all nine facets and no two systems were in complete agreement (Roberts et al., 2005).

Despite the difficulties involved in defining conscientiousness strong evidence exists to support the existence of the factor (Costa & McCrae, 1998). Despite previous research findings the SAPI's experimental conscientiousness measuring instrument was an exploratory research approach that aimed to develop and clarify ideas and research questions regarding conscientiousness in the South African context. The development of the experimental measure involved many steps, beginning with the development of definitions for facets and item development. Each step was subjected to subject matter expert evaluation from SAPI collaborators and peer evaluations in the form of workshops and Skype meetings. Once the measure was developed a pilot study was undertaken. After the pilot study the items of the

instrument were analysed. A first draft instrument was then developed that was applied to a multi-cultural group. The central aim of this study was to investigate whether the construct of conscientiousness as conceptualised in the first phase of the SAPI project was being measured by the experimental conscientiousness measuring instrument.

First and second-order factor analyses were conducted to investigate the conceptualisation of conscientiousness. The Cronbach alpha coefficients were also examined and items that did not adhere to certain criteria were eliminated. At the end of the analyses 19 facets remained. These facets all loaded on a higher order conscientiousness factor. The factors were hard working, career oriented, timeous, performance oriented, dedicated work, determined, future oriented, passionate, perseverant, purposeful, consistent, disciplined, meticulous, organised, punctual, tidy (personal), naughty, obedient and absent minded.

Seven (Competitive, Rebellious, Planful, Rule conscientious, Thorough, Tidiness (personal), Dedicated (family) of the original twenty-six facets failed to load meaningfully on the primary factor of conscientiousness and also did not load meaningfully on any on the sub-clusters. The first 2 facets (Competitive and Rebellious) were all phrased on the negative continuum of conscientiousness. These facets were also not currently used to describe conscientiousness (or lack thereof) in other existing conscientiousness models. The other facets (Planful, Rule conscientious, Thorough, Tidiness (personal) and Dedicated (family) were either represented by too few items or did not fit in with the conceptualisation of conscientiousness. Hence, these facets may be removed from the SAPI's conceptualisation of conscientiousness.

At the end of the analyses 19 facets loaded on a conscientiousness factor. The large number of facets (the highest number of facets identified in the literature is nine; Roberts et al., 2005) led to the decision to examine the facets with the highest loadings on the conscientiousness factor. Eleven factors had loadings of >0.7. These factors were Hard working (which initially clustered under achievement sub cluster), Dedicated (work), Determined, Future oriented, Passionate, Perseverant, Purposeful (which originally clustered under the sub-facet dedication), Disciplined, Meticulous, Organised and Punctual (which originally clustered under the sub-facet orderliness). However, eleven facets still represent a large number of facets. The criterion was then shifted to include only factors with a loading >.8 and this

resulted in the inclusion of five facets. These facets are: Determined, Future oriented, Purposeful, Meticulous and Organised. These facets originally clustered in the sub-clusters of dedication and orderliness.

These facets are comparable to various conscientiousness sub-scales found in the literature. The facets labelled organised and determined are especially prominent in existing literature. These comparisons are presented in table 6.1.

Table 6.1

Conscientiousness Scale Classifications from the Barrick and Mount Meta-analysis. Adapted from (adapted from Ones & Viswesvaran, 1996.)

Inventory	Subscale	SAPI equivalent
Edwards Personal Preference Schedule	Achievement	Future oriented
	Endurance	Determined
	Order	Organised
Adjective Checklist	Achievement	Future oriented
	Order	Order
Thematic Apperception & Psychologist Ratings	Achievement	Future Oriented
	Order	Organised
Jackson Personality Inventory	Organization	Organised
	Responsibility	
Personality Research Form	Achievement	Future oriented
	Endurance	determined
	Order	Organised
	Impulsivity	-
Multidimensional Personality Questionnaire	Hard work	Passionate/purposeful
	Impulsiveness	-
Hogan Personality Inventory	Prudence	Meticulous
	Ambition	Determined
Comfrey Personality Scales	Orderliness	Organised

The NEO-PI-VI, which measures the Big Five Factors, has a conscientiousness factor that consists of six factors labelled competence, order, dutifulness, achievement, self-discipline and deliberation. These facets are very similar to the facets in this research labelled organised, determined and purposeful.

Costa and McCrae (1998) note that understanding the factors of personality depends on understanding the facets that define them. Identifying the optimal set of facets for a factor is a difficult task. The subdivisions within each factor are not clearly demarcated and presently

the choice of specific facets appears to be somewhat arbitrary. In the case of the NEO-PI-R each factor consists of six facets identified through a review of the psychological literature.

These facets are intended to sample the domain broadly while at the same time assessing constructs of interest in their own right. The test does not claim that these facets constitute the only or the best possible set of facet constructs. This discussion concerning the number of traits included in a factor highlights the debate concerning of the use of broad versus narrow traits.

For example, Hogan and Ones (1997) criticise the conscientiousness factor for having too large a bandwidth. Parish (2002) contends that the use of broad factors has advantages such as greater scale reliability within an inventory due to greater scale length. Some researchers have demonstrated the utility of using narrow traits or sub-factors of conscientiousness in predicting dependent variables of interest (Ashton, 1998; Hough, 1992; Moon, 2001). Arguments concerning the use of broad or narrow traits have rest on understanding the criterion of interest and then finding the appropriate breadth for the measure (Moon, 2001). Identifying a replicable underlying structure of conscientiousness is important because lower-order facets of personality traits often provide better predictions of behavioural outcomes than composite measures (Roberts et al., 2004). Steward (1999) suggests that as a criterion increases in dynamism, broader traits become more useful. This study aimed to confirm the model of conscientiousness and it was therefore important to be over inclusive and use a broad spectrum of traits. However, as the SAPI project progresses researchers may want to isolate the lower order facets of the model in order to measure specific behaviour.

Various connections exist between the concepts of conscientiousness and integrity (Becker, 1998). Hogan and Ones (1997) note that some literature suggests that integrity assessments are simple “narrow bandwidth, high fidelity” (p.856) conscientiousness measures. That means that in the hierarchical representation of conscientiousness integrity would appear at a low level. As such integrity would be capable of predicting specific behaviours. However, a person who values conscientiousness is not necessarily possessed of integrity (Becker, 1998). The concept of conscientiousness appears to have both morally laden and morally neutral elements.

> For instance, responsibility could be related to integrity insofar as it involves dependably doing what one has promised to do. However, being careful and organised may be partially stylistic in the sense that people can vary widely on these dimensions without violating moral principles. For example, the stereotypical absent-minded professor might be rather careless (misplacing things) and somewhat disorganised (not writing down ideas or plans) but still have high integrity by acting in accordance with moral values and virtues (e.g. reason, purpose and independence) (Becker, 1998, p.158).

Thus, although the morally laden element of conscientiousness may be pertinent to integrity the morally neutral elements are not (Becker, 1998). This statement confirms the SAPI's conceptualisation of conscientiousness. The integrity or morally conscious component sometimes emphasised in other models is not the focus of the SAPI's conscientiousness factor. Instead, this element is measured by the SAPI's Integrity cluster (Lotter, in Press).

In summary, at the beginning of this study the personality factor of conscientiousness in the SAPI framework was conceptualised through a hierarchical model. Conscientiousness was the main factor in this model and consisted of five sub-factors labelled achievement oriented, dedication, orderliness, self-disciplined and thoughtless. Each of these five sub-factors consisted of various facets. In total, the Conscientiousness factor contained twenty-four facets. The study's primary aim was to confirm the model of Conscientiousness and various analyses were carried out using SPSS and SAS in order to meet this aim. The study also aimed to retain items that measure the factor conscientiousness. An iterative process was thus followed using set criteria to delete items that do not match the criteria as set out by the SAPI collaborators.

The literature review made it apparent that conscientiousness is a complex factor. Although most researchers agree that conscientiousness does exist, its precise definition, sub-clusters and facets remain contested terrain in the psychology literature. This complexity was also evident in the current study, and the conceptualisation of the factor changed following analysis. Exploratory factor analyses per sub-cluster led to the deletion of some facets and the addition of other facets. Additional factor analyses were performed and eventually only one factor, labelled conscientiousness, was retained and the sub-clusters were discarded. This

may indicate that there was too much overlap between the five sub-clusters or that they were not adequately defined.

Furthermore, 19 out of the (new) 26 facets loaded onto the conscientiousness factor. Seven facets (Planful, Competitive, Rebellious, Rule conscientious, Thorough, Tidiness (environment) and Dedicated (family)) were removed from the factor. The literature on Conscientiousness lists a maximum of nine facets and therefore the nineteen contained in this report represents a fairly large number. However, the experimental nature of this study led to a tendency to be over inclusive rather than to eliminate items or facets before they can be analysed.

Conscientiousness has received a lot of research attention and various aspects of the factor have been emphasised at different times (Moon, 2001). Some researchers have highlighted the dependability and responsibility aspect of the factor. Others researchers view conscientiousness in terms of achievement or achievement striving. Costa and McCrae (1998) state that conscientiousness has historically been associated with dependability (Tellegen & Waller, 1987), will to achieve (Digman & TakemotoChock, 1981), self-control (Conn & Rieke, 1994), prudence (Hogan & Hogan, 1992) and constraint (Tellegen, 1982). This range of traits implies that conscientiousness involves a diverse set of traits divisible into at least two major groups, proactive and inhibitive traits. The highest scoring facets in this study were determined, future oriented, purposeful, meticulous and organised. These facets all had loadings >.8. This indicates that conscientiousness in the South African framework has a dedication and orderliness orientation.

6.2 LIMITATIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH

The sample included in this study was limited to police reservists and cannot be seen as characteristic of the general population or the average working population. The majority of the sample consisted of black and indigenous African language respondents. This means that the distribution was not representative of the South African population. However, this study involved an experimental undertaking only; once the translated tests have been developed for the entire SAPI instrument (in which Conscientiousness is only one factor) the target population will be representative of the South African demographic.

The sampling method used in the current study reduced the number of analyses that could be executed. The number of respondents in each sub-group was too small to conduct comparability measurements across population groups.

However, the main objective of this study was to analyse the SAPI's conceptualisation of the conscientiousness factor. This instrument is not intended for usage on its own.

Conscientiousness will ultimately be only one factor (out of nine) included in the South Africa Personality Inventory (SAPI). This study only provided evidence that supports the existence of this single factor. However, the findings from this research study suggest a number of recommendations for future auxiliary research.

First, bias and equivalence should be tested. Bias and equivalence is of pivotal importance when applying psychological measures in a multicultural society such as South Africa. The new constitution and demands for cultural appropriateness of psychological measures led to the stipulations in the Employment Equity Act Section 8. The act places the onus on psychologists to demonstrate the equitability of their measures. For example, Church (2001) explains that when personality measures are applied cross-culturally issues of measurement bias and equivalence become important. This is especially true when scores for different cultural groups are compared.

Cole and Moss (1998) state that bias is present when a test score has meanings or implications for a relevant, definable subgroup of test-takers that are different from the meanings or implications for the remainder of the test-takers. Thus, bias refers to the differential validity of a given interpretation of a test score for any definable, relevant subgroup of test-takers.

Meiring (2007) distinguishes between two different forms of bias. The first type of bias, known as internal bias, focuses on the relationship between an observed score and a latent trait variable. Internal bias refers to the presence of nuisance factors that play a differential role in different cultures. For example, scores on a questionnaire may be more influenced by social desirability in one culture than in another. Internal bias challenges the validity of comparisons of constructs or scores obtained in different cultural groups.

The second form of bias is external bias (also known as predictive bias or differential prediction) and focuses on the relationship between two observed variables – a predictor (e.g. cognitive test or personality measure) and a criterion (e.g. performance instrument or training performance). If external bias exists the accuracy of statements that applicants should accept or reject is moderated by culture.

Secondly, it is recommended that the items be analysed using Item Response Theory (IRT). Model-based measurement, known as item response theory (IRT) or latent trait theory, has rapidly become mainstream as a theoretical basis for psychological measurement (Embertson, 1996). Tests are developed from model-based measurement like IRT because the theory is more plausible and because the potential to solve practical testing problems is greater (Embertson, 1996).

The Rasch model is regarded by many as the gold standard against which summated scales summarizing item responses must be assessed (Kreiner, 2007).

> Item analysis by Rasch models serves two different purposes. The first is to provide calibrating equations relating total scores on educational or psychological tests to estimates of the value of the latent trait variable underlying the responses. These procedures can be characterized as person measurement procedures. For this purpose, item analysis also estimates item parameters either prior to estimation of the latent traits or jointly with the latent trait estimates. Estimation of item parameters is, in most cases, the means to the ends. They are rarely of interest in themselves. The second purpose of item analysis by Rasch models is scale validation. Items in Rasch models are characterized by a number of very attractive properties. Measurement by Rasch models is not only construct valid and objective, but the Rasch model is also the simplest of all item response models in both mathematical and statistical terms. And it requires no assumptions concerning the distribution of the latent trait, whereas most other item response and factor analysis models require that the latent trait is normally distributed. The second purpose of the analysis is to make sure that items possess these properties by

> an examination of the fit of item responses to the model. Most procedures for analysis of fit also use estimates of item parameters, and some use person parameter estimates (Kreiner, 2007, p.269).

Reid et al. (2007) explain that traditional scale development statistics such as item difficulties (*p* values) and overall item–test score correlations are no longer the only criteria available for test developers to use to select the best items for a test. IRT can be used to help researchers specify how well individual items distinguish between individuals who do or do not possess a particular target level of the trait or ability of interest (Reid et al., 2007). It is possible to assess the degree to which guessing negatively affects measurement accuracy on an item-by-item basis. This detailed specification makes it possible to examine the expected degree of measurement error at particular levels of the ability or trait on an item-by-item basis, rather than relying on one global standard error of measurement (SEM) conventionally considered the counterpart to overall reliability of the test as a whole. Test items can be selected to minimize measurement error and maximize information gained at a particular target level. The benefits of using IRT and specifically the Rasch model in test development are evident and can provide interesting insight in further SAPI analyses.

Thirdly, structured personality inventories are vulnerable to test-takers who choose to answer in socially desirable ways (De Bruin, 2001; Griffith, Chmielowski & Yoshita, 2005). Faking on personality measures has been referred to in the literature as response distortion, impression management, social desirability, displaying unlikely virtues and self-enhancement (Griffith et al., 2005; Hough et al., 1990). There is general consensus in the literature that individuals can fake assessments, especially on non-cognitive measures such as personality tests. However, the literature is undecided concerning whether this faking matters or has any impact on hiring decisions (Griffith et al., 2005).

One reason that applicants fake is due to a lack of awareness. This lack of awareness results in them being unable to accurately indicate their true score (Schmuckle & Egloff, 2005). Applicants or test-takers may also fake or answer in a socially desirable way because the content of the items or the questions makes it obvious what the psychologist is attempting to assess and what the socially desirable or appropriate answer would be. De Bruin (2001) illustrates this by using the following example:

> When being assessed as regards your suitability for a job, you are asked to respond either „yes' or „no' to the following item on a personality measure: „I

> tell lies sometimes.' You will feel fairly pressurised to answer 'no', as you will reason with yourself that your potential employer is not looking to employ someone who lies. If you succumb to the pressure and answer 'no', you would have responded in a socially desirable way. Furthermore, if you continue to respond in this way on the measure, a pattern of socially desirable answers will be evident.

The literature includes a sizeable body of evidence which shows that individuals can raise their scores on personality measures (Hough & Paullin, 1994; Ryan & Sackett, 1987; Viswesvaran & Ones, 1999). Griffith et al. (2005) state that participants instructed to present themselves in a more favourable light have the ability to „fake good'. Research conducted by Viswesvaran and Ones (1999) showed that, on average, participants were able to improve their scores by nearly half a standard deviation.

The extent to which job applicants actually distort their responses has been widely disputed (Griffith et al., 2005). Lie scales or scales assessing socially desirable responding are typically used to determine whether applicants have faked their scores (Rosse et al., 1998).

Social desirability scales are self-report inventories that are used to assess an individual's tendency to present him or herself in a favourable light.

Social desirability (SD) is consists of two sub-facets. The first sub-facet is labelled self-deceptive enhancement (SDE). SDE measures the tendency to give honest but inflated self-descriptions. The second sub-facet, impression management (IM), measures the tendency to give intentionally inflated self-descriptions. Social desirability items are likely to be fairly obvious to applicants and may be even more prone to applicant faking. Research by Viswesvaran and Ones (1999) suggests that SD scales are more susceptible to faking then the Big Five scales. In addition, research has indicated that measures of social desirability are not very effective in identifying individuals who are faking (Snell et al., 1999).

During this study an SD scale (the MCSD scale) was adapted and used as part of the developmental phase of the experimental conscientiousness instrument. However, the purpose of this study was to confirm the factor structure of the conscientiousness cluster and

therefore no analysis was carried out on the results of the SD scale. Future research should focus on investigating the results generated by this scale.

Fourthly, it is recommended that additional research be conducted on the conscientiousness factor. According to Roberts et al. (2005, p.132) "until further research is carried out or measures of these lower order facets are developed, these dimensions may be best considered „transition' dimensions or „interstitial' dimensions that lie directly between Conscientiousness and one or more of the remaining Big Five." This means that researchers will consistently find a large number of facets within the conscientiousness factor. However, these facets might be superfluous or excessive because the construct is not well defined. A more differentiated model of conscientiousness can help to inform future research. For example Moon's (2001) achievement facet and Roberts et al.'s (2005) industriousness facet are both important for performance outcomes. The development of a working taxonomy might make it possible to develop more precise knowledge about how each facet of conscientiousness affects important work outcomes. A program dedicated to developing new measures of each of these conscientiousness facets may help researchers to reduce the amount of overlap between these facets and the remaining Big Five domains.

Fifthly, "outstanding employee performance has always been a desired outcome for organisations" (Sutherland et al., 2007, p.60). Barrick and Mount's (1991) meta-analysis provided significant findings in relation to the Conscientiousness construct. Conscientiousness was found to be a consistently valid predictor of employee performance for all occupational groups studied and for all criterion types. Thus, this aspect of personality appears to tap traits that are important to the accomplishment of work tasks in all jobs. That means that individuals who exhibit traits associated with a strong sense of purpose, obligation and persistence generally perform better than individuals who do not exhibit these traits. The literature contains several examples of the ability of conscientiousness to predict job performance. For example, Robertson, Baron, Gibbons, MacIver and Nyfield (2000) found statistically significant positive correlations between conscientiousness and specific performance factors such as Organized (.25,/><.O1) and Quality Driven (.12,/<.O1). These correlations are consistent with the idea that performance factors requiring dependability are associated with conscientiousness. A meta-analysis of the relationship between the Big Five Factors of personality and job criteria was replicated in a South African study (Rothmann, Meiring, Van der Walt, & Barrick, 2002). The results indicated that Emotional Stability and

Conscientiousness are valid predictors of job performance in South Africa, especially for individuals with academic qualifications of Grade 12 and higher.

Furthermore, Lievens, Dilchert and Ones (2009) explain that selection and admissions decisions in organizations rely on stable relationships between predictors and criteria. It is thus assumed that performance differences on various predictor constructs remain relatively stable across the years and that predictor–criterion relationships are of similar strength for individuals of differing tenure. Potential changes in validity coefficients have an impact on the expected utility of selection systems. In predictive studies the time periods selected for gathering criterion data rarely exceed a year or two, in most cases data is gathered over the course of a few months. In concurrent studies, criterion scores are often obtained from both newly selected individuals and individuals of varying tenure levels.

The long-term predictive validity of personality traits has not been adequately researched. Previous research has examined the relationships between personality variables and extrinsic and intrinsic career success (Judge et al., 1999), but similar long-term investigations have not been carried out for academic performance. Hence, a predictive validity study of conscientiousness related to employee performance and academic performance over a long time period in the South African context is recommended for future research.

Finally, it is recommended that the conscientiousness measure follows the SAPI project plan and is translated into all eleven official South African languages. The measure should then be administered to first language speakers from each of these language groups. This will further substantiate and validate the model of conscientiousness in the South African framework.

6.3 CONCLUSIONS AND IMPLICATIONS

South Africa is a country with a rich heritage, eleven official languages and a great cultural diversity. In the post-apartheid era South Africans have tried to move towards more equitable practices in all spheres of society. In this regard there has been ongoing debate regarding the fairness and validity of psychological testing in the South African context.

Kim, Park and Park (2000) explain that each culture needs to be understood from within its own frame of reference, which includes its ecological, historical and cultural context. Some

aspects of culture are universal but other aspects are unique to each culture. Hence, the SAPI project arose out of the need for culturally fair and unbiased personality tests in South Africa. These tests need to adhere to the criteria laid out in the Employment Equity Act. The project makes use of a convergent or multi-centred approach aimed at identifying both universal and culture-specific aspects of personality relevant to the South African context.

The objectives of this study included developing an experimental item pool for the various facets of the conscientiousness instrument; drafting an experimental conscientiousness instrument with an appropriate response format scale; conducting a pilot study with the experimental conscientiousness instrument; following a hierarchical approach in analysing the data with the aim of examining the underlying dimensionality of the data and confirming the structure of the conscientiousness cluster; and developing a first draft instrument that can be applied to multi cultural groups, all of which were completed successfully. The research findings confirmed the underlying factor structure of conscientiousness but indicated that the sub-clusters and facets need to be redefined. Future test developers working on the SAPI project need to decide on the number of facets to be included. This research has laid the foundation for the measurement of conscientiousness with the SAPI project.

The need for the development and norming of culturally relevant, fair and ethical tests for the South African population has long been acknowledged (Foxcroft, 1997). Prinsloo and Ebersöhn (2002) launched an appeal to practitioners, researchers, academics and others in the field of personality assessment to improve general awareness and knowledge regarding the difficulties facing the field of personality assessment. A call was also made for the improvement of the quality of current products and their application.

There is an abundance of literature regarding the need for new personality tests in South Africa. However, there is considerably less literature and studies relating to the response of South Africa's psychologists to this urgent plea. The SAPI-project represents a concentrated effort at addressing the current testing dilemma. The project has been in existence for five years and is thus still relatively new and a lot of work remains. It has been an honour to be a part of this dynamic endeavour. The results of this study yielded promising results for the conscientiousness factor. These results will assist in the greater quantitative SAPI project. The SAPI project has the potential to revolutionise current testing in South Africa and will make an immense contribution to the field of personality testing as a whole.

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Appendix A
Initial results of the Exploratory Factor Analysis of the Achievement oriented sub-cluster

Achievement Oriented

Number	Eigenvalue	Percent	Percent	Cum Percent
1	10.2450	22.767		22.767
2	3.6283	8.063		30.829
3	2.1924	4.872		35.701
4	1.9862	4.414		40.115
5	1.9235	4.274		44.390
6	1.5473	3.439		47.828
7	1.3566	3.015		50.843
8	1.3208	2.935		53.778
9	1.1738	2.609		56.387
10	1.0866	2.415		58.801
11	1.0364	2.303		61.104
12	0.9936	2.208		63.312
13	0.9520	2.116		65.428
14	0.8644	1.921		67.349
15	0.8360	1.858		69.206
16	0.8300	1.844		71.051
17	0.7646	1.699		72.750
18	0.7416	1.648		74.398
19	0.7304	1.623		76.021
20	0.6869	1.526		77.547
21	0.6511	1.447		78.994
22	0.6456	1.435		80.429
23	0.6161	1.369		81.798
24	0.6131	1.362		83.161
25	0.5639	1.253		84.414
26	0.5573	1.238		85.652
27	0.5387	1.197		86.849
28	0.5066	1.126		87.975
29	0.4860	1.080		89.055
30	0.4694	1.043		90.098

Appendix B

Initial results of the Exploratory Factor Analysis of the Dedication sub-cluster

Dedication

Number	Eigenvalue	Percent	Percent	Cum Percent
1	21.7227	31.482		31.482
2	2.6397	3.826		35.308
3	2.2773	3.300		38.608
4	1.8470	2.677		41.285
5	1.5097	2.188		43.473
6	1.4797	2.144		45.618
7	1.2917	1.872		47.490
8	1.2175	1.764		49.254
9	1.2153	1.761		51.015
10	1.1336	1.643		52.658
11	1.0568	1.532		54.190
12	1.0249	1.485		55.675
13	0.9955	1.443		57.118
14	0.9746	1.413		58.531
15	0.9527	1.381		59.911
16	0.9148	1.326		61.237
17	0.8808	1.277		62.514
18	0.8599	1.246		63.760
19	0.8240	1.194		64.954
20	0.8097	1.173		66.128
21	0.7786	1.128		67.256
22	0.7718	1.119		68.374
23	0.7613	1.103		69.478
24	0.7450	1.080		70.558
25	0.7390	1.071		71.629
26	0.7019	1.017		72.646
27	0.6845	0.992		73.638
28	0.6712	0.973		74.611
29	0.6665	0.966		75.576
30	0.6604	0.957		76.534

Appendix C

Results of the initial Exploratory Factor Analysis of the Orderliness sub-cluster

Orderliness

Number	Eigenvalue	Percent	Percent	Cum Percent
1	24.3422	29.686		29.686
2	3.3753	4.116		33.802
3	2.5879	3.156		36.958
4	2.2767	2.776		39.734
5	1.9546	2.384		42.118
6	1.6232	1.979		44.097
7	1.5302	1.866		45.964
8	1.4449	1.762		47.726
9	1.3624	1.661		49.387
10	1.3308	1.623		51.010
11	1.2863	1.569		52.579
12	1.1531	1.406		53.985
13	1.1394	1.390		55.374
14	1.1130	1.357		56.732
15	1.0737	1.309		58.041
16	1.0275	1.253		59.294
17	0.9964	1.215		60.509
18	0.9771	1.192		61.701
19	0.9473	1.155		62.856
20	0.9432	1.150		64.006
21	0.9231	1.126		65.132
22	0.8793	1.072		66.204
23	0.8488	1.035		67.239
24	0.8425	1.027		68.267
25	0.8281	1.010		69.277
26	0.8067	0.984		70.260
27	0.7813	0.953		71.213
28	0.7620	0.929		72.142
29	0.7374	0.899		73.042
30	0.7353	0.897		73.938

Appendix D

Results of the initial Exploratory Factor Analysis of the Self-disciplined sub-cluster

Self-disciplined

Number	Eigenvalue	Percent	Percent	Cum Percent
1	5.2699	25.095		25.095
2	1.9429	9.252		34.347
3	1.3489	6.424		40.771
4	1.1556	5.503		46.273
5	1.1501	5.477		51.750
6	0.9885	4.707		56.457
7	0.9368	4.461		60.918
8	0.8381	3.991		64.909
9	0.7945	3.783		68.692
10	0.7462	3.553		72.245
11	0.6940	3.305		75.550
12	0.6512	3.101		78.651
13	0.6352	3.025		81.676
14	0.5814	2.768		84.445
15	0.5722	2.725		87.170
16	0.5414	2.578		89.748
17	0.5119	2.437		92.185
18	0.5009	2.385		94.570
19	0.4507	2.146		96.716
20	0.3795	1.807		98.523
21	0.3101	1.477		100.000

Appendix E

Results of the initial Exploratory Factor Analysis of the Thoughtlessness sub-cluster

Thoughtlessness

Number	Eigenvalue	Percent	Percent	Cum Percent
1	2.8712	17.945		17.945
2	2.1309	13.318		31.263
3	1.2708	7.942		39.206
4	1.1006	6.879		46.084
5	1.0450	6.531		52.615
6	0.9661	6.038		58.653
7	0.9452	5.908		64.561
8	0.8871	5.544		70.105
9	0.8425	5.266		75.371
10	0.7595	4.747		80.118
11	0.7128	4.455		84.573
12	0.6261	3.913		88.486
13	0.5714	3.571		92.058
14	0.5276	3.298		95.356
15	0.4233	2.646		98.001
16	0.3198	1.999		100.000

Appendix F

Cronbach Alpha Coefficients for all of the facets.

1. Achievement Sub-Cluster

a.) Career oriented

Multivariate

Correlations

	Item5	Item6	Item7	Item22	Item41
Item5	1.0000	0.2884	0.5403	0.4860	0.5180
Item6	0.2884	1.0000	0.3386	0.2961	0.3042
Item7	0.5403	0.3386	1.0000	0.4959	0.5470
Item22	0.4860	0.2961	0.4959	1.0000	0.5364
Item41	0.5180	0.3042	0.5470	0.5364	1.0000

The correlations are estimated by REML method.

Cronbach's α

	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Entire set	0.7694	

Excluded

Col	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Item5	0.7110	
Item6	0.8119	
Item7	0.7006	
Item22	0.7137	
Item41	0.7056	

b.) Hard working

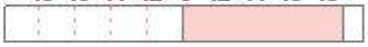
Multivariate

Correlations

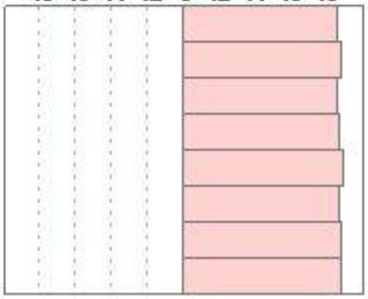
	Item1	Item2	Item9	Item18	Item21	Item24	Item25	Item39
Item1	1.0000	0.6039	0.7665	0.6641	0.4653	0.6547	0.5034	0.5503
Item2	0.6039	1.0000	0.5537	0.4889	0.3988	0.5029	0.4232	0.4201
Item9	0.7665	0.5537	1.0000	0.6438	0.4372	0.6742	0.5484	0.5700
Item18	0.6641	0.4889	0.6438	1.0000	0.4031	0.5949	0.4404	0.4794
Item21	0.4653	0.3988	0.4372	0.4031	1.0000	0.4584	0.4015	0.3717
Item24	0.6547	0.5029	0.6742	0.5949	0.4584	1.0000	0.5342	0.5417
Item25	0.5034	0.4232	0.5484	0.4404	0.4015	0.5342	1.0000	0.4634
Item39	0.5503	0.4201	0.5700	0.4794	0.3717	0.5417	0.4634	1.0000

The correlations are estimated by REML method.

Cronbach's α

	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Entire set	0.8902	

Excluded

Col	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Item1	0.8657	
Item2	0.8802	
Item9	0.8656	
Item18	0.8741	
Item21	0.8945	
Item24	0.8684	
Item25	0.8818	
Item39	0.8803	

c.) Competitive

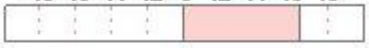
Multivariate

Correlations

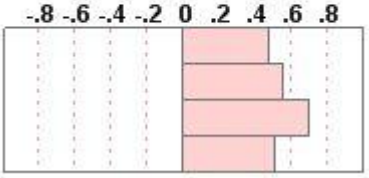
	Item11	Item12	Item13	Item14
Item11	1.0000	0.4852	0.1158	0.4944
Item12	0.4852	1.0000	0.1003	0.3425
Item13	0.1158	0.1003	1.0000	0.2470
Item14	0.4944	0.3425	0.2470	1.0000

The correlations are estimated by REML method.

Cronbach's α

	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Entire set	0.6459	

Excluded

Col	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Item11	0.4757	
Item12	0.5596	
Item13	0.7026	
Item14	0.5092	

d.) Timeous

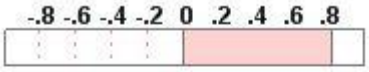
Multivariate

Correlations

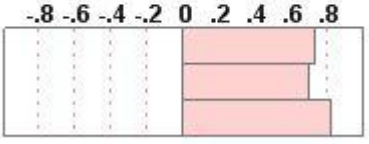
	Item43	Item44	Item47
Item43	1.0000	0.7141	0.5400
Item44	0.7141	1.0000	0.5838
Item47	0.5400	0.5838	1.0000

The correlations are estimated by REML method.

Cronbach's α

	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Entire set	0.8254	

Excluded

Col	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Item43	0.7370	
Item44	0.7006	
Item47	0.8316	

e.) Performance

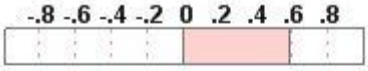
Multivariate

Correlations

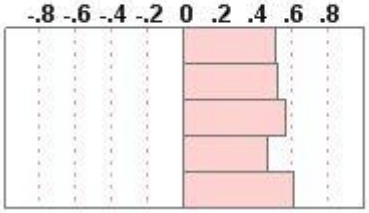
	Item32	Item35	Item28 2	Item33 2	Item36 2
Item32	1.0000	0.3128	0.2351	0.3464	0.2087
Item35	0.3128	1.0000	0.1945	0.3985	0.1653
Item28 2	0.2351	0.1945	1.0000	0.2763	0.1037
Item33 2	0.3464	0.3985	0.2763	1.0000	0.2473
Item36 2	0.2087	0.1653	0.1037	0.2473	1.0000

The correlations are estimated by REML method.

Cronbach's α

	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Entire set	0.5940	

Excluded

Col	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Item32	0.5126	
Item35	0.5260	
Item28 2	0.5748	
Item33 2	0.4704	
Item36 2	0.6163	

2. Dedication Sub-Cluster

a.) Dedication (work)

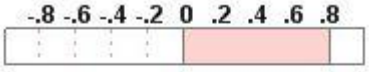
Multivariate

Correlations

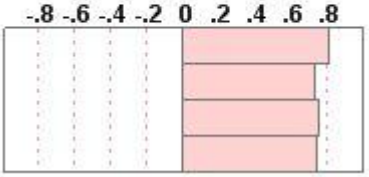
	Item50	Item51	Item52	Item53
Item50	1.0000	0.5111	0.4351	0.4509
Item51	0.5111	1.0000	0.6080	0.6160
Item52	0.4351	0.6080	1.0000	0.5846
Item53	0.4509	0.6160	0.5846	1.0000

The correlations are estimated by REML method.

Cronbach's α

	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Entire set	0.8137	

Excluded

Col	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Item50	0.8186	
Item51	0.7363	
Item52	0.7587	
Item53	0.7530	

b.) Dedication (family)

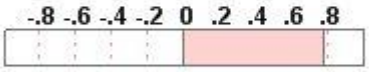
Multivariate

Correlations

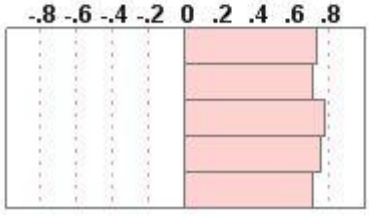
	Item54	Item55	Item56	Item57	Item58
Item54	1.0000	0.4924	0.3364	0.4673	0.4254
Item55	0.4924	1.0000	0.3712	0.3696	0.6577
Item56	0.3364	0.3712	1.0000	0.3418	0.3543
Item57	0.4673	0.3696	0.3418	1.0000	0.4089
Item58	0.4254	0.6577	0.3543	0.4089	1.0000

The correlations are estimated by REML method.

Cronbach's α

	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Entire set	0.7820	

Excluded

Col	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Item54	0.7404	
Item55	0.7122	
Item56	0.7783	
Item57	0.7555	
Item58	0.7172	

c.) Determined

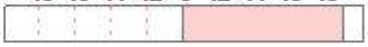
Multivariate

Correlations

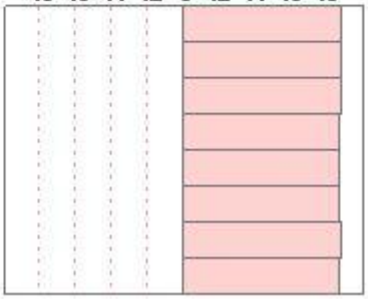
	Item62	Item63	Item64	Item65	Item66	Item67	Item68	Item69
Item62	1.0000	0.4599	0.4529	0.4694	0.4825	0.4993	0.4835	0.5361
Item63	0.4599	1.0000	0.4926	0.6030	0.4651	0.5409	0.4230	0.4413
Item64	0.4529	0.4926	1.0000	0.5046	0.5547	0.5154	0.4760	0.4523
Item65	0.4694	0.6030	0.5046	1.0000	0.5353	0.5636	0.4041	0.4346
Item66	0.4825	0.4651	0.5547	0.5353	1.0000	0.6243	0.4915	0.4949
Item67	0.4993	0.5409	0.5154	0.5636	0.6243	1.0000	0.5310	0.5622
Item68	0.4835	0.4230	0.4760	0.4041	0.4915	0.5310	1.0000	0.6508
Item69	0.5361	0.4413	0.4523	0.4346	0.4949	0.5622	0.6508	1.0000

The correlations are estimated by REML method.

Cronbach's α

	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Entire set	0.8898	

Excluded

Col	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Item62	0.8790	
Item63	0.8786	
Item64	0.8784	
Item65	0.8768	
Item66	0.8735	
Item67	0.8700	
Item68	0.8772	
Item69	0.8749	

d.) Future-oriented

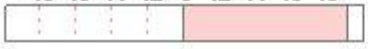
Multivariate

Correlations

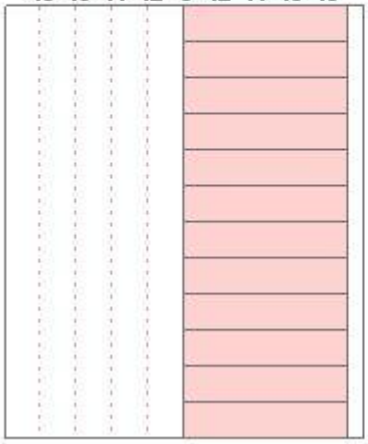
	Item77	Item78	Item79	Item80	Item81	Item82	Item84	Item85	Item87	Item88
Item77	1.0000	0.4798	0.5101	0.5336	0.4155	0.4553	0.3834	0.4053	0.3538	0.4372
Item78	0.4798	1.0000	0.6261	0.5654	0.4308	0.5141	0.4458	0.4344	0.4328	0.5119
Item79	0.5101	0.6261	1.0000	0.5704	0.4569	0.4706	0.3893	0.4144	0.4186	0.4830
Item80	0.5336	0.5654	0.5704	1.0000	0.5542	0.5418	0.4226	0.4583	0.4324	0.4970
Item81	0.4155	0.4308	0.4569	0.5542	1.0000	0.5527	0.3861	0.4273	0.4123	0.4807
Item82	0.4553	0.5141	0.4706	0.5418	0.5527	1.0000	0.4426	0.4790	0.4755	0.5247
Item84	0.3834	0.4458	0.3893	0.4226	0.3861	0.4426	1.0000	0.5639	0.5157	0.5509
Item85	0.4053	0.4344	0.4144	0.4583	0.4273	0.4790	0.5639	1.0000	0.5074	0.5513
Item87	0.3538	0.4328	0.4186	0.4324	0.4123	0.4755	0.5157	0.5074	1.0000	0.6158
Item88	0.4372	0.5119	0.4830	0.4970	0.4807	0.5247	0.5509	0.5513	0.6158	1.0000
Item89	0.4406	0.5696	0.5074	0.5331	0.4667	0.5104	0.5068	0.5481	0.5674	0.7183
Item91	0.4489	0.5829	0.5039	0.5412	0.4563	0.4872	0.4455	0.5343	0.5125	0.6530

The correlations are estimated by REML method.

Cronbach's α

	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Entire set	0.9204	

Excluded

Col	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Item77	0.9172	
Item78	0.9128	
Item79	0.9142	
Item80	0.9123	
Item81	0.9166	
Item82	0.9136	
Item84	0.9160	
Item85	0.9146	
Item87	0.9151	
Item88	0.9111	
Item89	0.9107	
Item91	0.9115	

e.) Passionate

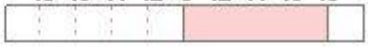
Multivariate

Correlations

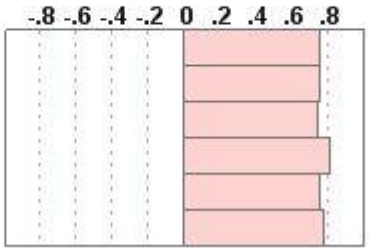
	Item96	Item97	Item98	Item99	Item100	Item101
Item96	1.0000	0.6315	0.5765	0.2745	0.3926	0.3592
Item97	0.6315	1.0000	0.5805	0.2596	0.4409	0.3342
Item98	0.5765	0.5805	1.0000	0.3366	0.4601	0.3853
Item99	0.2745	0.2596	0.3366	1.0000	0.3725	0.3264
Item100	0.3926	0.4409	0.4601	0.3725	1.0000	0.4783
Item101	0.3592	0.3342	0.3853	0.3264	0.4783	1.0000

The correlations are estimated by REML method.

Cronbach's α

	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Entire set	0.8013	

Excluded

Col	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Item96	0.7592	
Item97	0.7589	
Item98	0.7512	
Item99	0.8102	
Item100	0.7624	
Item101	0.7812	

f.) Perseverant

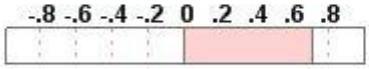
Multivariate

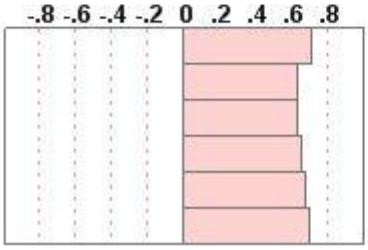
Correlations

	Item108	Item109	Item110	Item111	Item114	Item103
Item108	1.0000	0.4007	0.2596	0.2005	0.1790	0.1956
Item109	0.4007	1.0000	0.5163	0.4076	0.3383	0.2415
Item110	0.2596	0.5163	1.0000	0.5356	0.3972	0.3160
Item111	0.2005	0.4076	0.5356	1.0000	0.2932	0.2675
Item114	0.1790	0.3383	0.3972	0.2932	1.0000	0.2010
Item103	0.1956	0.2415	0.3160	0.2675	0.2010	1.0000

The correlations are estimated by REML method.

Cronbach's α

	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Entire set	0.7120	

Excluded Col	**α**	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Item108	0.7107	
Item109	0.6320	
Item110	0.6414	
Item111	0.6600	
Item114	0.6867	
Item103	0.7077	

g.) Purposeful

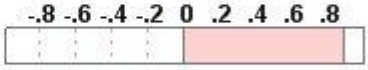
Multivariate

Correlations

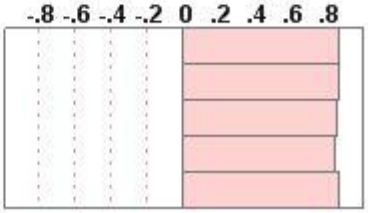
	Item123	Item125	Item126	Item127	Item128
Item123	1.0000	0.5877	0.6245	0.5904	0.5513
Item125	0.5877	1.0000	0.6623	0.5707	0.5097
Item126	0.6245	0.6623	1.0000	0.6849	0.5789
Item127	0.5904	0.5707	0.6849	1.0000	0.8100
Item128	0.5513	0.5097	0.5789	0.8100	1.0000

The correlations are estimated by REML method.

Cronbach's α

	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Entire set	0.8894	

Excluded

Col	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Item123	0.8749	
Item125	0.8763	
Item126	0.8589	
Item127	0.8492	
Item128	0.8671	

3.) Orderliness Sub-Cluster

a.) Consistent

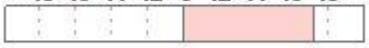
Multivariate

Correlations

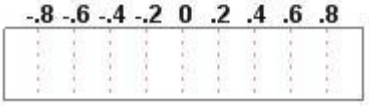
	Item131	Item132
Item131	1.0000	0.5688
Item132	0.5688	1.0000

The correlations are estimated by REML method.

Cronbach's α

	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Entire set	0.7231	

Excluded

Col	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Item131	.	
Item132	.	

b.) Disciplined

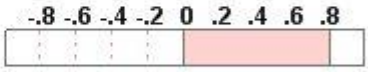
Multivariate

Correlations

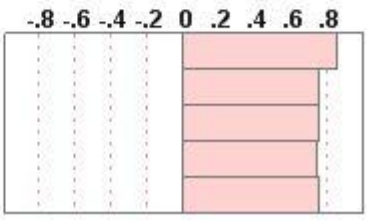
	Item136	Item137	Item138	Item139	Item140
Item136	1.0000	0.3718	0.3650	0.3162	0.3061
Item137	0.3718	1.0000	0.5539	0.6885	0.5481
Item138	0.3650	0.5539	1.0000	0.6299	0.5498
Item139	0.3162	0.6885	0.6299	1.0000	0.6859
Item140	0.3061	0.5481	0.5498	0.6859	1.0000

The correlations are estimated by REML method.

Cronbach's α

	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Entire set	0.8138	

Excluded

Col	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Item136	0.8593	
Item137	0.7573	
Item138	0.7624	
Item139	0.7451	
Item140	0.7643	

c.) Meticulous

Multivariate

Correlations

	Item151	Item152	Item153	Item154	Item155	Item160	Item161
Item151	1.0000	0.4328	0.4484	0.4206	0.5720	0.4858	0.4566
Item152	0.4328	1.0000	0.6867	0.5130	0.5310	0.4739	0.4942
Item153	0.4484	0.6867	1.0000	0.5705	0.5465	0.4703	0.5157
Item154	0.4206	0.5130	0.5705	1.0000	0.5389	0.4544	0.4947
Item155	0.5720	0.5310	0.5465	0.5389	1.0000	0.5349	0.6220
Item160	0.4858	0.4739	0.4703	0.4544	0.5349	1.0000	0.5821
Item161	0.4566	0.4942	0.5157	0.4947	0.6220	0.5821	1.0000

The correlations are estimated by REML method.

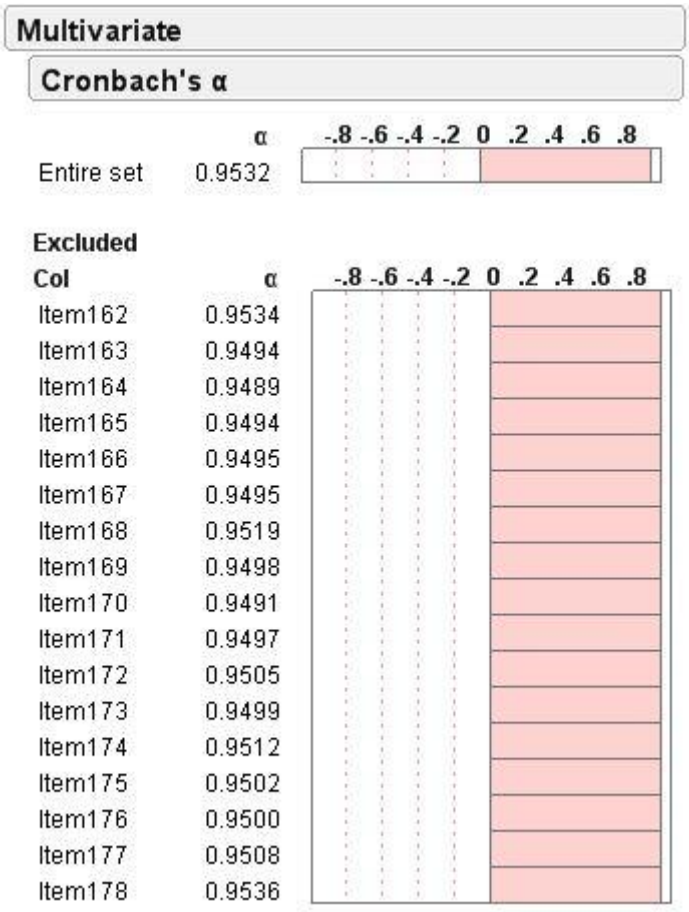
Cronbach's α

	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Entire set	0.8807	

Excluded

Col	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Item151	0.8727	
Item152	0.8623	
Item153	0.8581	
Item154	0.8666	
Item155	0.8564	
Item160	0.8665	
Item161	0.8619	

d.) Organised


Multivariate
Cronbach's α
α
-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Entire set 0.9532
Excluded
Col α
Item162 0.9534
Item163 0.9494
Item164 0.9489
Item165 0.9494
Item166 0.9495
Item167 0.9495
Item168 0.9519
Item169 0.9498
Item170 0.9491
Item171 0.9497
Item172 0.9505
Item173 0.9499
Item174 0.9512
Item175 0.9502
Item176 0.9500
Item177 0.9508
Item178 0.9536

e.) Punctual

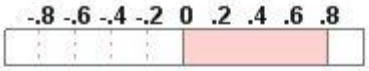
Multivariate

Correlations

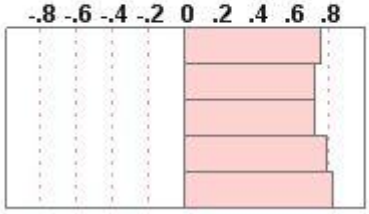
	Item183	Item184	Item185	Item186	Item188 2
Item183	1.0000	0.6546	0.5252	0.3998	0.3339
Item184	0.6546	1.0000	0.6827	0.4542	0.4318
Item185	0.5252	0.6827	1.0000	0.5270	0.4455
Item186	0.3998	0.4542	0.5270	1.0000	0.2660
Item188 2	0.3339	0.4318	0.4455	0.2660	1.0000

The correlations are estimated by REML method.

Cronbach's α

	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Entire set	0.8029	

Excluded

Col	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Item183	0.7600	
Item184	0.7245	
Item185	0.7287	
Item186	0.7889	
Item188 2	0.8228	

f.) Tidiness (personal)

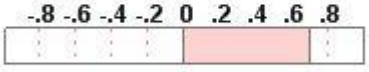
Multivariate

Correlations

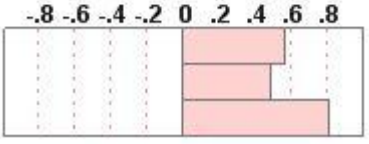
	Item192	Item194	Item197
Item192	1.0000	0.6889	0.3503
Item194	0.6889	1.0000	0.4282
Item197	0.3503	0.4282	1.0000

The correlations are estimated by REML method.

Cronbach's α

	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Entire set	0.7028	

Excluded

Col	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Item192	0.5668	
Item194	0.4955	
Item197	0.8152	

g.) Tidiness (environment)

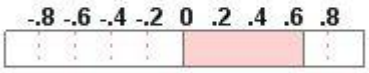
Multivariate

Correlations

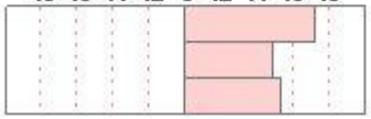
	Item193	Item202	Item203
Item193	1.0000	0.3753	0.3336
Item202	0.3753	1.0000	0.5712
Item203	0.3336	0.5712	1.0000

The correlations are estimated by REML method.

Cronbach's α

	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Entire set	0.6756	

Excluded

Col	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Item193	0.7271	
Item202	0.4916	
Item203	0.5365	

h.) Thorough

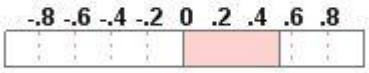
Multivariate

Correlations

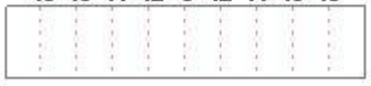
	Item210	Item211 2
Item210	1.0000	0.3682
Item211 2	0.3682	1.0000

The correlations are estimated by REML method.

Cronbach's α

	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Entire set	0.5380	

Excluded

Col	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Item210	.	
Item211 2	.	

4.) Self–disciplined Sub-cluster

a.) Obedient

Multivariate

Correlations

	Item220	Item221	Item222	Item223
Item220	1.0000	0.5663	0.3691	0.3883
Item221	0.5663	1.0000	0.5278	0.4143
Item222	0.3691	0.5278	1.0000	0.4759
Item223	0.3883	0.4143	0.4759	1.0000

The correlations are estimated by REML method.

Cronbach's α

	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Entire set	0.7630	

Excluded Col	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Item220	0.7209	
Item221	0.6739	
Item222	0.7045	
Item223	0.7321	

b.) Naughty

Multivariate

Correlations

	Item214 2	Item215 2	Item216 2	Item218 2
Item214 2	1.0000	0.3149	0.3532	0.2386
Item215 2	0.3149	1.0000	0.4114	0.3491
Item216 2	0.3532	0.4114	1.0000	0.2954
Item218 2	0.2386	0.3491	0.2954	1.0000

The correlations are estimated by REML method.

Cronbach's α

	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Entire set	0.6614	

Excluded Col	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Item214 2	0.6201	
Item215 2	0.5588	
Item216 2	0.5636	
Item218 2	0.6282	

c.) Rebellious

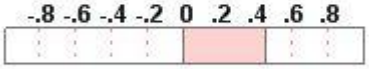
Multivariate

Correlations

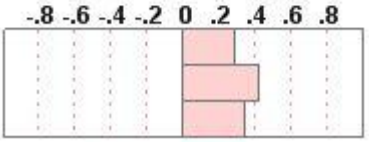
	Item224 2	Item228 2	Item230 2
Item224 2	1.0000	0.2084	0.2809
Item228 2	0.2084	1.0000	0.1800
Item230 2	0.2809	0.1800	1.0000

The correlations are estimated by REML method.

Cronbach's α

	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Entire set	0.4528	

Excluded

Col	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Item224 2	0.2946	
Item228 2	0.4251	
Item230 2	0.3450	

d.) Rule-conscientious

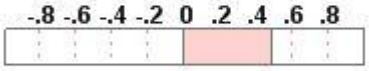
Multivariate

Correlations

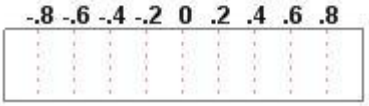
	Item229 2	Item234 2
Item229 2	1.0000	0.3270
Item234 2	0.3270	1.0000

The correlations are estimated by REML method.

Cronbach's α

	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Entire set	0.4923	

Excluded

Col	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Item229 2	.	
Item234 2	.	

5.) Thoughtlessness Sub-cluster

a.) Absent minded

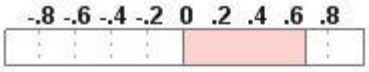
Multivariate

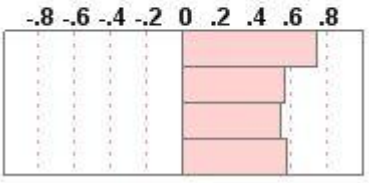
Correlations

	Item241 2	Item242 2	Item243 2	Item244 2
Item241 2	1.0000	0.2450	0.2534	0.2584
Item242 2	0.2450	1.0000	0.5589	0.4320
Item243 2	0.2534	0.5589	1.0000	0.4887
Item244 2	0.2584	0.4320	0.4887	1.0000

The correlations are estimated by REML method.

Cronbach's α

	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Entire set	0.6762	

Excluded Col	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Item241 2	0.7451	
Item242 2	0.5678	
Item243 2	0.5483	
Item244 2	0.5861	

b.) Planful

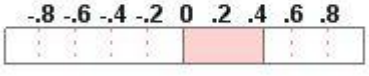
Multivariate

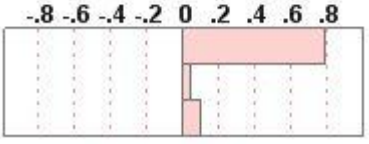
Correlations

	Item248	Item249	Item250
Item248	1.0000	0.0530	0.0208
Item249	0.0530	1.0000	0.6595
Item250	0.0208	0.6595	1.0000

The correlations are estimated by REML method.

Cronbach's α

	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Entire set	0.4508	

Excluded Col	α	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
Item248	0.7935	
Item249	0.0402	
Item250	0.0982	