An Empirical Analysis of the Representation of Lower-order Facets of the Big Five Personality Dimensions

Dion Greenidge, BA., MSc.

Thesis submitted to the University of Nottingham for the degree of Doctor of Philosophy

December 2013

Abstract

In the field of personality psychology there is some consensus among researchers that human personality, at the broadest level, can be described in terms of five fundamental personality dimensions. Universally, these personality dimensions are referred to as the "Big Five" model or the Five Factor Model (FFM) of personality: Extraversion, Conscientiousness, Agreeableness, Emotional Stability versus Neuroticism, and Intellect or Openness to Experience. However, currently, there is little conceptual or empirical consensus about a meaningful taxonomy of lower-order facets that make up each of the Big Five personality factors. This thesis sought to identify a parsimonious and replicable taxonomy of lower-order facets of the Big Five personality factors, and test the lower-order facet structure for construct and criterion-related validity. Based on the US Eugene-Springfield community sample (ESCS) (N =375), Study 1 examined facet scale scores from nine widely used personality inventories using Exploratory Factor Analysis in order to identify a shared overall lower-order structure for each of the Big Five personality domains. Factor analyses of 162 facet scales revealed 29 facets for the Big Five which demonstrated good convergent validity. However, some facets (e.g. traditionalism, peacefulness, trust) showed less clear patterns of discriminant validity, and thus appear to be compound traits or blends of two or more Big Five factors. In Study 2, a new 232-item Big Five instrument, the Hierarchical Personality Assessment Questionnaire (HPAQ), was developed to measure the 29 lower-order facets derived in Study 1. In the development phase of HPAQ, the factor scores for the 29 facets from Study 1 were correlated with the International Item Pool (Goldberg, 1999) in order to generate an initial pool of items. An initial pool of 348 IPIP items to mark the 29 facets was then administered to a large sample of undergraduate and postgraduate students at a University in the English-speaking

Caribbean (N = 778) with the intention of choosing 8 items that best marked each of the facets. Additionally, the HPAQ was validated in a second sample of undergraduate and postgraduate students (N = 807) against the NEO-PIR and its psychometric properties were further examined. The development and validation of the HPAQ was a first step in moving towards Study 3. Study 3 investigated the differential criterion-related validity of the 29 HPAQ lower-order facets in the prediction of job performance criteria (task performance, counterproductive work behaviour, and organisational citizenship behaviours). In addition, the incremental validities of the 29 lower-order facets in the prediction of job performance criteria were also examined. Overall, Study 3 found that the 29 lower-order facets demonstrated differential criterion-related validity and provided incremental validity beyond the global Big Five factors in predicting the job performance criteria and vice versa. Overall, this thesis empirically derives an initial taxonomy of lower-order facets of the Big Five personality factors based on nine personality inventories and developed a new Big Five personality instrument to measure explicitly this lower-order facet structure. The theoretical and practical implications of these results, limitations, and suggestions for future research are discussed.

Acknowledgements

First and foremost, I would like to express my sincerest gratitude to my PhD supervisor Dr. Iain Coyne for his continuous guidance and support of my PhD studies and research. Dr. Coyne's mentorship, good advice, encouragement, and friendship have made the PhD process a truly incredible learning experience for me. Dr. Coyne also took the time to foster my professional development and for this I am truly grateful.

I would like to acknowledge the Department of Management Studies, University of the West Indies, where I am currently a member of faculty for providing necessary financial support for this research in the purchasing of research materials and equipment. I also thank the staff of the Department of Management Studies for their support and encouragement since the start of my PhD studies, especially Dr. Philmore Alleyne, Dr. Joseann Knight, Dr. Glenda Gay, Dr. Akhentoolove Corbin, Dr. Justin Robinson, Professor Betty-Jane Punnett, Mrs. Neila Hinkson, Ms. Monica Smith, and Ms. Deborah Howard.

I would also like to express thanks to all those students and the organisations who took part in my research. I am especially grateful to Kareem Payne and Randy Warner for assisting me with the collection of data, and Kathy–Ann Greenidge, Renaldo Fletcher, and Mavis Clarke for assisting me with data entry.

I am most grateful to Professor Lewis Goldberg, Oregon Research Institute, for providing me with Eugene-Springfield (Oregon) Community Sample data without which this thesis would not have been possible. Professor Goldberg's advice, not to mention his unsurpassed knowledge of personality research has been invaluable.

I would also like to extend my deepest appreciation to my friends, who have been an immense source of inspiration throughout my PhD studies. I especially would like to acknowledge

Dwayne Devonish and Dr. Cheryl Cadogan-McClean whose moral support and friendship have been invaluable on both an academic and personal level, for which I am extremely grateful.

Last, but by no means least, I would like to thank my family for their endless and unconditional support and encouragement throughout my PhD studies and my life.

Table of Contents

List of Tables

Chapter 1: Introduction

1.1 The Value of Personality in Personnel Selection

Since the late twentieth century personality research has impacted significantly on the practice and science of industrial-work-organisational psychology (Hough & Ones, 2001). Moreover, personality variables are now acknowledged as critical features in predicting and understanding individual, team, and organisational performance (Hough & Ones, 2001). Schmidt and Hunter (1998) opined that the ultimate goal of personnel selection research is to identify and validate predictors that will differentiate good performers from poor performers.

Previous to the mid-1980's, the majority of the reviews on the value of personality dimensions in employee selection were far from encouraging and concluded that the validity of personality inventories as a predictor of job performance is rather small in magnitude (Guion & Gottier, 1965; Lent, Aurbach, & Levin, 1971; Reilly & Chao, 1982; Schimitt, Gooding, Noe, Kirsh, 1984). However, at the time that these early reviews were conducted, there was no agreement within the field of personality psychology on a taxonomy for classifying personality traits. Some researchers have suggested that the lack of a common personality framework was a contributing factor to the low predictive validity of personality reported in those early reviews (Barrick & Mount, 1991; Hough, 1992; Mount & Barrick, 1995). By the 1990's, consensus among researchers emerged that human personality, at the broadest level, can be described in terms of five fundamental personality dimensions, universally referred to as the "Big Five" factor structure or the Five Factor Model (FFM) (Digman, 1990; John, 1990; McCrae & John, 1992). Today, the Big Five framework is the most widespread and accepted classification system for personality traits

(Costa & Macrae, 1994; Digman, 1990; Goldberg, 1993a; John & Srivastava, 1999).

The emergence of the five-factor model has led to resurgence in personality assessment as a selection tool (Woods, 2003) and transformed the debate about using personality measures to predict success in the workplace (Goldberg, 1993a; Landy, Shankster, & Kohler, 1994; Robertson & Smith, 2001). This renaissance is owed in great deal to meta-analytic studies examining the relationship between personality and job performance accruing strong evidence that personality measures, when classified within the FFM, are valid predictors of job performance across a wide array of occupations, jobs, and situations (Barrick & Mount, 1991; Barrick, Mount, & Judge, 2001; Hurtz & Donovan, 2000; Ones & Viswesvaran, 2001; Salgado, 1997, 2002, 2003; Tett, Jackson, & Rothstein, 1991). Moreover, this evidence of prediction is mostly attributed to Conscientiousness and Neuroticism or Emotional stability dimensions (Barrick et al., 2001). Salgado's (2003) meta-analytic study found that for Conscientiousness and Emotional Stability, the FFM-based inventories had greater criterion validity than the non FFM-based inventories. As a result, he recommended that practitioners should use FFM-based inventories in order to make personnel selection decisions. In addition, the Big Five personality dimensions have been shown to have incremental validity in the prediction of job performance above and beyond that accounted for by other personnel selection methods such as cognitive ability (Avis, Kudisch, & Fortunato, 2002; Mchenry, Hough, Toquam, Hanson, & Ashworth, 1990; Salgado, Viswesvaran, & Ones, 2002; Schmidt & Hunter, 1998), biodata (McManus & Kelly, 1999; Mount, Witt, & Barrick, 2000; Salgado et al., 2002; Schmidt & Hunter, 1998), assessment centers (Goffin, Rothstein, & Johnston, 1996), and interviews (Cortina, Goldstein, Payne, Davison, & Gilliland, 2000).

1.2 Rationale of the Thesis

In the selection of a personality measure, researchers should be more explicit about the role of theoretical development and predictive validity (Barrick & Mount, 2005). In this respect, researchers will need to draw on hierarchically structured taxonomies that comprehensively capture the basic lower-order facets of personality, and the more global, higher-order factors (Barrick & Mount, 2005). This structural representation offers high efficiency (parsimony) at the broader-bandwidth level and higher fidelity (predictive accuracy) at the narrower level (Saucier & Goldberg, 2003). Numerous measures have been construed to measure personality traits in organisational settings. Predominately, there is some convergence between these measures, but these taxonomies also differ to some extent in the breadth of the various scales (Ones & Viswesvaran, 1996; Ones & Anderson, 2002). Moreover, the taxonomic structure of personality variables has an effect on the magnitude and nature of the personality-criteria relationships (Hough & Furnham, 2003).

At present, there is little conceptual or empirical consensus in the personality literature about a meaningful taxonomy of lower-order facets that make up each of the broad Big Five personality factors (Costa & McCrae, 1998; Roberts, Chernyshenko, Stark, & Goldberg, 2005; Saucier & Ostendorf, 1999). Moreover, based on a comprehensive review of the literature, Ozer and Benet-Martinez (2006) concluded that “there is no consensus about what might constitute even the beginning of a comprehensive list of narrow traits” (p. 8.3). Psychologists should explore lower level personality traits because they provide a comprehensible theoretical basis for the Big Five, and represent important individual differences (Briggs, 1989). Identifying an adequate taxonomy of lower-order facets that represent each of the Big Five personality factors is significant to the understanding of the relationships between personality variables

and various criteria of interest to industrial-work-organisational psychologists (Hough & Furnham, 2003; Hough & Ones, 2001; Hough & Oswald, 2000). Similarly, DeYoung, Quilty, and Peterson (2007) purported that new knowledge concerning the lower-level structure of the Big Five personality model could have important implications for understanding the associations between the Big Five personality factors and a wide variety of other phenomena. Furthermore, lower-level facets with high and low criterion-related validities are contained within the five broad factors, which dilute the criterion-related validity of the factors (Hough & Oswald, 2000).

Further, Hough and colleagues advocated that an adequate lower-order structure of the five broad factors might reveal important differences in the way that lower-order facets may possibly relate differently to criteria (Hough & Furnham, 2003; Hough & Ones, 2001; Hough & Oswald, 2000). Barrick and Mount (2005) argued that the development of a lower level taxonomy of personality "will enable personality research to lift the cloud originating from the proliferation of personality constructs that currently obscures meaningful relations between lower level personality and criterion constructs" (p. 369). Moreover, identifying a replicable underlying structure of Big Five factors is important because narrower traits are often better predictors of behaviour outcomes than broad personality factors (Ashton, 1998; Mershon & Gorsuch, 1988; Paunonen, 1998; Paunonen & Ashton, 2001a). Researchers have called for the use of narrow personality measures to increase criterion-related validity, above that achieved by the Big Five (Ashton, 1998; Paunonen, 1998; Paunonen, Rothstein, & Jackson, 1999; Schneider, Hough, & Dunnette, 1996). In addition, due to moderate intercorrelations between lower-order facets, when researchers or practitioners compute an average global score for a Big Five personality dimension based on individual scores on lower-order facets, they should be cautious in interpreting these global

scores for the mere reason that a variety of personality profiles could be observed for the same average global score (Roberts et al, 2005). The basic argument is that even though some lower-order facets of a broad personality factor may predict a criterion, others may not. In this respect, use of a broad personality measure effectively averages predictive and non predictive lower-order facets. As a result, the broad personality measure's criterion-related validity with the criterion will be higher than that of the non-predictive facets and lower than that of the most predictive facets. This leads to theoretical confusion: the broad personality factor is thought to predict the criterion, when in actuality the criterion is predicted by one facet and not by another (Schneider et al., 1996; Smith & McCarthy, 1995). Thus, taxonometric work in the area of Big Five personality constructs is critical for the future undertaking of work-related and other applied research contexts (Roberts et al, 2005).

The primary objective of this thesis is to investigate the shared overall lower-order structure of the Big Five personality domains based on nine widely used personality inventories, which have varying frameworks that converged with the Big Five or FFM and have been applied in various contexts. More specifically, scales scores from nine personality inventories related to each of the Big Five personality domains were factor analysed separately in order to identify a shared overall structure for each of the Big Five domains. These measures are the Jackson Personality Inventory – Revised (JPI-R; Jackson, 1994), the revised NEO Personality Inventory (NEO-PIR; Costa & McCrae, 1992a), 16 Personality Factor Questionnaire Fifth Edition (16PF5: Conn & Rieke, 1994), Hogan Personality Inventory (HPI; Hogan & Hogan, 1992), AB5C Scales from the International Item Pool (ACB5C-IPIP; Goldberg, 1999), the Multidimensional Personality Questionnaire (MPQ; Tellegen, 1982, Tellegen & Waller, 2008), the Temperament and Character

Inventory-Revised (TCI-R; Cloninger, 1999; Cloninger, Przybeck, Svrakic,& Wetzel, 1994), the Six-Factor Personality Questionnaire (6FPQ; Jackson, Paunonen, & Tremblay, 2000), and the HEXACO Personality Inventory (HEXACO-PI; Lee & Aston, 2004). In discovering the Big Five, systematic analysis of personality inventories provided confirmation that the Big Five was a useful higher-order taxonomy for the domain of personality traits (Roberts et al., 2005). To date, there has been one study that explored the lower-level structure of the Big Five, namely the Conscientiousness domain (Roberts et al., 2005), through a comprehensive assessment of several personality scales. This thesis is the first research, to the best of this author's knowledge, to explore the lower-order structure of each of the Big Five domains using scales drawn from several validated personality inventories. Furthermore, this research includes the most personality inventories ever to be used in one study to examine the lower-order structure of the Big Five.

Given that many researchers have postulated that narrower traits are better predictors than broad personality traits, and call for the use of narrow personality measures to increase criterion-related validity above and beyond that achieved by broad personality traits (For example, Ashton, 1998; Paunonen, 1998), this thesis also investigates the incremental validity of the derived lower-order facets above and beyond the Big Five personality factors in predicting three job performance criteria. Theoretically, task performance, organisational citizenship behaviour (OCB) and counterproductive work behaviours (CWB) have been identified as components of overall job performance (Rotundo & Sackett, 2002). These three dimensions of overall job performance were measured in this thesis. Moreover, this thesis examines the differential predictive validity of the derived lower-order facets in predicting task performance, OCB, and CWB. This allows for the mapping of

lower-level facets to task performance, OCB, and CWB, thereby providing significant benefits to practitioners and employers in the personnel selection context, as they would be able to select scales that would be most relevant to the criteria of interest. Furthermore, this thesis serves as one of the few research efforts to explore the differential predictive validity of lower-level facets of all the Big Five personality dimensions in predicting task performance, OCB, and CWB as well as assess the incremental validity of lower-level facets above the Big Five personality factors in predicting these said criteria.

1.3 Significance of Study

This thesis provides new knowledge about the lower-level structure of the Big Five. It empirically derives lower-order taxonomy of the Big Five personality factors based on nine personality inventories, and thus may constitute the beginning of a comprehensive framework of lower-order facets of the trait domain of the Big Five. Moreover, the lower-order structure of the Big Five discovered in this thesis will be critical for understanding important relationships between personality variables and theoretically-relevant criteria. More specifically, the current thesis enhances our understanding of the relationship between personality variables and multidimensional job performance criteria. It demonstrates how the twenty-nine facets of the Big Five discovered here are differentially related to task performance, citizenship performance, and CWB as well as provides support for the incremental validity of narrow traits above and beyond the broad Big Five personality dimensions. Despite the wide debate on the relative value of broad and narrow traits for predicting job performance criteria, empirical research assessing the differential criterion-related validity of narrow traits in predicting multidimensional job performance criteria have been limited. Bergner, Neubauer, & Kreuzthaler (2010) purported that

the validity of narrow traits in predicting job performance has not been adequately addressed. Where studies have explored such effects, they have tended to focus only on narrow traits of Conscientiousness. This thesis provides a response to the call for future research exploring the interrelationships among facets of the other four Big Five personality factors and the usefulness of these narrow traits in predicting a wide array of job performance criteria (Dudley, Orvis, Lebiecki, & Cortina, 2006).

In addition, predictive validity is the most important property of a personnel assessment method (Schimdt & Hunter, 1998). Predictive validity coefficients are often converted to dollar-payoff terms that can be understood by managers by means of a utility analysis; an organisation receives greater financial returns from a selection test with greater predictive validity than a less valid test (Arvey & Faley, 1992; Cascio, 1991). Thus, from a practical point of view, the findings of this thesis suggest that both narrow and broad bandwidth measures have utility for personnel selection contexts. Therefore, the relative value of narrow traits or broad Big Five personality factors for personnel selection will require the judicious consideration of the likely theoretical or conceptual relations between the particular personality variable or variables (regardless of broad or narrow) and the particular job performance criteria (see O'Neill, Goffin, & Tett, 2009; Rothstein & Goffin, 2006). Furthermore, it may be necessary for personnel selection practitioners to perform personality based job analysis within a specific occupational category to properly select relevant personality variables, and thus a personality measure to use for that particular selection context.

A major contribution of the current thesis is the development of a new Big Five measure, the Hierarchical Personality Assessment Questionnaire (HPAQ), a hierarchical taxonomy, which comprehensively captures the basic lower-level facets of the Big

Five domains, and the more global, higher-order Big Five personality factors. Thus, the HPAQ will offer high efficiency (parsimony) at the broader-bandwidth level and higher fidelity (predictive accuracy) at the narrower level (Saucier & Goldberg, 2003). In addition, such a structural framework, providing a standard set of lower-order facets, could promote cooperative research and facilitate communication among investigators. This new Big Five personality instrument could be made available for future applied research, as well as for use in the personnel selection context.

1.4 Structure of the Thesis

Chapter 2 of this thesis provides a selective review of literature on the Big Five model or Five-Factor model of personality and the relationship between the broad Big Five personality factors and narrow traits of the Big Five and job performance criteria. Specifically, this chapter critically reviews the literature on the Big five personality factors, the theoretical perspectives of the Five-Factor model of personality and the Bandwidth-Fidelity Dilemma. The chapter further discusses, task performance, OCB, and CWB constructs, and their relationship with the Big Five personality factors and narrow traits of the Big Five factors.

Chapter 3 outlines the methodology, presents the results and discusses the findings and implications of Study 1 after taking into consideration the theoretical and empirical literature. Study 1 empirically derives a lower-order structure of the Big Five by factor analysing scales drawn from nine widely used personality inventories, and thus addresses the main objective of this thesis.

Chapter 4 covers the methodology, results and discussion of the findings of Study 2. In Study 2, a new Big Five personality measure, the Hierarchical Personality Assessment Questionnaire (HPAQ), was developed to include scales that measure the lower-

order facets derived in Study 1. Also, in Study 2, the HPAQ was validated against an extensively used Big Five measure, the NEO-PIR. The results of Study 1 indicated that none of the nine personality inventories used measures all of twenty-nine lower-order facets derived here. Thus, the development of a new Big Five personality instrument to measure the twenty-nine lower-order facets have the advantage of allowing the twenty-nine lower facets to be assessed in other samples. Specifically, such an instrument would make possible criterion-validity research involving the twenty-nine lower facets and various criteria. Therefore, Study 2 is the first step in moving towards Study 3.

Chapter 5 outlines the methodology, presents the results and discusses the findings and implications of Study 3. In Study 3, the differential criterion-related validity of the lower-order facets in predicting task performance, OCB, and CWB was investigated. Additionally, the incremental validity of the lower-order facets above and beyond the broad Big Five factors in predicting the above mentioned job performance criteria was also examined. Appendix A presents a tabular summary of the data analysis strategies used across the three studies mentioned above.

Finally, chapter 6 concludes the thesis by providing a discussion that integrates the findings of the three studies in the context of the literature. It also offers theoretical and practical implications and limitations of the study, as well as draws attention to areas for future research.

Chapter 2: Literature Review

2.1 The Big Five Model or Five Factor Model of Personality

2.1.1 The emergence of the five factors. The Big Five factor structure or Five-Factor model (FFM) of human personality did not originate from a particular theoretical perspective but emerged from the factor analytic approach in personality research from two traditions – the questionnaire and psycholexical traditions (De Raad & Perugini, 2002; Woods, 2003). Research from the psycholexical tradition – the study of personality traits in natural language – revealed that five factor solutions were frequently extracted from the English trait-descriptive adjectives sets (Golberg 1992, 1993a) and from trait-descriptive adjective sets in numerous other languages (Saucier, Hampson, & Goldberg, 2000). Research from cross-cultural studies within the questionnaire tradition – factor analytic studies of personality inventories – also extracted five factor solutions from a number of different languages (McCrae & Costa, 1997). Although, the names “Big Five” model and “Five Factor Model” are often used interchangeably to represent a five factor personality structure that is quite similar, they have been derived from the psycholexical and questionnaire tradition respectively (De Raad & Perugini, 2002; Saucier & Golberg, 1998).

Early on, Cattell (1947, 1948) in the development of his model of personality structure, reduced 4500 trait-descriptive terms derived from Allport and Odbert’s (1936) compendium of trait descriptive words to a set of 35 highly complex bipolar variables through factor analysis and a clustering approach (i.e. analysing the covariance matrix). The 35 bipolar variables were described in terms of opposing tendencies, with a composite set of between two to five adjectives and phrases comprising each extreme. Cattell conducted several studies applying factor analyses using oblique rotation on the correlation matrices among these 35 variables, and

concluded he had identified 12 oblique rotated factors replicated across self-ratings, other ratings, and objective test. Eventually, Cattell settled upon a sixteen factor model of personality (Cattell, 1973). However, most studies later reanalysing data on which Cattell based his system have not confirmed the number and nature of the factors he proposed (Fiske, 1949; Tupes & Christal, 1961, reprinted in 1992; Digman, 1990; Goldberg, 1993a). Nevertheless, other researchers were stimulated by Catell's work, and the availability of a short list of variables, to examine the dimensional structure of personality (John & Srivastava, 1999).

In an attempt to replicate Cattell's (1947) personality factors, Fiske (1949) analysed a set of 22 of Cattell's variables using graphical rotation and oblique rotation, but was unable to identify more than a five-factor solution (not the original 12 oblique factors proposed by Cattel). Fiske analysis found five factors replicated across samples of self-ratings, ratings by peers, and observer ratings, which he labelled as Social Adaptability, Conformity, Emotional Control, Inquiring Intellect, and Confident Self-expression. Fiske was apprehensive about naming the five factors as he believed that such an undertaking may constrict or distort our conceptualisation of each factors (Fiske, 1949). Moreover, Fiske named his five factors recurrent factors to highlight their similarity across the three samples.

Ernest Tupes and Raymond Christal's (1961, 1992), dubbed the true fathers of the Big Five structure (Goldberg, 1993a), work on the structure of personality has been recognised as being "pivotal" and having "laid the foundations" for research on the five-factor model (McCrae, 1992, p. 217). Tupes and Christal (1961, 1992) investigated the structure of personality by reanalysing the correlation matrices from a number of studies that used sets of variables developed by Cattell (including Cattell 1947, 1948 and Fiske, 1949 correlations). They performed exploratory factor

analysis on eight different datasets, ranging from air force cadets with no more than a high school education to first-year graduate students. They recovered five personality factors in each dataset, which they labelled: Surgency, Agreeableness, Dependability, Emotional Stability, and Culture. Thus, this demonstrated the robustness of the five factor solution across studies and corroborated Fiske's (1949) finding of "five relatively and recurrent strong factors and nothing more of any consequence" (Tupes & Christal, 1992, p. 250).

Five-factor structures similar to the one proposed by Tupes and Christal have been replicated by Norman (1963), Borgotta (1964), Smith (1967), and Digman and Takemoto-Cocks (1981). Norman (1963) found evidence in support of a five-factor solution, based on the correlations of 20 peer rating scales from four samples of male undergraduate students, and concluded that five factors might represent "an adequate taxonomy of personality attributes" (p. 582). Borgatta (1964) collected self-ratings, peer rankings and peer-ratings in two studies, the subjects being sorority and fraternity members, and found five clear factors, which he labelled Assertiveness, Likeability, Responsibility, Emotionality, and Intelligence. Smith (1967) using 42 bipolar rating scales based on the work of Allport and Odbert (1936) and Cattell (1947, 1948), compared structures derived from factor analysis of the correlations of three separate samples of college first year students who were rated by other members of their study group and found five robust factors, which he interpreted as Extraversion, Agreeableness, Emotionality, Strength of Character, and refinement.

Digman and Takemoto-Chock (1981) conducted a reanalysis of the correlations of six studies based on ratings, including the classic work of Cattell (1947, 1948) and Fiske (1949), and produced further support for the robustness of the five-factor solution of the rating domain. These researchers concluded that the five-factor

structure first proposed by Fiske and later by Tupes and Christal (1961), and Norman (1963) represents an impressive theoretical structure: “regardless of whether teachers rate children, officer candidates rate one another, college students rate one another, or clinical staff members rate graduate trainees, the results are pretty much the same” (p. 164-165). They contended that the five-factor structure could serve as a broad framework for the myriad of personality constructs that have been proposed by theorists.

Some researchers have tested the presupposition held by Norman (1967) and others that studies employing a more representative subset of personality-descriptive terms greater than Cattell’s variables would identify dimensions beyond the five factors and have generally found no evidence for anything more complex than a five factor solution (for example, Goldberg, 1981, 1982, 1990). Norman (1967) expanded Allport and Odbert’s (1936) list of personality terms to 2,800 trait-descriptive terms, which he classified into 75 semantic categories. Goldberg (1990), using Norman´s (1967) listing, constructed a self-report inventory of 1, 710 trait-descriptive adjectives. He then obtained 75 scale scores for every subject by aggregating Norman’s categories and their intercorrelations were factor analysed. Goldberg’s results demonstrated robustness for five-factor solutions across different methods of factor extraction and rotation, but not for more complex solutions. In addition, Goldberg (1990) conducted two other studies obtaining self and peer ratings in four samples (two self-ratings and two peer ratings) and found that within each sample Big Five factor structures emerged. In fact, the Big Five factor structures that emerged in the self-ratings and peer-ratings samples were quite similar to each other and to the structure obtained in the study of Norman’s 75 categories using the comprehensive list of 1, 710 trait-descriptive terms. Goldberg’s (1990) analyses demonstrated that the original five broad factors remained virtually stable when more

than five factors were rotated and provided no support for replicable domains beyond the Big Five. Thus, evidence steadily mounted for a five-factor structure that underpins hundreds of personality traits (for example, Costa & McCrae, 1988a; Digman & Inouye, 1986; Goldberg, 1992; McCrae & Costa, 1987, 1989a, 1997; Saucier, 1997; Saucier & Goldberg, 1996a).

2.1.2 Description of the five factors. The most widely accepted labels for the proposed five orthogonal factors of human personality are those of Costa and McCrae (1992b) and include Neuroticism, Extraversion, Conscientiousness, Agreeableness, and Openness to Experience .The neuroticism versus emotional stability factor concerns preferences that relates to an individual's emotional stability and personal adjustment (Hollenbeck, et al., 2002; Seibert & Kramer, 2001). Thus, neuroticism is "a dimension of personality defined by stability and low anxiety at one end as opposed to instability and high anxiety at the other end" (Pervin, 1989, p. G-7). Moreover, neuroticism or emotional stability is the degree to which an individual is prone to experience negative affects such as sadness, anxiety, guilt, anger, disgust, hostility, and is not easily depressed, self-confident, untroubled versus worried and calm (Barrick & Mount, 1991; Boudreau, Boswell, Judge, & Bretz, 2001; Costa & McCrae, 1988a, 1992b). Some researchers have argued that neuroticism is a trait that encompasses negative emotionality, along with other tendencies associated with an underlying dimension – core self-evaluation –, including self-esteem, locus of control, and generalised self-efficacy (Judge & Bono, 2001; Judge, Erez, Bono, & Thoresen, 2002).

Individuals high on neuroticism are anxious, depressed, guilt-prone, easily frustrated, insecure (Caspi, Roberts, & Shiner, 2005), and are more vulnerable to daily stressors than those low on this factor (Gunthert, Cohen, & Armeli, 1999), are predisposed to

experiencing negative life events (Magnus, Diener, Fujita, & Pavot, 1993), are prone to negative appraisals of their environment, and use ineffective coping strategies to deal with stressful situations (Watson & Hubbard, 1996), are fixated with being aware of, coping with, and avoiding potential threats to self, whether real or fictional (Elliot & Thrash, 2002). An individual low in neuroticism is adaptable, calm, and not prone to extreme emotional reactions (Burger, 2008). Neuroticism has been found to be a relevant predictor of several behavioural and psychological phenomena at the individual level. For example, positive mood and negative mood (David, Green, Martin, & Suls, 1997), marital and sexual satisfaction (Fisher & McNulty, 2008), subjective well-being, happiness, and life-satisfaction (DeNene & Cooper, 1998), job satisfaction (Judge, Huller, & Mount, 2002), use of emotion-focus coping strategies (Bouchard, 2003; Mathews et al., 2006), work-family conflict, family-work conflict, psychological distress (Rantanen, Pulkkinen, & Kinnunen, 2005), and depressive and anxiety disorders (Wienstock & Whisman,2006).

Extraversion is the extent to which an individual is outgoing, assertive, energetic, talkative, gregarious, timid, and quiet (Costa & McCrae, 1992a; Hofstee, De Raad, & Golberg, 1992). Three possible core features of this factor has been identified in the theoretical and research literature: the tendency to frequently experience positive moods (Fleeson, Malanos, Achille, 2002) and positive emotionality (Watson & Clark, 1997), an underlying sensitivity to potential rewards (Lucas, Diener, Grob, & Shao, 2000), the tendency to behave in ways and at the same time enjoy those behaviours that act as a magnet for social attention (Ashton, Lee, & Paunonen, 2002). Depue and Collins (1999) argued that affiliation (engaging in and appreciating warm personal relationships) and agency (being assertive, influential, and socially dominant) are central components of extraversion. On the other hand, introversion typically symbolises

an absence of extraversion rather than be its opposite. Costa and McCrae (1992a) explained that “introverts are reserved rather than unfriendly, independent rather than followers, even-paced rather than sluggish” (p. 15). Studies have found that extraverts spend more time in social settings than introverts and tend to have more friends (Asendorpf & Wilpers, 1998) and find interpersonal interactions more rewarding because of their social facility (Watson & Clark, 1997). Additionally, research shows that the extraversion factor is a predictor of several behavioural and psychological phenomena. For example, leader emergence and leader effectiveness (Judge, Ilies, Bono, & Gerhardt, 2002), transformational and transactional leadership (Bono & Judge,2004), subjective well-being (Haynes & Joseph, 2003), physical ill health (Grant & Langan-Fox, 2007), exercise/physical fitness (Bogg, Voss, Wood, & Roberts, 2008), job stress (Penley & Tomaka, 2002), the use of problem-solving, cognitive restructuring, and support seeking coping strategies (Connor-Smith, & Flachsbart, 2007).

The conscientiousness factor refers to preferences associated with a self-control and self-discipline approach to thinking and behaving. Conscientiousness is the degree to which individuals are organized, determined, purposeful, plan oriented, efficient, achievement oriented, thorough, responsible, and reliable versus inefficient, undependable, lackadaisical, and disorganized (Burger, 2008; Caspi et al., 2005; Goldberg, 1990, 1992; Hofstee, et al., 1992; McCrae & Costa, 1989a; Salgado, 1997). Ashton and Lee (2001) postulated that conscientiousness can be viewed as “engagement within task-related behaviour” (p. 342), and in this regard represents preferences related to behaviours that have a propensity to improve efficiency or accuracy when completing tasks. Individuals with high conscientiousness are dependable, reliable, orderly, organized, risk adverse, high need achievers, attentive, careful, persistent, and can delay gratification (Burger, 2008; Caspi

et al., 2005; McCrae & John, 1992; Goldberg, 1990). An individual low in this factor tends to be undependable, absent-minded, careless, irresponsible, and can be easily distracted (Burger, 2008; Caspi, et al., 2005; Hofstee et al., 1992). Moreover, Conscientiousness has been found to be related to a number of behavioural and psychological phenomena. For example, job stress (Penley & Tomaka,2002), academic performance (Trapmann, Hell, Hirn, & Schuler, 2007; Wagerman & Funder, 2007), career success (Judge, Higgins, Thoresen, & Barrick,1999), general health dietary practices (Bogg, et al., 2008; Goldberg & Stycker, 2002), exercise/physical fitness (Bogg & Roberts, 2004; Courneya & Hellsten, 1998), risky health behaviours (Terracianno & Costa, 2004; Vollrath, Knoch, & Cassano, 1999),use of task-focused coping strategies (Mathews et al., 2006), and problem- solving and cognitive restructuring coping strategies (Conor-Smith & Flachsbart, 2007).

Agreeableness is the personality dimension that concerns preferences associated with interpersonal and socially humane aspects of personality such as cooperation, friendliness, and consideration. Ashton and Lee (2001) posited that agreeableness can be interpreted in terms of the trait, forgiveness (versus retaliation), that determines prosocial versus antisocial behaviour. Moreover, agreeableness is also characterised as being dominated by a communal orientation (John & Srivastava, 1999; Wiggins, 1991). Graziano and Eisenberg (1997) noted that the variances in the underlying motivation for maintaining a positive relationship with others can account for the structural and behavioural aspects of the agreeableness dimension. Agreeable individuals are describe as cooperative, trusting, altruistic, helping, generous, sympathetic, nurturant, flexible, forgiving, friendly, and polite (Caspi et al., 2005; Costa & McCrae, 1992a; Goldberg, 1990; McCrae & John, 1992). Whereas those individuals low in agreeableness are cold,

antagonistic, headstrong, self-centred, spiteful, sceptical of others, aggressive, rude, and manipulative (Burger, 2008; Caspi et al., 2005; Costa & McCrae, 1992a; Digman, 1990). Agreeableness has been shown to be related to a number of behavioural and psychological phenomena. For example, interpersonal relationships (Donnellan, Conger, & Bryant, 2004; Jensen-Campbell & Graziano, 2001), life satisfaction, marital satisfaction, social satisfaction (Heller, Watson, & Ilies, 2004), negative evaluations of social groups (Graziano, Bruce, Sheese, & Tobin, 2007), prosocial motivation (Graziano, Habashi, Sheese, & Tobin, 2007), and risky health behaviours (Hoyle, Fejfar, & Miller, 2000; Terraciano & Costa, 2004; Vollrath et al. 1999).

The Fifth of the Big Five factors, openness to experience is the most controversial of the Big Five personality traits (McCrae & Costa, 1997). The controversy among researchers relates to the conceptualisation of the internal structure of construct (Hough & Ones, 2001). Moreover, openness to experience is the least studied Big Five trait both inside and outside organizations (Judge & Bono, 2000). The factor has been labelled as intellect (Digman & Inouye, 1986; Goldberg, 1981; Hogan, 1983), intelligence (Borgatta, 1964), imagination (Saucier, 1994), and culture (Tupes & Christal, 1961/1992). Openness to experience concerns preferences that relate to intellectual curiosity, new ideas, novelty, imagination, and divergent thinking, culture, broad-mindedness, artistic, creative, and complexity of an individual's mental and experiential life (Burger, 2008; Costa & McCrae, 1992a; Goldberg, 1990; Hofstee et al., 1992; John & Srivastava, 1999). Ashton and Lee (2001) viewed openness to experience as "engagement within idea-related endeavours" (p. 342). Individuals high on openness to experience are open to new ideas, creative, intellectual, artistic, have cultural interests, and independent thinkers. An individual who is low this factor is conventional or narrow minded, traditional, and

unimaginative. In addition, research has shown that openness to experience is related to a number of behavioural and psychological phenomena. For example, fluid and crystallised cognitive ability (DeYoung, Peterson, & Higgins, 2005), creativity across several domains (Feist, 1998), academic performance (Chamorro-Premuzic & Furnham, 2008), entrepreneurial status (Zhao & Seibert, 2006), increases in depressive symptoms and self-esteem across a significant life transition (Kling, Ryff, Love, Essex, 2003), eating a more healthy diet (Bogg & Roberts, 2004; Bogg et al., 2008; Goldberg & Strycker, 2002), and interracial attitudes (Flynn, 2005).

2.1.3 Theoretical perspectives of the five factor model of personality. In the face of criticism that the Five-Factor model is atheoretical (Revelle, 1987; Wiggins, 1992), five theoretical perspectives have been set forth. These five theoretical perspectives within the FFM are the lexical theory or hypothesis (Saucier & Golberg, 1996b), five-factor theory (McCrae & Costa, 1996), interpersonal theory or the dyadic-interactional perspective by Wiggins and his Colleagues (Trapnell & Wiggins, 1990; Wiggins & Pincus, 1992; Wiggins & Trapnell, 1996), socioanalytic theory (Hogan, 1996), and the evolutionary theory or the social adaptation perspective (Buss, 1996). These theoretical perspectives are briefly summarised.

Personality traits are characterised by terms contained in all human languages. The practice of studying words to understand personality is based on the lexical hypothesis. There are two main tenets of the lexical hypothesis. The first tenet is based on the logic that the most important, significant, and widespread individual differences in human personality have over time become encoded as single attribute-descriptive terms such as trait adjectives and type nouns in some or all of the world's languages (Goldberg, 1981, 1990,1993a). The second tenet posits that the more important an

attribute-descriptive term in real world transaction, the greater the representation of that attribute in language (Saucier & Goldberg, 1996b, 2003) or “the more important is an individual difference in human transaction, the more languages will have a term for it” (Goldberg, 1981, p.142). In other words, the more important such variations are, the more people will notice them and talk of them, and the more likely they will be expressed as a single word (Briggs, 1992). In this respect, the Lexical hypothesis purports an argument that the Big Five personality factors are not necessarily equal in their importance and replicability; the relative importance of a factor depends on its salience in natural language (Saucier & Goldberg, 1996b). There is evidence to suggest that the three Big Five dimensions of Extraversion, Agreeableness, and Conscientiousness are more easily replicable than Emotional Stability and Intellect (Saucier, 1995).

Saucier and Goldberg (1996b) purported that the lexical perspective focuses on phenotypic personality characteristics that are better described as “attributes” than as “traits”. The lexical perspective describes a Big Five model of phenotypic personality characteristics (observable, surface characteristics) rather than genotypic constructs (underlying causal properties); in this regard, is a framework for description rather than explanation (Saucier & Goldberg, 1996b). Moreover, the Big Five factor structure based on the lexical hypothesis depicts dimensions of perceived personality (Saucier & Goldberg, 1996b). Furthermore, the lexical approach elucidates important and meaningful personality attributes that should be studied and explained by personality psychologists because characteristics that are fundamental, for social, cultural, or biological reasons are encoded in human language (John & Srivastava, 1999). However, trait psychologists have identified important distinctions that have not been encoded in lay adjectives, thus indicating that analyses of adjectives might not sufficiently

capture personality facets (Costa, McCrae, & Dye, 1991). Nevertheless, a minimum set of subcomponents required for a comprehensive hierarchical model of personality attributes can result from lexical studies (Saucier & Ostendorf, 1999). Therefore, lexical studies can produce necessary content validity criteria against which to check the comprehensiveness of any theorised classification such as the NEO-PI-R (Saucier & Ostendorf, 1999). In this regard, the lexical approach can have a positive impact on the theory of personality by elucidating which personality dimensions should be researched by psychologist.

McCrae and Costa's (1996, 1999) five-factor theory describes personality as a system in which personality traits influence individual psychological functioning through dynamic processes. There are four underlying assumptions to five-factor theory: variability, proactivity, knowability, and rationality (McCrae & Costa, 1996). Variability refers to the assumption that individual variances in personality exist; that is, not all individuals manifest the same level of a personality dimension. McCrae and Costa asserts that the personality dimensions described by the FFM make human variability in behaviour and experience over time understandable. The assumption of proactivity states that the origins of behaviour are located within the individual; in this respect, personality traits are viewed as playing a prominent role in the explanation of an individual's behaviour. The assumption of knowability states important scientific insights as it relates to human nature can result from the study of personality. The rationality assumption states that individuals generally have the ability to understand themselves and others around them. Moreover, ordinary people have at least an embedded comprehension of personality and as a result they have a language to describe personality. The use of personality questionnaires in FFM research is based on the premise that people are rational.

The five-factor theory is a meta-theoretical framework that comprises the majority of the factors that have been connected with personality theories and most of the features of human nature identified by theorists (McCrae & Costa, 1996). McCrae and Costa (1996, 1999) proposed a personality system comprising six elements of biological bases, basic tendencies, characteristic adaptations, objective biography, self-concept, and external influences and their interrelations. McCrae and Costa view basic tendencies as personality traits construed as abstract causal potentials and dispositions of the individual, thus distinguishing the five personality factors from patterns of behaviour , and from acquired skills, social roles, beliefs, habits and relationships (characteristic adaptations) that lead to behaviour (Johnson & Krueger, 2004; McCrae et al, 2000). To this end, McCrae and Costa noted that the Big Five personality dimensions are not directly comprehensible to public observation or to private introspection, but are deeper psychological entities that can only be deduced from behaviour and experience. All adults can be characterised by their differential standing on the five personality factors, which have some bearing on patterns of thoughts, feelings, and behaviour (McCrae & Costa, 1996).

The five personality traits are considered endogenous dispositions insulated from shared environmental influences (McCrae & Costa, 1996, 1999); that is, the five factors and their narrow and specific facets are at least in part heritable (Loehlin, et al., 1998; McCrae et al., 2000). In this respect, the five factor model of personality is rooted in biological structures and processes (McCrae et al., 2000), such as neurotransmitters, hormones, specific gene loci, brain regions and so on (Plomin & Caspi, 1999). Personality traits affect characteristic adaptations such as relationships, learned behaviours, but characteristic adaptations have no effect on changes in traits (McCrae & Costa, 1996, 1999).

McCrae and Costa (1999) suggested that “traits developed through childhood reach mature form in adulthood; thereafter they are stable in cognitively intact individuals” (p.145). However, more recently, Costa and McCrae (2006) acknowledge that slight changes in traits may occur after childhood, and these changes are more pronounced in early adulthood rather than in later adulthood. Trait development is hypothesised by the five-factor theory to result from intrinsic maturation independent of environmental influences (Costa & McCrae, 2006; McCrae, 2002; McCrae et al, 2000).

In the five-factor theory, the elements of the personality system are interrelated through dynamic processes (McCrae & Costa, 1996, 1999). Dynamic processes cited by McCrae and Costa, include but are not limited to interpersonal processes (for example, social manipulation and role playing), identity formation (for example, self-discovery), regulation of emotion (for example, expression or suppression of affect), violation (for example, delay gratification, planning and scheduling), coping and defence (for example, repression, positive thinking), and information processing (for example, perception, implicit learning). Basic tendencies not only shape our attitudes, social roles, relationships, perception of others , and so on (characteristic adaptations), but can also affect the self-concept – an individual’s perceptions, implicit and explicit views of self, and self-esteem as it relates to their attitudes, abilities, personality and so on. An individual’s self-concept can also be influenced by characteristic adaptations, objective biography (specific instances of emotional reactions and behaviour in an individual’s life such as career paths, streams of consciousness, historical accidents), and external influences(an individual’s psychological environment such as parent-child relationships, peer socialisation, education, culture, norms, life events and so on). The five-factor theory hypothesised a reciprocal relationship between objective biography and external influences.

The dyadic-interactional perspective on the FFM is a theoretical framework that integrates the Interpersonal Circle or Circumplex model (IPC) and the FFM (Wiggins & Pincus, 1992; Trapnell & Wiggins, 1990; Wiggins & Trapnell, 1996). The dyadic-interactional perspective characterizes the FFM by extending the IPC classification of interpersonal behaviour to include the three Big Five personality dimensions of conscientiousness, neuroticism, and openness to experience (Ansell & Pincus, 2004; Wiggins & Pincus, 1992). This perspective on the FFM organises interpersonal traits around metaconcepts of agency (Dominance related to Surgency/Extraversion) and communion (Nurturance/Love related to Agreeableness), which serve as conceptual coordinates for the measurement of interpersonal behaviour (Wiggins & Trapnell, 1996). The main tenet of this perspective is that personality traits captured by the FFM – especially Extraversion and Agreeableness dimensions – can be "conceptualised as the expression of individuals' need for status and love and the dynamics of their fulfilment" (Benet-Martínez, 1997, p. 661). Moreover, the theory proposes that there is an interpersonal aspect that permeates all Big Five factors (Ansell & Pincus, 2004; Wiggins & Trapnell, 1996); that is, all of the Big Five factors play a critical interpersonal role in human interaction (Ansell & Pincus, 2004). Further, FFM traits account for additional thoughts, feelings, and behaviour that affect interpersonal interaction (Ansell & Pincus, 2004). Also, these additional thoughts, feelings, and behaviour that influence interpersonal interaction "should be perceivable by raters and should have sufficient social and emotional implications that they may be described within the interpersonal space" (Ansell & Pincus, 2004, p. 173). In this respect, similar to the lexical theory, the dyadic-interpersonal perspective conceptualises the FFM traits in terms of descriptive concepts (John & Srivastava, 1999).

The dyadic-interpersonal perspective grants conceptual priority to the two FFM factors of Agreeableness and Extraversion for the reason that these two factors are relatively pure lower-order indicants of the highly abstract conceptions of agency and communion (Wiggins & Trapnell, 1996). Moreover, Wiggins and Trapnell posited that Conscientiousness, Neuroticism, and Openness to Experience are traits that either facilitate or interfere, with the development and maintenance of agentic needs (such as achievement, social status, and autonomy) and communal needs (such as security, trust, and belongingness and love). Using four influential FFM instruments – NEO-PI-R (Costa & McCrae, 1992a), Revised Synonym Clusters (Goldberg, 1990), Hogan Personality Inventory (Hogan & Hogan, 1992), and Multidimensional Personality Questionnaire (Tellegen, 1994) – Wiggins and Trapnell (1996) provided classifications of conscientiousness, neuroticism, and openness to experience facets in terms of agency and communion. In terms of conscientiousness, some of the agentic facets identified were achievement striving, competence, discipline, decisiveness, and persistence, while some of the communal facets identified were dutifulness, order, deliberation, dependability, and impulse control. In relation to neuroticism, “core” mood facets of anxiety and depression such as independence, no guilt, not anxious, and vulnerable were classified as agentic facets, while anger-related facets such as good attachment, trusting, even tempered, and calmness were classified as communal characteristics. In terms of openness to experience, examples of agentic features identified from the four instruments were ideas, action, intelligence, depth, curiosity, and sophistication, while examples of communal features identified were values, aesthetics, fantasy, creativity, and culture.

The socioanalytic theory of personality posits that individuals have a need for social status and social acceptance in social settings and that they use trait terms to indicate their perceptions of others

in social settings (Hogan 1983). Hogan views trait terms as the "linguistic tools of observers" (1996, p.172); cognitive categories that people use to describe, remember, and evaluate the behaviour of others. Thus, traits are regarded as socially constructed representations used by people to describe observed consistencies in behaviour that are important socioculturally (Benet-Martínez, 1997). Moreover, these perceptions constitute the reputations of others (MacDonald, 1998). Thus, the reputation of a person is encoded in trait terms, and one's reputation is stable, enduring, and can predict future behaviour (Hogan, 1996). Individuals engage in reputation management and will do whatever it takes to protect their reputations (MacDonald, 1998). Individuals have a self-conception of their own personality, which they may distort with self-presentation strategies or with self-deception biases (John & Srivastava, 1999; MacDonald, 1998). In this respect, individual self-ratings of personality might not be a true summary of behavioural tendencies; thus might not constitute one's reputation.

The socioanalytic perspective purports that reputations have a well-defined structure and that structure is the FFM, in this regard, an individual's reputation can be profiled in terms of the FFM (Hogan, 1996). For the most part, the FFM concerns the structure of observer ratings and peoples' personality profiles, as indicated by others' ratings on dimensions of the FFM, are relatively true summaries of behavioural tendencies and constitutes their reputation observed by others (MacDonald, 1998). "The FFM contains the categories that people use to evaluate one another; through the vehicle of reputation, these categories reveal the amount of status and acceptance that a person has been granted, and that he or she can normally expect to receive. A 'reputation' defined in terms of the FFM, is an index of how well a person is doing in the game of life. Because the game, at a deep level, concerns reproductive success, it is ultimately quite serious"

(Hogan, 1996, p. 173). Furthermore, individual differences subsumed in the FFM provide indicators of whether individuals are suited for particular roles. Individuals do not only assess the phenotypic traits of others, but also differentially appraise these traits in relation to the type of relationship entered into (MacDonald, 2005).

The evolutionary perspective on the FFM proposes that over evolutionary time, humans have evolved "difference-detecting mechanisms" designed to evaluate individual differences among people that have most relevance for solving social adaptive problems (Buss, 1996; MacDonald, 1998). This perspective views personality as an adaptive landscape in which "perceiving, attending to, and acting upon differences in others is crucial for solving problems of survival and reproduction" (Buss, 1991, p. 471). In this respect, the Big Five personality traits represent the salient psychological features of our social adaptive landscape (Buss, 1991; John & Srivastava, 1999). Buss (1991) notes that the evolutionary perspective on the FFM offers three ways to account for the prominence of the five factors: (1) important differences in the strategies individuals use to achieve species-typical goals are represented by the Big Five personality traits; (2) the five factors might "signify mere noise - variations that were neutral with respect to natural selection, and hence evolutionary unimportant" (p. 471); (3) the most significant aspects of social landscape to which humans have had to adapt might be summarised by the Big five personality traits.

The evolutionary perspective proposes that the FFM plays a critical role in social adaptive problems of strategic facilitation – solving social adaptive problems associated with uncovering allies – and social interference – solving social adaptive problems associated with conflict of interest with others – (Buss, 1996; MacDonald, 1998). Individual differences captured by the Big Five

personality traits are regarded as important in shaping three forms of non-kin strategic alliances of mateship (long-term heterosexual alliances), coalitions (groups of individuals formed to achieve a common goal), and friendships (dyadic reciprocal alliances) with others (Buss, 1996). The positive poles of the Big Five personality factors transcend relationship type; that is, value aspects of Agreeableness, Conscientiousness, Extraversion, Openness to Experience, and Neuroticism are valued in mateships, coalitions, and friendships (Buss, 1996). Individual differences subsumed by the FFM are also critically linked with strategic interference. Various kinds of strategic interference are likely to be associated with the negative poles of Big Five personality dimensions (Buss, 1996). For example, among married couples, spouses who are low on agreeableness and high on neuroticism are likely to abuse their spouses verbally and physically (Buss, 1996). Therefore, “in broad brush strokes” (Buss, 1996, p.188), the dimensions of individual differences captured by the FFM identifies some of most significant costs and benefits associated with others who form our social adaptive landscape.

The evolutionary theory also proposes that individual differences in the qualities or resources individuals can employ to solve adaptive problems they are confronting may in part reflect personality dimensions represented by the Big Five (Buss, 1996). For example, an individual high on Agreeableness may better be able solve adaptive problems by eliciting cooperation from others, while individuals high on Conscientiousness may solve adaptive problems by exerting discipline, industriousness, and sheer hard work. Individuals low on neuroticism may solve adaptive problems by relying on inner resiliency, steadiness of nerves, and the capacity to recover from setbacks (Buss, 1996). This perspective also proposes that individuals strategically apply to the self and to others in everyday usage, trait terms represented by the Big Five with the

purpose of manipulating impressions form others so as to achieve adaptively significant goals. Individuals will be inclined to overstate positive traits to impress others and exaggerate negative traits as a means to lower the desirability of potential rivals (Buss, 1996; MacDonald, 1998).

In summary, five theoretical perspectives have been presented on the conceptual status of the Big Five personality dimensions. These theoretical perspectives range from descriptive concepts to biologically based concepts (John & Srivastava, 1999). The lexical theory or hypothesis (Saucier & Goldberg, 1996b) describes a Big Five model of phenotypic personality characteristics, and postulates that all the Big Five dimensions are not equal in their importance and replicability; the relative importance of a factor is dependent on its salience in natural language. The interpersonal theory (Wiggins & Trapnell, 1996) organises traits around metaconcepts of agency and communion, and posits that all of the Big Five play an important role in human interaction, and account for additional thoughts, feelings, and behaviour that affect human interaction. In socioanalytic theory (Hogan, 1996), with the emphasis on social functions of self and other perceptions, the FFM contains the cognitive categories people use to describe, remember, and evaluate behaviour of others and self. The evolutionary perspective argues that the FFM dimensions are psychological features of the individual´s social adaptive landscape and plays a significant role in social adaptive problems of strategic facilitation and social interference. Finally, Costa and McCrae´s (1996, 1999) five factor theory view the Big five dimensions as underlying biological or causal properties.

2.1.4 Arguments for the Big Five. Personality researchers posit that the Big Five model or FFM (hereinafter refer to as the Big Five model as the preferred term) represents an adequate

organising taxonomy for describing the basic dimensions of human personality (Costa & McCrae, 1988a; Digman, 1990; John, 1990; John & Srivastava, 1999; McCrae & Costa, 1997; Saucier & Golberg, 1998). Moreover, personality researchers posit that the Big Five represents human personality at the highest level of the hierarchy (Goldberg, 1993a; John & Srivastava, 1999; McCrae & Costa, 1996; McCrae & John, 1992). Furthermore, these five personality factors are reported to account for the majority of variation in human behaviour (Paunonen & Nicol, 2001). McCrae and John (1992) purported that the conception that there are five broad personality factors is "an empirical fact, like that there are seven continents on earth or eight American presidents from Virginia" (p. 194).

The Big Five model can and does function as a reference framework for other personality classifications (De Raad and Perugini, 2002) and, thus, provides a framework for personality theorists to work within. At the broad level of abstraction, the Big Five model captures the commonalities among most of the existing systems of personality traits; therefore, providing an integrative descriptive model for research (John & Srivastava, 1999). Factor analytic studies of personality traits have shown through convergences between Big Five measures and measures of other major models of personality that the FFM subsumes competing models of human personality, including Leary's (1957) interpersonal circle model (McCrae & Costa, 1989a), Murray's (1938) structure of psychological needs (Ashton, Jackson, Helmes, & Paunonen, 1998; Costa & McCrae, 1988b), Jung's (1971) psychological types (McCrae & Costa, 1989b), Eysenck's (1947) two-factor model (Carroll, 2002; Goldberg & Rosolack, 1994; McCrae & Costa, 1985), and Cattell (1945) sixteen personality factor system (Carroll, 2002; Chernyshenko, Shark, & Chan, 2001; Conn & Rieke, 1994). Thus, these studies demonstrated evidence that the FFM is a comprehensive model of human personality. In

addition, the five factor structure provides a nomological network within which personality constructs can be related to one another (John & Robbins, 1994). In this respect, the model has brought about clarity to the diverse array of proposed personality measures; providing a common yardstick that has permitted comparison of different inventories and their predictive correlates (Biesanz & West, 2004).

The Big Five model is also a useful organizing framework for classifying facets at a level below the five factors (Schimt, Kihm, & Robie, 2000). Knowledge of the Big Five factors would assist in defining, organizing, and understanding the lower-level facets associated with each of the Big Five factors (Ryckman, 2008). This would reduce the redundancy that arises from measuring the same construct under different names (McCrae & John, 1992). As such, the FFM could serve as a starting point for the development of assessment instruments (De Raad & Perugini, 2002).

With regard to the robustness and generalisability of the FFM, research studies have established evidence for its replicability across different languages and cultures. In general, the results of numerous cross-cultural and cross-language studies provided extensive evidence that the FFM has cross-cultural generalisability and does not simply reflect the structure of the English language (for example, Benet-Martínez & John, 2000; Kallasmaa, Allik, Realo, & McCrae, 2000; McCrae & Costa, 1997; McCrae, Costa, del Pilar, Rolland, & Parker, 1998; McCrae et al., 2005a, 2005b; Ostendorf, 1990; Rolland, 2002; Somer & Goldberg, 1999). Ostendorf (1990) found that five factors similar to the English lexical Big Five emerged from self-ratings and peer-ratings of 430 German single-word descriptors. For the 46 peer-ratings, Ostendorf reported replicability coefficients of .99, .99, .99, .98, and .93 in the five-factor solution, as compared to a replicability coefficient of .76 for the sixth factor in the six-factor solution. Whereas, for the 47 self-

ratings, he reported replicability coefficients of .99, .99, .98, .97, and .93 in the five factor solution, as compared to a replicability coefficient of .14 for the sixth factor in the six-factor solution.

McCrae and Costa (1997) assessed the cross-cultural generalisability of the FFM by comparing data from studies using six translations of the Revised NEO Personality Inventory with the American factor Structure. German, Portuguese, Hebrew, Chinese, Korean, and Japanese samples showed factor structures that were similar to the American five factor solution. The median cross-language coefficients of factor congruence with the American factor structure were .96, .95, .94, .96, and .96 for Neuroticism, Extraversion, Openness to Experience, Agreeableness, and Conscientiousness respectively. They concluded that these data provided strong evidence that there is a universal human structure for describing personality based on the FFM. Rolland's (2002) review of studies on the cross-cultural generalisability of the FFM found that comparisons of varimax factor solution in 16 different cultures showed evidence of the cross-cultural generalisability of Neuroticism, Openness to Experience, and Conscientiousness. Extraversion and Agreeableness seemed to be more sensitive to cultural context. In another study, McCrae et al. (2005a) tested the universality of personality traits from the observer's perspective. They recruited college students from 50 cultures representing six continents who identified an adult or college-aged man or woman whom they knew well and rated the 11, 985 targets using the third-person version of the NEO-PIR. The results of factor analyses showed that the American self-report normative FFM factor structure was replicable in most cultures and was identifiable in all. They concluded that for the most part these findings supported the hypothesis that features of personality traits are common to all human groups based on the FFM.

Researchers have contributed evidence that the Big Five are robust and generalisable across different rating sources (for example, Goldberg, 1990; McCrae & Costa, 1985; Ostendorf, 1990). McCrae and Costa (1987) purported that “if the five-factor model is a reasonable representation of human personality, it should be recoverable from questionnaires as well as from adjectives and from observer ratings as well as from self-reports” (p. 81). McCrae and Costa examined the correspondence between assessments of the Big Five personality factors among peer-ratings, and between peer-ratings and self-reports, using both adjective factors and questionnaire scales from the NEO Personality Inventory (NEO-PI). The results showed substantial cross-observer agreement on all five adjective factors: intraclass correlations among raters, ranging from .30 to .65, and correlations between mean peer-ratings and self-reports, from .25 to .62. Similar results were evident in analyses of scales from the NEO-PI. Parker and Stumpf (1998) used self-reports and parental ratings of four instruments – NEO-Five-Factor Inventory (NEO-FFI), the Adjective Check List (ACL), Myers-Briggs Type Indicator (MBTI), and the California Child-Q-Set (CCQ) to assess personality dimensions according to the FFM of personality in academically talented youth. The structure of FFM personality was replicated in self-reports of academically talented youths and in parental observations across instruments. In another study, McCrae et al. (2004) investigated cross-observer agreement on traits of the FFM across cultures using Russian and Czech translated versions of the NEO-PIR. They found that the American Normative self-report five factor structure was replicated in Russian and Czech self-reports and observer ratings data sets. Also, cross-observer correlations showed moderate to high agreement for the FFM traits.

With regard to its robustness, a number of studies have been conducted showing the stability of the FFM over time (for example,

Roberts & DelVechio, 2000; Soldz & Vaillant, 1999; Vaidya, Gray, Haig, & Watson, 2002). Costa and McCrae's (1988a) six-year longitudinal study of trait stability of self-ratings and spouse ratings using the NEO-PI instrument reported high retest stability coefficients for all five dimensions in self-ratings and for three dimensions (Neuroticism, Extraversion, and Openness to Experience) in spouse ratings. They found comparable levels of stability for men and women and for younger and older individuals. They concluded that the data supported the position that personality is stable after 30 based upon a Big Five measure. Soldz and Vaillant (1999) conducted a longitudinal study that followed 163 men for over 45 years who were rated on personality traits at the end of their college careers and took the NEO-PI at approximately ages 67-68. The college traits were transformed, by means of a rating procedure, to scales measuring each of the Big Five dimensions and related to the NEO-PI. Three of the Big Five factors – Neuroticism, Extraversion, and Openness –, showed significant correlations across the 45-year interval. Furthermore, the trait profiles remained relatively stable over the time period. Costa, Herbst, McCrae, and Siegler (2000) six to nine year interval longitudinal study of 40 year olds (Midlife Adults) reported a mean test-retest correlation of .83 for all five factors of the NEO-PI. In another study, Vaidya, et al. (2002) investigated the stability of personality and trait affect. Subjects were retested on a Big Five measure and a trait affect inventory over a two year-five month and a two-month period. Results from both retest demonstrated clear evidence of differential stability; the Big Five factors were consistently more stable than the affective traits.

McCrae et al. (1999) conducted a cross-cultural comparison study to assess age differences in personality using U.S. samples as a comparison baseline. For both cross-sectional and longitudinal studies in the U.S., Neuroticism, Extraversion, and Openness

decline from age 18 to age 30, while Agreeableness and Conscientiousness increase. These trends continued after age 30, but usually at a slower rate. Similar patterns of age differences were found in cross-sectional studies using data from Germany, Italy, Portugal, Croatia, and South Korea, for both men and women. They concluded that as nations sampled differ substantially in culture and recent history, this suggest the hypothesis that changes in adult personality are universal maturational changes.

The robustness of the FFM has been further demonstrated by studies showing substantial heritability for trait scores (for example, Loehlin, 1992; Loehlin, McCrae, Costa, & John, 1998). Across many studies, the average estimate of the heritability of personality traits is about 50% (Plomin & Caspi, 1999). Riemann, Angleitner, & Strelau (1997) conducted a study of twins reared together using self- report and peer-report NEO-FFI scales to assessed the genetic and environmental influences on personality and found when corrected for measurement error, heritability estimates for the five factors ranged from .66 to .79. Loehlin et al. (1998) conducted a study including 807 pairs of twins and found that regardless of whether the five factors are measured with questionnaires, or with adjective scales from the lexical approach, they show substantial and comparable heritabilities, with little or no contribution of shared family environment.

2.1.5 Criticisms of the Big Five. In spite of the wide acceptance of the FFM as a comprehensive taxonomy of human personality among personality researchers, the model is not without its critics (Block, 1995; Eysenck, 1992, 1997). One of the main criticisms of the FFM or Big Five model of personality is its atheoretical explanatory approach (Briggs, 1989; Eysenck, 1997; Wiggins, 1992). Revelle (1987) noted that there is little explanation for why and how the five factors to personality came about.

However, McCrae and Costa (1999) argued that an explanation for why there are five factors of personality is not important to understanding personality. They stated that:

> Shouldn't a five factor theory explain why there are five factors and not six? And why these factors and not others? That would be an impressive feat, but it is not essential to scientific understanding. The speed of light is crucial to the theory of special relativity, but that theory gives no clue as to why c = 300,000 km/sec....There is nothing magic about the number five [in the Five Factor model]; it is simply what the data seem to show (p. 147).

There is still some disagreement among researchers about the Big Five factor structure, that is to say, whether there are three (Eysenck, 1991), seven (Hough, 1992), eight (Comrey & Backer, 1970), or sixteen (Cattel, Eber, & Delhees, 1968) major dimensions of personality. Factor solutions have emerged in factor analytic studies that do not converge well with the FFM (Block, 1995; Lee, Ogunfowora, & Ashton, 2005). Researchers have found patterns of three or four factors (Eysenck, 1991; Church & Burke, 1994; Tellegen, 1982, 1985), seven factors (Benet & Waller, 1995; John, Caspi, Robins, Moffitt, & Stouthamer-Loeber, 1994; Tellegen & Waller, 1987) and as many as eight factors (Lanning, 1994). Digman's (1997) investigation of higher-order factors of the Big Five suggested that the Big Five may reflect two metatraits, which he labelled Alpha and Beta. Factor Alpha was represented by Big Five factors Agreeableness, Extraversion, and Conscientiousness, and factor beta was represented by Extraversion and Openness to Experience. More recently, DeYoung and colleagues have suggested that two constructs labelled Stability and Plasticity constitute the highest level of personality organization in the hierarchy built around the Big Five (DeYoung, 2006; DeYoung, Peterson, & Higgins, 2002).

Recent lexical studies of personality structure have suggested a six-dimensional framework – called the HEXACO model – consisting of the Big Five factors and an additional six factor termed Honesty-Humility (Ashton & Lee, 2005; Ashton, Lee, Perugini et al., 2004; Ashton, Lee, & Son, 2000; Lee & Ashton, 2004). Paunonen and Jackson (2000) reanalysed Saucier and Goldberg (1998) lexical data of English person-descriptive adjectives and identified an additional ten factors (religiosity, manipulativeness, honesty, sexuality, frugality, traditionality, masculinity/femininity, conceitedness, humour, and risk taking). Furthermore, recent factor joint analyses studies of the Chinese Personality Assessment Inventory (CPAI) and measures of the FFM conducted by Cheung and colleagues (Cheung et al., 2001; Cheung, Cheung, Leung, Ward, & Leong, 2003) found evidence to support a six-factor model of personality. In these factor joint analyses, three of the four CPAI factors, namely the Dependability, Social Potency, and Individualism converged with four of the Big Five factors (Extraversion, Conscientiousness, Neuroticism, and Agreeableness). Moreover, the CPAI Interpersonal Relatedness dimension emerged as a distinct factor from the Big Five dimensions, whereas FFM dimension Openness to Experience was not covered by the CPAI. In another study, De Raad and Barelds (2008) analysis of a list of 2,365 personality descriptive terms selected from a computerised database of the Dutch language yield an eight factor solution that included the Big Five and three additional factors, labelled Virtue, Competence, and Hedonism.

However, in response to this criticism, proponents of the Big Five model has argued that the model have been replicated numerous times by different researchers, with different instruments, using different methods, and in different languages and culture, with the emergence of additional factors in isolated samples (Costa & McCrae, 1995a; Goldberg & Saucier, 1995).

Furthermore, the additional factors have not been replicated across studies (McCrae, 2001; Goldberg & Saucier, 1995). In addition, advocates of the FFM maintain that although there might be more than five factors, at least some version of the Big Five factors is necessary for an adequate description of personality (McCrae & John, 1992).

Some personality researchers have argued that the FFM is too broad and not fully representative of human personality (Block, 1995; Hough, 1998). Narrower traits are viewed as more useful in predicting behavioural and occupational outcomes than broad personality dimensions (Ashton, 1998; Merhson & Gorsuch, 1988; Paunonen, 1998; Paunonen & Ashton, 2001a, 2001b). However, John and Srivastava (1999) noted that this criticism of the Big Five does not take into account the fact that personality can be conceptualised at different levels of abstraction. A more detailed discussion of this criticism is provided in the section on the Bandwidth-Fidelity Dilemma.

Further, the FFM has been criticised for the obliqueness of scale scores (Eysenck, 1992; Block, 1995). The Big Five factors are construed to be orthogonal factors or are orthogonal in theory (Costa & McCrae, 1995a; Saucier, 2002); however, empirical research have often recorded moderate intercorrelations among scale scores on the Big Five factors, suggesting that these factors may be oblique not orthogonal. Block (1995) concluded that the intercorrelations among Big Five scale scores of NEO-PIR and NEO-FFI are “unusually high values, corrected or uncorrected, and should be bothersome, even unacceptable, to the orthogonality-emphasizing NEO five-factor position” (p.206). Eysenck (1992) commented on the intercorrelations among the Big Five scale scores for the NEO-PIR and exclaimed that “clearly, even on their [i.e., Costa and McCrae’s] own showing there are not 5 independent factors in their data!” (p. 670). Moreover, Eysenck suggested that

the Conscientiousness and Neuroticism dimensions capture the same constructs and posed “why have two major dimensions, highly correlated and the theory underlying one explaining the content of the other?” (p. 670).

Another argument against the Big Five stems from the perception there appears to be “no single Big Five” (John, 1990), which is evident in questions critics pose such as, “which Big Five” or “whose Big Five” (John, 1990). Researchers have revealed that even when five factor solutions have been recovered in factor analytic studies, the five factor solution that emerged across studies are not always identical (Burger, 2008). Also, researchers do not agree on the interpretation of five broad factors (Hofstee et al., 1992). For example, extraversion has been interpreted as surgency, assertiveness, power, and social activity (Digman, 1990; John 1990). Agreeableness has also been called friendly compliance, love or warmth, likability, and consensuality (Digman, 1990; John, 1990). Conscientiousness has also been labelled will to achieve, dependability, task interest, impulsivity, constraint, prudence and work (Digman, 1990; John, 1990). Neuroticism versus Emotional Stability has been interpreted as adjustment, emotionality, ego strength, dominant-assured, and affect (Digman, 1990). The fifth factor, commonly called Openness seems to have the most extensive disagreement; interpreted alternatively as intellectance, inquiring intellect, culture, intelligence, independent, and intellectual interest (Digman, 1990; John & Srivastava, 1999). Nevertheless, proponents of the five-factor structure have argued that although there are differences in emphasis and interpretation as it relates to the Big Five among researchers, there is consensus among researchers that they are referring to the same phenomenon; also, there is empirical evidence of convergent validity among their instruments (Costa & McCrae 1992b). Moreover, they argue that factor analysis and content analysis of

numerous personality measures have indicated that there is general agreement with regard to the meaning of the dimensions and any difference between authors is minor and ought not to be considered an issue (Mount & Barrick, 1998). Furthermore, proponents contend that the similarities between the Big Five factor structures uncovered using different methods and different populations are quite remarkable (John, 1990; McCrae, 2001).

2.1.6 Structure of the Big Five factors. In the field of personality psychology there is widespread consensus that the description of personality can be represented in a hierarchy of levels with specific descriptions at the lower levels of the hierarchy and broader traits at higher levels of the hierarchy (Diagman, 1990; Eysenck, 1990; Goldberg, 1993a). However, while there is some consensus among personality researchers about the characteristics of the higher-level factors, there is little consensus about an optimal set of lower-level factors (Costa & McCrae, 1998; Goldberg, 1999; Roberts, et al., 2005; Saucier & Ostendorf, 1999). Two main approaches to personality structure, the hierarchical or vertical and the circumplex or horizontal approaches have been proposed to model different levels of the hierarchy, particularly in terms of the distinction between facets and factors (De Raad & Perugini, 2002). Both approaches conceptualise the Big Five as broad personality dimensions subsuming several more specific dimensions or facets; facets can either be regarded as hierarchically nested in the Big Five or as blends of the Big Five (De Raad & Perugini, 2002; Goldberg, 1993b). Hierarchical approaches are better suited for studying specific facets, which belong to the central core of a factor, while circumplex approaches are better fitted for studying those facets which, even though still aspects of a factor are blended with facets belonging to other factors (Perugini & Gallucci, 1997).

The hierarchical or vertical approaches to personality structure consider facets as first order factors and the Big Five as second order factors (De Raad & Perugini, 2002). Moreover, vertical relations among variables (for example for most specific to the most abstract) are emphasised in hierarchical models of personality while the relations among variables at the same level are deemphasised (Goldberg, 1993b). Facets are supposed to correlate substantially with a specific Big Five factor, and modestly with other factors, so that each of the Big Five factors can be characterised by the meaning of a handful of facets that load primarily on that factor (De Raad & Perugini, 2002; De Raad, 1998). Some investigators have explicitly used a hierarchical approach for ordering their lower-level facets of the FFM (Costa, et al., 1991).The most notable example is Costa and McCrae (1992a), whose latest version of their inventory – NEO-PI-R – contains six facets that are thought to capture the main features of each of the five major domains, a total of 30 facets.

The circumplex or horizontal approaches to personality structure give emphasis to the relations among variables at the same level in the hierarchy (Goldberg, 1993b). In horizontal models, variables are located in multidimensional space, which specify the relations among them. “When that space is limited to only two dimensions and the locations of the variables are projected to some uniform distance from the origin, the resulting structures are referred to as “circumplex” representations” (Goldberg, 1993b, p. 174). Hosftee et al. (1992) proposed the most comprehensive circumplex representation, called the Abridged Big Five-Dimensional Circumplex (AB5C model). This circumplex structure of the FFM contains ten two-dimensional circumplexes formed from all pairs of the Big Five factors, upon which facets can be located. Thus, in the model, facets are represented as blends of two higher-order Big Five factors and are assigned to the plane formed by the two Big Five factors with which they best correlate (for example, its two

highest factor loadings). Ninety clusters or segments of interrelated traits are formed by clustering together variables that are located in close proximity in each plane. As a result of the circular ordering of the clusters, forty-five bipolar facets were formed. Each circumplex can be divided into 12 slices of 30 degrees each; bipolar facets are represented by six lines that delineate the boundaries between the slices. Therefore, each circumplex has two “factor-pure” facets, which represent the Big Five dimensions. These factor-pure facets are defined by axes located at 0-180 and 90-270 degrees, respectively. In addition, each Big Five dimension has two “high loadings” facets, which are located at ±30 degrees from the “pure” axes. As a result, nine lower-level facets can be derived rationally for each Big Five dimension – one pure factor and eight with secondary loadings.

Taxonometric research, conceptual or empirical, focused on identifying an optimal number of lower-order facets for each of the Big Five has been limited. With regard to the Extraversion, McCrae & Costa’s (1983) NEO model conceptualised this domain as including six facets of warmth, gregariousness, assertiveness, activity, excitement seeking, and positive emotions. Moreover, Watson and Clark (1997) argued that at one point or another six facets have been included in different models to represent this domain: venturesome (comparable to excitement seeking), affiliation (akin to warmth), positive affectivity (similar to positive emotions), energy (comparable to activity), ascendance (akin to assertiveness), and ambition. Alternatively, Depue and Collins (1999) proposed a more succinct model of the Extraversion domain with three central characteristics of agency (comparable to ascendance and assertiveness), sociability (similar to gregariousness), and impulsivity. However, they argued that impulsivity is not a pure Extraversion facet but rather a compound trait of Extraversion and Conscientiousness. In addition, Lucas et al.

(2000) investigated the nature of the fundamental features of Extraversion and found three facets of affiliation, ascendency, and venturesome. Recently, Hough and Ones (2001) proposed a working taxonomy of Extraversion-related traits comprising three facets: dominance (akin to ascendance, agency, and assertiveness), sociability, and activity energy level.

To date, three lexical studies have explored the lower-order structure of Extraversion. Perugini and Gallucci (1997) lexical study based on an Italian lexicon found three distinct facets of Extraversion: effervescence, exuberance, and shyness. Moreover, Saucier and Ostendorf (1999) found four replicable facets of Extraversion across English and German Languages: sociability, unrestraint, assertiveness, and activity-adventurousness. In the third study, using data sets from six studies in European languages (Triestean, Hungarian, Roman, Dutch, Polish, and Czech), Peabody and De Raad (2002) found four facets of Extraversion: assertiveness, impulse expression, talk, and sociableness (comparable to Saucier and Ostendorf's sociability).

In relation to Conscientiousness, Hough (1992) argued that Conscientiousness consist of two main domains, achievement and dependability. Costa and colleagues (Costa et al., 1991; Costa & McCrae, 1998) purported that facets contained in the Conscientiousness domain could be divisible into proactive aspects (such as achievement and dutifulness) and inhibitive aspects (such as orderliness and self-control). Later, Hough and Ones (2001) proposed a working taxonomy of Conscientiousness-related traits comprising six facets: achievement, dependability, order, cautiousness/impulse control, moralistic, and persistence. Thus far, four lexical studies have investigated the lower-order structure of Conscientiousness. Perugini and Gallucci (1997) found four facets of Conscientiousness: reliability, meticulousness, recklessness, and superficiality. Moreover, Saucier and Ostendorf (1999) found four

replicable facets of Conscientiousness across English and Germany languages: orderliness (similar to meticulousness), decisiveness, responsibility (similar to reliability), and industriousness (comparable to superficiality). In another study, Peabody and De Raad (2002) found four facets of Conscientiousness: impulse control (similar to recklessness), responsibility, orderliness, and work (akin to industriousness). They also identified a "transitional" persistence factor, which appears between Conscientiousness and Extraversion. In the fourth study, Roberts, Bogg, Walton, Chernyshenko, and Shark's (2004) delved deeper into the lexicon of trait adjectives that mark Conscientiousness and identified five facets found in previous lexical research on the lower-order structure of Conscientiousness: orderliness, industriousness, reliability, decisiveness, and impulse control. They also identified two additional lower-order facets of Conscientiousness not found in previous lexical research: formalness and conventionality.

Additionally, Roberts et al. (2005) factor analysed thirty-six scales drawn from seven major personality inventories to identify the lower-order structure of the Conscientiousness domain. They found six facets of Conscientiousness: industriousness, order, self-control, responsibility, traditionalism, and virtue. Five of the facets (industriousness, order, self-control, responsibility, and traditionalism) were similar to pervious lexical research (e.g. Roberts et al., 2004; Saucier & Ostendrof, 1999).

There has been much debate on how best to characterise the Openness to Experience domain. McCrae and Costa's (1983) NEO model characterized Openness to Experience as including facets of fantasy, aesthetics, feelings, actions, ideas, and values. On the other hand, the Intellect factor in the lexical model is described as including aspects of introspective, intellectual knowledge reflection, and artistic imagination (Goldberg, 1994; Saucier, 1994) as well as non-conformity and independence (Capara & Perugini, 1994; De

Raad, Hendriks, & Hosftee, 1992). However, the more recent trend of a compound label, “Openness/Intellect” exemplifies the fact that both labels identify distinct aspects of the domain (DeYoung et al., 2005). DeYoung et al. (2007) found evidence for two distinct aspects of Openness/Intellect that corresponded to intellect and openness. Recently, Hough and Ones (2001) proposed a working taxonomy of Openness to Experience-related traits consisting six facets: complexity, culture/artistic, creativity/ innovation, change/variety, curiosity/breath, and intellect. So far, three lexical studies have explored the lower-order structure of Intellect or Openness to Experience. Perugini and Gallucci (1997) found two distinct facets of Openness to Experience: broad-mindedness and unconventionality. Whereas, Saucier and Ostendorf (1999) found three replicable facets of Intellect across English and German languages: intellect, imagination, and perceptiveness. In the third study, Peabody and De Raad (2002) found four facets of Intellect: cleverness, imaginativeness, reflectiveness, and culture and talent.

With reference to Emotional Stability versus Neuroticism domain, McCrae and Costa’s (1983) NEO model characterised this domain as encompassing six facets of anxiety, angry hostility, depression, self-consciousness, impulsiveness, and vulnerability to stress. Saucier and Goldberg’s (2001) review of lexical studies of personality structure, identified two distinct trait clusters of Emotional Stability – irritability and anxiety/fearfulness –, but indicated that in some studies irritability was grouped with Agreeableness. Also, Hough and Ones (2001) proposed a working taxonomy of Emotional Stability-related traits consisting of three facets: self-esteem, anxiety, and even-tempered. To date, three lexical studies have investigated the lower-order structure of Emotional Stability. Perugini and Gallucci (1997) found two facets of Emotional Stability: serenity and firmness. Moreover, Saucier & Ostendorf (1999) found three replicable facets of Emotional Stability

across English and German languages: irritability (low), insecurity (low), and emotionality (low). In the third study, Peabody and De Raad (2002) found three facets: fearfulness, irritableness, and stability.

As to the Agreeableness domain, Costa et al. (1991) proposed traits of trust, straightforwardness, altruism, compliance, modesty and tender-mindedness as facets of Agreeableness. Saucier and Goldberg's (2001) review of lexical studies of personality structure identified four distinct trait clusters: gentleness, humility, generosity and warmth, and integrity/sincerity, whilst Hough and Ones (2001) proposed a working taxonomy of Agreeableness-related traits consisting of one facet: nurturance. So far, three lexical studies have explored the lower-order structure of Agreeableness. Perugini and Gallucci (1997) found five facets of Agreeableness: sympathy, tender-mindedness, friendliness, hostility, and overbearance. Moreover, Saucier & Ostendorf (1999) found four replicable facets of Agreeableness across English and German languages: warmth-affection, gentleness, generosity, and modesty-humility. In the third study, Peabody and De Raad (2002) found four facets: helpfulness, peacefulness (similar to gentleness), unassertiveness, and conceitedness (similar to modesty-humility).

While there has been one study through a comprehensive assessment of several personality inventory scales to identify the lower-order structure of the Conscientiousness domain (Roberts et al., 2005), to the best of the author's knowledge, there is no study to date that have sought to identify the lower-order structure of the other Big Five domains through a comprehensive assessment of several personality inventory scales. In discovering the Big Five, confirmation that the Big Five was a useful higher-order taxonomy for the domain of personality traits was forthcoming from the systematic analysis of personality inventories (Roberts et al., 2005). This thesis is the first effort to the author's knowledge to empirically

derive a taxonomy of lower-order personality traits of all the Big Five domains by factor analysing scales drawn from several personality inventories, all developed using different theoretical perspectives and empirical approaches to scale construction. The primary assumption of this approach is that different theoretical perspectives and empirical studies have identified in one form or another, most, if not all, significant lower-order facets of each of the Big Five personality factors and, thus, these lower-order facets are ingrained in the corresponding personality inventories (Roberts et al., 2005). Moreover, the factor analytical technique can be a useful approach for determining the number and nature of lower-order facets of the Big Five domains as long as a comprehensive set of lower-order facets of domains are identified and the correlations matrix between measured variables is available (Fabrigar, Wegener, MacCallum, & Strahan, 1999). Given the above discussion, the following research question was formulated:

> *Research Question 1: What is the number and nature of shared lower-order facets underlying each of the Big Five personality factors?*

2.2 The Bandwidth-Fidelity Dilemma

As described above, contained within each of the Big Five are several narrow traits or facets. Proponents of the FFM of personality often use personality inventories that are hierarchical in nature to measure personality. Oftentimes, personnel selection researchers and practitioners claimed to be faced with the choice of measuring a single narrowly defined variable or measuring more cursory exploration of many variables (Ones & Viswesvaran, 1996). This problem is referred to as Bandwidth-Fidelity (BWF) dilemma (Cronbach, 1960; Cronbach & Gleser, 1957). Ones and Viswesvaran noted that broad traits (broad-bandwidth personality characteristics) are more inclusive, general and abstract, and are

less linked to behaviours, in contrast to specific and narrow personality traits (narrow-band personality characteristics), which have “clear behavioural connotations” (p. 612). In this respect, the BWF dilemma can be viewed as a dispute over whether it is best to use narrow personality traits which are directly linked to behaviours or broad personality traits which are less linked to behaviours. Basically, in the context of personality assessment for selection purposes, the debate on BWF concerns whether broadly defined personality traits are better predictors of job performance and in explaining behaviours, than narrowly defined personality traits (Ones & Viswesvaran, 1996).

Ones and Viswesvaran (1996) advocate the use of broad personality traits in personnel selection research. They argued that broad personality traits have better criterion-related validity than narrower traits at least in prediction of broad and complex criteria and are also better for building generalisable theories of work behaviour. Moreover, they noted that the most frequently used criteria by industrial-organisational psychologists in the validation of predictors are supervisory ratings of overall job performance (a broad and multi-faceted construct). They further noted that “utility analysis suggests that the contribution of predictors in personnel selection ought to be judged in terms of overall job performance rather than individual components of it” (p. 615). Furthermore, they reported that there is consensus in the literature that multiple acts are more predictable than single criteria and that job performance components are correlated and load on a general factor in varying degrees. What is more, they also argued that as overall job performance is a factorially complex criterion, predictors that are factorially complex will be required in order to achieve the maximum validity. In addition, Ones and Viswesvaran stated that using narrow traits will only be advantageous to the extent that

narrow traits have specific variance that predicts a criterion above and beyond that of broad traits.

To support their arguments, Ones and Viswesvaran reviewed the several existing meta-analyses of the relationship between personality and job performance. They argued that the results of these studies demonstrated evidence that the Big Five dimensions can predict broad job performance domains, and that narrow traits do not add incremental validity over broad traits in the prediction of broad job performance domains. For example, they cited a study by Barrick and Mount (1994), which showed the broadly defined Conscientiousness factor was more predictive of job performance criteria than any of its constituent narrower traits. Moreover, they conducted analyses using data from several meta-analyses, and concluded that broad job performance criteria are better predicted by broad personality traits.

By contrast, the use of narrow personality traits in personnel selection have been advocated by several researchers (e.g., Ashton, 1998; Ashton, Jackson, Paunonen, Helmes, & Rostein, 1995; Briggs, 1989; Paunonen et al., 1999; Reynolds & Clark, 2001; Schneider et al., 1996). Carver (1989) contended that facets can be more powerful predictors of dependent variables because of their position on the explanation level. Moreover, facets can represent a level of aggregation with adequate stability and sensitivity, whereas general factors are too molar and insensitive to dependent variables (Bagozzi & Heatherton, 1994; Carver, 1989). Ashton et al. (1995) argued that combining facets into one higher-order scale can submerge the specific, non-error variance associated with each facet even though facets may correlate highly with the factor they define. In addition, Paunonen et al. (1999) posited that the use of broad personality traits in personnel selection has two main disadvantages: (a) the empirical accuracy of broad personality traits in predicting criteria will to be inferior to that obtained by narrow

personality traits that define the broad personality traits, and (b) the use of broad bandwidth measures will compromise the psychological meaningfulness and interpretability of personality-work behaviour associations. Similarly, Tett and colleagues (Tett, Gutterman, Bleier, & Murphy, 2000; Tett, Steele, & Beauregard, 2003) argued that the validity of a selection battery will be increased by use of specific narrow traits. Tett et al. (2000) purported the use of narrow bandwidth measures have the benefits of (a) providing more points of comparison, thereby improving job-person fit (b) providing more comprehensive understanding of causes, effects, and measurements of constructs, and (c) allowing for a more powerful construct validation through a clearer articulation of the nomological net.

Paunonen et al. (1999) also highlighted that the aggregating of narrow trait scales into broad dimensions results in the loss of information, because of the counteractive effects of different facets on the prediction of performance criteria. For instance, if an equal number of facets are positively and negatively related to performance with similar magnitudes, the overall broad trait will not be related to performance at all. Recently, Paunonen and Nicol (2001) posited that facets of a Big Five personality factor could have different relations with a criterion (e.g., linear, non-linear, curvilinear, indirect effects, etc). They further argued that simply using a Big Five composite measure for prediction would result in the lost of this type of information. In addition, Ashton (1998) purported that a major disadvantage of relying solely on broad measures of personality is that those narrower facets that have the strongest theoretical and empirical relationships with criteria of interest cannot be extracted from broad dimensions.

Several studies have demonstrated evidence for the incremental criterion-related validity of narrow personality traits over and above broad personality in predicting behaviour criteria.

Mershon and Gorsuch (1988) examined the incremental criterion-related validities of the 16 primary factors of the Six Personality Factor Questionnaire (16PF; Cattell, Eber, & Tatsuoka, 1970) over and above the six broader factors measured by that instrument in four datasets with real life criteria (e.g., occupation, pay, drug use and psychiatric status changes). They found that the 16 primary traits produce statistically significant increases in the squared multiple correlations over and above the use of the six broader traits alone in nearly all of the datasets. Ashton et al. (1995) using a student sample, compared the predictive validities of the Extraversion factor and the Methodicalness factor (their Conscientiousness predictor) with those of more specific facet scales that define those factors. A variety of criteria (e.g., student fun-seeking behaviour, and tidy behaviour) were also measured. The results demonstrated that facet scales yielded significantly and substantially higher validities than did broad factor scales in predicting the three composite criteria. Differences in squared correlations, ranged from .05 to .13.

Research studies have demonstrated substantial evidence in favour of using narrow bandwidth personality measures as predictors of behaviour outcomes over using broad bandwidth personality measures (Paunonen, 1998; Paunonen & Ashton 2001a, 2001b; Paunonen & Nicol, 2001; Paunonen, Haddock, Forterling, & Keinonen, 2003). For example, Paunonen (1998) conducted two studies consisting of university undergraduate students to evaluate the Big Five factor measures and narrow trait measures for their accuracy in predicting behaviour criteria. In the first study, narrow traits were measured using Jackson's (1984) Personality Research Form-E and the Big Five factors were measured using the NEO-FFI. A variety of criteria (e.g., GPA, number of dates per month, and smoking behaviour) were also measured. The results showed that narrow facets often added incremental validity over the broad

factors. On average, narrow facets added 13.5% more variance across all fourteen behaviour criteria than the Big Five factors, which correspond to an increment of about .32 in a predictor-criterion correlation coefficient. Broad factors only accounted for 2.1% more variance on average than the narrow facets. In the second study, narrow facets were measured using the Jackson Personality Inventory and the Big Five factors were measured using the NEO-FFI. This study reported similar findings and found that narrow facets added more incremental validity over the broad factors. The results revealed that on average, narrow facets added 10.7% more variance across all fourteen behaviour criteria than the Big Five factors, which corresponds to an increment of about .85 in a predictor-criterion correlation coefficient. Broad factors only accounted for 2.5% more variance on average than the narrow facets. Based on the findings of both studies, Paunonen concluded that aggregating narrow traits into their underlying broad personality factors could result in decreased predictive accuracy due to the loss of trait-specific but criterion-valid variance.

Paunonen et al. (2003) conducted a cross-cultural study involving four countries (Canada, England, Germany, and Finland) to determine whether personality factors and facets predict a variety of complex behaviours or behaviour outcomes (e.g., GPA, smoking, dieting, obesity, and alcohol consumption) and to compare the predictive validities of narrow traits and their underlying broad personality factors in predicting the same criteria across cultures. In this study, lower-level facets and the Broad personality factors they defined were measured using Supernumerary Personality Inventory (SPI; Paunonen, 2002). They reported that the narrow traits accounted for more variance in several of the criteria than broad factors underlying those traits. Furthermore, the results demonstrated substantial consistency across cultures. Based on these findings, Paunonen et al. concluded that narrow bandwidth

measures have the advantage that researchers capitalised on their trait specific and criterion-predictive variance. In addition, they stated that the judicious selection of lower-level facet scores will maximize prediction accuracy and, simultaneously enhance our understanding of the predictors of behaviour.

2.3 Task Performance, OCB, and CWB

As expressed previously, one of the debates in personality assessment is in its prediction of job performance. Job performance is a very important construct to much of work psychology (Ones & Viswesvaran, 2001), and is viewed as a criterion that is complex, dynamic, and multidimensional (Borman, Hanson, & Hedge, 1997; Campbell, 1990; Conway, 1996; Hough & Oswald, 2000). Similarly, Motowildo, Borman, and Schmit (1997) described job performance as a criterion that is behavioural, episodic, evaluative, and multidimensional. Job performance can be defined as "the observable things people do (i.e. behaviours) that are relevant for the goals of the organisation" (Campbell, McHenry, Wise, 1990, p. 314). More recently, Viswesvaran and Ones (2000) defined job performance as "scalable actions, behaviour and outcomes that employees engage in or bring about that are linked with and contribute to organisational goals" (p. 216). Some researchers (Rotundo & Sackett, 2002; Sackett, 2002; Visvasvaran and Ones, 2000) have postulated that job performance consist of three broad domains: task performance, organisational citizenship behaviour (OCB) and counterproductive work behaviour (CWB). Furthermore, Rotundo and Sackett (2002) posited that an individual's overall job performance can be conceived of as a composite of these three performance domains. Each of these job performance dimensions will now be discussed in turn.

2.3.1 Task performance. Task performance is mainly reliant on assigned task-related activities (Spector & Fox, 2002). The traditional view of the job performance space was restricted to the task performance domain (Dala, 2005). Furthermore, task performance has been equated with overall job performance in many validity studies (Murphy & Shiarella, 1997). Task performance is defined in the current work psychology literature as "the proficiency which incumbents perform activities that are formally recognised as part of their jobs; activities that contribute to the organisation's technical core either directly or indirectly by providing it with need materials and services" (Borman & Motowildo, 1993, p. 73). In this respect, there are two types of task performance. One type comprises activities that directly transform raw materials into the goods and services produced by the organisation (Motowidlo, Borman, & Schmit, 1997). Examples of such activities are operating a production machine in a manufacturing plant, performing surgery in a hospital, teaching in a school, and so on (Motowidlo, et al., 1997). The second type comprises those indirect activities that service and maintain the technical core of the organisation's system by replenishing supplies; distributing end products; or enabling the organisation to function effectively by providing services of planning, coordination, supervising, or staff functions (Motowidlo, et al., 1997). Therefore, task performance yields a direct relation to the organisation's technical core either by way of maintaining and servicing its technical requirements or by executing its technical processes (Motowidlo, et al., 1997).

2.3.2 OCB. The concept of Organisational Citizenship Behaviour (OCB) was first introduced in the literature by Organ and his colleagues (Bateman & Organ, 1983; Organ, 1988; Smith, Organ, & Near, 1983), and initially defined it as "individual behaviour that is discretionary, not directly or explicitly recognized

by the formal reward system, and that in the aggregate promotes the effective functioning of the organization" (Organ, 1988, p. 4). However, almost a decade later, Organ (1997) redefined the concept of OCB as behaviour that contributes "to the maintenance and enhancement of the social and psychological context that supports task performance" (p. 91). With this new conceptualisation of OCB, he did away with the requirement for citizenship behaviours to be extra role and not be directly recognized by the formal reward system. Nevertheless, Organ maintained that they should be discretionary and contribute to organisational effectiveness. Other labels have been adopted by researchers to represent domains of behaviour that overlap with the notion of OCB described by Organ and his colleagues including prosocial organisational behaviour (Brief & Motowildo, 1986); organisational spontaneity (George & Brief, 1992); extra-role behaviour (e.g. Van Dyne, Cummings & McLean Parks, as cited in LePine, Erez, & Johnson, 2002) contextual performance (Borman & Motowidlo, 1993, 1997; Motowidlo & Van Scotter, 1994). While these terms are not necessarily interchangeable, they all represent domains of behaviour that capture aspects of effective job performance.

Citizenship behaviours are somewhat similar across jobs (Borman, Penner, Allen, & Motowildo, 2001). Several frameworks of citizenship behaviours have been proposed and operationalised by different researchers. Moreover, although these frameworks differ from each other in some significant ways, what they have in common is a main focus on positive non-task behaviours that contribute to organisational effectiveness (Sackett, Berry, Wiemann, & Laczo, 2006). Furthermore, these frameworks cover behavioural categories that are largely overlapping (Sackett, et al., 2006). Early work by Organ and colleagues (Smith, et al., 1983) based on the factor analyses of supervisor ratings identified a two dimensional model of OCB: Altruism (e.g. behaviour related to helping others in

face-to-face situations) and Generalized Compliance (compliance with norms defining a good worker). Five years later, Organ (1988) put forward an expanded five-factor taxonomy of OCB: Altruism (e.g. helping another person); Conscientiousness (e.g. role behaviour beyond minimum required level); Sportsmanship (e.g. not complaining about unimportant matters); Courtesy (e.g. confer with others before taking action); and Civic virtue (e.g. keeping pace with matters that affect the organisation). Borman and Motowildo (1993) proposed a five dimension model: (1) persisting with enthusiasm and extra effort; (2) helping and cooperating with others; (3) volunteering to carry out task activities outside of one's formal job requirements; (4) endorsing, supporting and defending organisational goals; and (5) following organisational rules and procedures. Van Dyne, Graham and Dienesch's (1994) framework suggested three dimensions: organisational obedience (respect for the rules and regulations of the organisation); loyalty (allegiance to an organisation and promotion of its interest); and participation (social, advocacy and functional). Van Scotter and Motowidlo (1996) offered two dimensions of interpersonal facilitation (cooperative, considerate and helpful acts that assist co-workers) and job dedication (self-disciplined, working hard, taking initiative and rule-following behaviour).

Coleman and Borman (2000) using factor analyses, multidimensional scaling analyses and cluster analyses methodologies developed an integrated model to represent the citizenship behaviours domain based on existing contextual and citizenship models. A three dimension model of citizenship behaviours emerged comprising Interpersonal citizenship performance (including interpersonal altruism and interpersonal conscientiousness); Organisational citizenship performance (organisational allegiance and organisational compliance); and Job-task citizenship performance (extra effort on the job, dedication to

the job, and initiative and self development). Moreover, researchers in the citizenship behaviours domain have posited that citizenship behaviours can be grouped into two distinct categories; those directed towards the organization and those directed towards individuals (Marinova & Moon, 2003; Organ & Paine, 1999; Williams & Anderson, 1991).

2.3.3 CWB. Counterproductive work behaviour (CWB) is intentional deviant behaviour, which has the potential to hurt the organisation (organisationally directed), or other members of the organisation (interpersonally/people directed). CWB involves acts such as aggression, verbal hostility (insults and nasty comments) drug/alcohol use during working hours, work avoidance (e.g. tardiness), absence, lateness, doing tasks incorrectly, sabotage, theft, and property deviance (Bennett & Robinson, 2000; Dalal, 2005; Gurys & Sackett, 2003; Martinko, Gundlach, & Douglas, 2002; Robinson & Bennett, 1995). Like the citizenship domain, the literature offers varying definitions and concepts of the counterproductive behaviours domain. For example, Robinson and Bennet (1995) defined workplace deviance as “voluntary behaviour that violates significant organisational norms and in doing so threatens the well-being of an organization, its members or both” (p. 556) and Gruys and Sackett (2003) defined CWB as “…any intentional behaviour on the part of an organisation member viewed by the organization as contrary to legitimate interests” (p.30). Numerous labels have been used to represent this domain: workplace honesty (Murphy, 1993); workplace deviance (Robinson & Bennet, 1995); antisocial behaviour (Giacalone & Greenberg, 1997); counterproductive workplace behaviour (Gruys & Sackett, 2003); revenge (Bies & Tripp, 2005); and organisational retaliatory behaviours (Skarlicki & Folger, 1997).

The dimensionality of CWB has been captured by a number of taxonomies. Early work by Hollinger and Clark (1982) suggested that workplace dishonesty could be grouped into two broad categories of deviant behaviour: Property deviance (e.g. theft, property damage); and Production deviance (e.g. absenteeism, tardiness). Robinson and Bennet (1995) set out to expand upon Hollinger and Clark framework and developed a two-dimensional taxonomy of interpersonal behaviour toward organisational members versus behaviour toward the organization as whole and minor versus serious acts. Within this they identified four categories of deviant acts: Production deviance (organisational and minor); Property deviance (organisational and serious); Political deviance (interpersonal and minor); and Personal aggression (interpersonal and serious).

As in the case of the citizenship behaviours domain, researchers in the CWB domain have differentiated between behaviours directed towards organisations members – e.g., verbal hostility towards co-workers – and behaviours that are directed towards the organisation as a whole – e.g., withdrawal, sabotage – (Berry, Ones, & Sackett, 2007; Gruys & Sackett, 2003). For example, Bennet and Robinson (2000) refined their taxonomy to simply an interpersonal deviance and organisational deviance dimension. Similarly, Marcus, Schuler, Quell and Hümpfner (2002) distinguished between interpersonal and organizational deviance in the development of their counterproductivity questionnaire. However, they further postulated that within these dimensions, behaviours could be categorized on the basis of form of manifestation (absenteeism, substance abuse, aggression and theft).

2.4 Big Five Personality Factors and Task Performance, OCB, and CWB

Meta-analytic research based on the FFM has provided evidence that personality is a valid predictor of task-based criteria such as overall job performance (for example, Barrick & Mount, 1991; Barrick, et al., 2001; Hurtz & Donovan, 2000; Tett et al., 1991). Two of the earliest meta-analytic studies to provide evidence for the utility of the FFM for selecting employees into a variety of jobs are those of Barrick and Mount (1991) and Tett et al. (1991). In the Barrick and Mount (1991) meta-analysis of 117 validity studies comprising sizes ranging from over 14, 000 to 19, 000 subjects, Conscientiousness was shown to be a valid predictor of job or task performance across the five occupational groups (*p* ranges from .20 to .23). They found that the other Big Five personality factors are valid predictors of job performance for certain occupation categories: Extraversion was a valid predictor of job performance for managers and sales occupation categories; Agreeableness was a valid predictor of job performance for managers and police occupation categories; and Emotional Stability was a valid predictor of job performance for police and professional and skilled or semi-skilled occupation categories. However, Openness to Experience was not a valid predictor of job performance for any occupation group. Conversely, Tett et al.'s (1991) meta-analytic findings provided some evidence that all of the Big Five personality factors are valid predictors of job performance. They reported mean corrected correlations for the relationship between job performance and Agreeableness (mean corrected r = .33), Openness (mean corrected r = -.27), Neuroticism (mean corrected r = -.22), Extraversion (mean corrected r = .15), and Conscientiousness (mean corrected r = .18).

In a later meta-analysis, based upon studies conducted in the European Community, which were not included in prior reviews, Salgado (1997) found that Conscientiousness and Emotional Stability are valid predictors of job performance across occupational groups (p = .25 and p = .19 respectively). Additionally, Salgado reported that the other Big Five factors are valid predictors only for some occupational groups: Extraversion is a valid predictor for managers and police; Openness to Experience is a valid predictor for police and skilled labour; and Agreeableness was a valid predictor for professionals, skilled labour, and managers. In another study, Hurtz and Donovan (2000) conducted a meta-analysis to investigate the relationship between personality and job performance using only scales that were explicitly designed to measure the Big Five. In their study, Hurtz and Donovan explored the criterion-related validity of the Big Five for task and citizenship dimensions. They reported findings that closely paralleled that of prior meta-analytic studies. They found that Conscientiousness and Emotional Stability are valid predictors of task performance (ρ_v = .15 and ρ_v = .13 respectively).

Barrick et al. (2001) meta-analysis of fifteen prior meta-analytic studies supported previous findings that Conscientiousness is a valid predictor of overall job performance across all occupations. Furthermore, Conscientiousness was shown to be most consistent and salient predictor of overall job performance among the Big Five personality dimensions. In addition, they found that Emotional Stability was a valid predictor of overall job performance, but only for certain occupational groups (police and skilled or semi-skilled). The other three Big Five personality factors did not predict overall job performance. In a more recent metanalytic investigation, Connelly and Ones (2010) found that other-ratings of the Big Five personality factors yielded considerably greater validities for predicting job performance than do self-ratings of the Big Five.

More specifically, they found that the validities of other-ratings of Conscientiousness, Emotional Stability, Openness to Experience, and Agreeableness for predicting job performance were substantially greater than that of self-ratings. Similarly, Oh, Wang, and Mount (2011) in their meta-analysis of the relationship between observer ratings of the five-factor model (FFM) personality traits and overall job performance found that the predictive validity of observer ratings of FFM traits were greater than self-report ratings of FFM traits. Moreover, they found that unlike self-report ratings of FFM traits, observer ratings of all FFM traits significantly predicted overall performance. Furthermore, observer ratings of FFM traits added significant incremental variance over self-report ratings of corresponding FFM traits in predicting overall job performance, but the converse was not true. Additionally, Le et al. (2011) found evidence suggesting that the relationships between Big Five personality factors, Conscientiousness and Emotional Stability, and task performance was curvilinear rather than linear. Specifically, they found that both Conscientiousness and Emotional Stability will initially lead to higher levels of task performance but the relationship will become weaker and eventually diminishes as levels of Conscientiousness and Emotional Stability increases past a certain point. They also found that the point at which the two personality traits-task performance relationships diminishes is lower for low-complexity jobs than high complexity jobs. Thus, suggesting that high levels of both Conscientiousness and Emotional Stability are more advantageous for task performance in high than low-complexity jobs.

With regard to OCB, Organ and Ryan (1995) conducted the most comprehensive meta-analytic study investigating the dispositional and attitudinal predictors of citizenship behaviours. They include two Big Five personality traits in their study: Conscientiousness and Agreeableness. They reported significant

mean corrected correlations between Conscientiousness and Agreeableness and the altruism dimension of citizenship behaviours (mean corrected r =.22 and mean corrected r =.11 respectively) and generalised compliance (mean corrected r = .33 and mean corrected r = .13 respectively). Later, Hurtz and Donovan (2000) meta-analytic study examined the criterion-related validity of the Big Five for two dimensions of contextual performance: job dedication and interpersonal facilitation. They found that Conscientiousness and Emotional Stability were valid predictors of both job dedication (ρ_v = .18 and ρ_v = .13 respectively) and interpersonal facilitation while Agreeableness emerged as valid predictor of interpersonal facilitation (ρ_v = .17). Also, Borman et al.'s (2001) review of the personality and citizenship performance relationship for twenty post-Organ and Ryan (1995) studies yielded evidence that Conscientiousness (mean uncorrected correlation across OCB dimensions; Mean r = .24) and Agreeableness (mean uncorrected correlation across OCB dimensions; Mean r = .13) are valid predictors of OCB. In addition, recent meta-analyses (Lepine, et al., 2002; Dalal, 2005) have provided evidence that Conscientiousness is a positive predictor of OCB (mean corrected correlation; Mean ρ = .23 and Mean ρ = .30 respectively). In these two studies, the authors did not examine the relationships between other personality traits and OCB.

Chiaburu, Oh, Berry, Li, & Gardner (2011) metanalytic study found that Emotional Stability, Extraversion, and Openness/Intellect provided incremental validity above and beyond Conscientiousness and Agreeableness in predicting citizenship behaviours. Furthermore, they found that Openness and Agreeableness demonstrated stronger relationships with citizenship than task performance whereas the Conscientiousness, Emotional Stability, and Extraversion demonstrated relationships of similar magnitudes with citizenship and task performance. In a recent empirical study,

Le et al. (2011) found evidence suggesting that the relationships between Big Five personality factors, Conscientiousness and Emotional Stability, and OCB was curvilinear rather than linear. Specifically, they found that both Conscientiousness and Emotional Stability will initially lead to higher levels of OCB but the relationship will become weaker and eventually diminishes as levels of Conscientiousness and Emotional Stability increases past a certain point.

In general, research studies investigating the relationship between the Big Five dimensions and OCB has been mixed but promising. For example, Sackett, et al. (2006) found that each of the Big Five personality dimensions was significantly positively correlated with composite OCB: Agreeableness (r = .39), Openness (r = .32), Extraversion (r = .29), Emotional Stability (r = .21), and Conscientiousness (r = .28). They also reported significant correlations between each of the Big five dimensions and all three citizenship dimensions measured in their study. Miller, Griffin, and Hart (1999) found that Conscientiousness was positively related contextual performance, while Extraversion was negatively associated with contextual performance. Neuman and Kickul (1998) found that Conscientiousness and Agreeableness correlated significantly positively with all five of Organ's original OCB dimensions (rs = .20 -.41 and rs = .21-.34). Furthermore, they found that Extraversion registered negative relationships with all of Organ's five OCB dimensions, but was only significantly related to the OCB dimensions of altruism, civic virtue, and conscientiousness. Van Scotter and Motowildo (1996) found a significant positive correlation between Conscientiousness and Agreeableness and citizenship behaviours of job dedication and interpersonal facilitation. They also found a significant positive correlation between extraversion and interpersonal facilitation.

As to CWB, research studies have provided evidence for the personality-CWB relationship. For example, Salgado's (2002) meta-analysis investigated the relationship between Big Five dimensions and measures of counterproductive behaviours, and found that Conscientiousness and Agreeableness were valid predictors of the deviant behaviour criterion that consisted of measures of admissions, theft, disciplinary problems, actual theft, and substance abuse, organisational rule breaking, property damage, and other irresponsible behaviour (an operational validity of .26 and .20 respectively). The Dalal (2005) meta-analysis only examined the relationship between Conscientiousness and CWB, and found that Conscientiousness was a moderately strong correlate of CWB (*p* range = -.26 to -.38 with Mean *p* = -.38). In another study, Sackett et al (2006) found that each of the Big Five personality dimensions was significantly negatively correlated with composite CWB, with the exception of Openness to Experience: Conscientiousness (r = -.41), Emotional Stability (r = -.32), Agreeableness (r = -.30), and Extraversion (r = -.11). They also found that Conscientiousness, Emotional Stability, and Agreeableness are negative correlates of CWB facets of organisational deviance and interpersonal deviance. Furthermore, they reported a negative relationship between Extraversion and the CWB facet of organisational deviance. More recently, Berry et al (2007) conducted a review and meta-analysis of the common correlates of CWB-Interpersonal deviance and CWB-Organisational Deviance, and found that Conscientiousness, Agreeableness, and Emotional Stability were much stronger correlates of both CWB-Interpersonal deviance and CWB-Organisational Deviance (*p*s = -.23 to -.46) than Extraversion and Openness to Experience (*p*s = -.09 to .02). Furthermore, they reported that Agreeableness was the most salient correlate of CWB-Interpersonal deviance and Conscientiousness was the most salient correlate of CWB-Organisational Deviance. Additionally, in a recent

empirical study, Le et al. (2011) found evidence suggesting that the relationships between Big Five personality factors, Conscientiousness and Emotional Stability, and CWB was curvilinear rather than linear. Specifically, they found that both Conscientiousness and Emotional Stability will initially lead to lower levels of CWB but the relationship will become weaker and eventually diminishes as levels of Conscientiousness and Emotional Stability increases past a certain point.

2.5 Narrow Personality Traits and Task Performance, OCB, and CWB

Research investigating the personality-job performance link at the facet level is scant. Ashton (1998) tested Ones and Viswesvaran's (1996) claim that broader personality variables are better predictors of job performance criteria than narrow traits, and found that the responsibility and risk taking narrow measures of the Jackson Personality Inventory were more strongly associated with overall work delinquency than the Big Five personality dimensions. Vinchur, Schippmann, Switzer, & Roth's (1998) meta-analytic study, investigated the relationships between the Big Five personality dimensions, two facets of Extraversion (affiliation and potency), and two facets of Conscientiousness (Achievement Orientation and Dependability) and objective sales performance. They found that the facet of Conscientiousness - Achievement Orientation – and the facet of Extraversion – Potency – demonstrated the strongest associations with objective sales performance (mean *r*s = .23 and .15 respectively). Similarly, Warr, Bartram, and Martin (2005) found that the facet of Conscientiousness - Achievement Orientation – and the facet of Extraversion – Potency – were related to sales performance. Stewart (1999) examined the relationships with job performance at different stages of employee tenure for a broad Conscientiousness

personality measure and two narrow facets of Conscientiousness (order and achievement), and found that the order facet correlated more strongly with job performance for employees in the transition stage (newly hired employees) and demonstrated incremental validity beyond global Conscientiousness. In addition, Stewart found that the achievement facet correlated more strongly with job performance in the maintenance stage (veteran employees) and demonstrated incremental validity beyond global Conscientiousness.

Dudley et al. (2006) conducted a meta-analysis to investigate the degree to which four narrow traits of Conscientiousness (achievement, dependability, order, and cautiousness) predict job performance criteria above and beyond global Conscientiousness. The results of this study suggested that narrow traits of conscientiousness do incrementally predict task performance, contextual performance, and CWB above and beyond global Conscientiousness, but the degree to which they contribute depends on the particular job performance criterion and occupation type. Specifically, for task performance and interpersonal facilitation, the variance explained by narrow traits above and beyond global Conscientiousness was small to moderate (ΔR^2 = .046 and ΔR^2 = .058 respectively). On the contrary, for job dedication and CWB, the narrow traits explained a substantial percentage of criterion variance above and beyond global Conscientiousness (ΔR^2 = .259 and ΔR^2 = .136 respectively). Furthermore, the estimated true validities for task performance ranged from .11 to .25 across narrow traits with achievement showing the highest validity (p = .25). For job dedication, the estimated true validities ranged from .08 to .46 across narrow traits with dependability demonstrating the highest validity (p = .46). For interpersonal facilitation, the estimated true validities ranged from -.02 to .23 across narrow traits with dependability showing the highest validity (p = .23). Finally, for CWB, the estimated true validities ranged from -.34 to

.00 across narrow traits with dependability demonstrating the highest validity (p = -.34).

Marcus and Schuler (2004) found that self-control (conceptually a narrow trait of conscientiousness) to be the most dominant predictor of CWB within a set of twenty-five independent variables and was the only variable that accounted for considerable amount of variance above that of other variables. In another study, Roberts, Harms, Caspi, & Moffitt (2007) found that three narrow measures of the Multidimensional Personality Questionnaire (MPQ) – self-control, aggression, and social closeness – assessed at age 18 were statistically significant predictors of CWBs at age 26. In addition, Hastings and Thomas (2009) found that the lower-order facets Agreeableness – trust, morality, altruism, cooperation, modesty, and sympathy –, the lower-order facets of Conscientiousness – self-efficacy, orderliness, dutifulness, achievement striving, self-disciplines, and cautiousness -, the lower-order facets of Openness to Experience – artistic interests, emotionality, and intellect –, and the lower-order facet of Extraversion – friendliness – were negatively related to workplace deviance. Moreover, they found that the lower facet of Extraversion – excitement seeking – and the lower-order facets of Neuroticism – anger and immoderation – were positively related to workplace deviance.

More recently, O'Neill and Hastings (2011) found that the integrity, risk taking, and seductiviness narrow personality measures of the Supernumerary Personality Inventory were as strong or stronger predictors of interpersonal workplace deviance, organisational workplace deviance, and overall workplace deviance as were any of the broad Big Five personality factors. Additionally, Beauregard (2012) found that employees with high levels of perfectionism perform more citizenship behaviours. Moreover, Beauregard found that general self-efficacy predicted higher levels

of citizehship behaviours, but only for men. In another study, Chih-Ting and Chih-Hsun (2013) found that employees high in self-esteem are more likely to engage in OCB whereas employees high in equity sensitivity were less likely to engage in OCB.

Although there has been extensive theoretical discussion as it relates to the relative value of broad and narrow traits for predicting job performance criteria, empirical research assessing the differential criterion-related validity of narrow traits of the Big Five personality dimensions with multidimensional job performance criteria and the incremental validity of narrow traits beyond the broad Big Five personality dimensions in predicting multidimensional job performance criteria have been limited. Furthermore, the majority of studies that explored the differential criterion-related validity and incremental validity of narrow traits in predicting job performance criteria focused on narrow traits of Conscientiousness. Dudley et al. (2006) suggested that future research should explore the interrelationships among facets of other broad Big Five dimensions and the usefulness of these narrow traits in predicting a wide array of job performance criteria. This thesis will investigate the differential predictive validity of lower-level facets of each of the Big Five personality dimensions for predicting task performance, OCB, and CWB. In addition, the incremental validity of these lower-level facets beyond the broad Big Five personality dimensions in the prediction of task performance, OCB, and CWB will also be examined. Thus, the following research questions were formulated:

Research Question 2: Which lower-order personality traits are valid predictors of task performance, OCB, and CWB?

Research Question 3: Do lower-order facets demonstrate incremental validity above and beyond the Big Five personality dimensions in the prediction of task performance, OCB, and CWB?

Chapter 3: Study 1 – An Empirical Analysis of the Representation of Lower-order Facets of the Big Five Personality Dimensions

3.1 Introduction

As previously outlined, to date, there is little conceptual or empirical consensus among personality researchers about a lower-level taxonomy of the Big Five domain (Costa & McCrae, 1998; Goldberg, 1999; Roberts, et al., 2005; Saucier & Ostendorf, 1999). In this study, the lower-order structure of each of the Big Five domains was investigated by factor analysing scale scores from nine personality inventories related to each of the Big Five separately. More specifically, this study sought to identify a shared overall lower-order structure for each of the Big Five domains based on nine personality inventories. The rationale underpinning this approach is that different theoretical perspectives and empirical studies have identified in one form or another, most, if not all, significant lower-order facets of each of the Big Five domains and, thus, these lower-order facets are ingrained in the corresponding personality inventories (Roberts et al., 2005). As a comprehensive set of lower-order facets of Big Five personality factors were identified and the correlation matrix between measured variables is available, using factor analytic techniques to determine the number and nature of lower-level facets would be appropriate (Fabrigar et al., 1999).

Although some factor analytic studies have produced factor solutions with fewer or more higher-order factors than the Big Five (for example, Digman, 1997; DeYoung et al., 2002; Lee & Ashton, 2004; Paunonen & Jackson, 2000; Tellegen & Waller, 1987), this study focused on the FFM or Big Five model as an organising taxonomy for lower-level personality traits primarily because, as mentioned in Chapter 2, at the broad level of abstraction, the Big

Five model captures the commonalities among most of the existing systems of personality traits; therefore, providing an integrative descriptive model for research (John & Srivastava, 1999). Factor analytic studies provided evidence through convergences between Big Five measures and measures of other major personality models that the FFM subsumes competing models of human personality (for example, Aston et al., 1998; Goldberg & Rosolack, 1994; Carroll, 2002; McCrae & Costa, 1989a). Moreover, using the Big Five as an organising framework for classifying lower-order facets served to reduce the redundancy that arises from measuring the same construct under different names (McCrae & John, 1992).

The nine personality inventories used in this study were the Jackson Personality Inventory – Revised (JPI-R; Jackson, 1994), the revised NEO Personality Inventory (NEO-PIR; Costa & McCrae, 1992a), 16 Personality Factor Questionnaire Fifth Edition (16PF5: Conn & Rieke, 1994), Hogan Personality Inventory (HPI; Hogan & Hogan, 1992), AB5C Scales from the International Item Pool (ACB5C-IPIP; Goldberg, 1999), the Multidimensional Personality Questionnaire (MPQ; Tellegen, 1982, Tellegen & Waller, 2008), the Temperament and Character Inventory-Revised (TCI-R; Cloninger, 1999; Cloninger et al., 1994), the Six-Factor Personality Questionnaire (6FPQ; Jackson et al., 2000), and the HEXACO Personality Inventory (HEXACO-PI; Lee & Aston, 2004). These nine personality inventories have been widely used in various applied research contexts. Moreover, the majority of these instruments have been used in organisations for selection purposes (for example, NEO-PIR, HPI, 16PF). Furthermore, these nine instruments have been developed using different theoretical perspectives and approaches to scale construction and have various perspectives on each of the Big Five domains and their respective lower-level traits. In this study, the following research question was investigated:

Research Question 1: What is the number and nature of shared lower-order facets underlying each of the Big Five personality factors based on scales drawn from nine personality inventories?

3.2 Method

3.2.1 Measures and Facets Selection. The following is a brief discussion of each of the nine personality inventories used in this study that were administered to ESCS sample between 1993 and 2003.

3.2.1.1 The revised Neo Personality Inventory (NEO-PI-R). The NEO-PI-R, administered in the summer of 1994, is a 240-item questionnaire developed to operationalise the FFM of personality (Costa, et al. 1991; Costa and McCrae, 1992a). The NEO-PI-R consists of scales measuring five domains: Neuroticism, Extraversion, Openness to Experience, Agreeableness, and Conscientiousness. Each domain comprises six subscales referred to as facets, a total of 30 facets. All thirty facets comprising the domains were included in the analyses. Items are scaled with a 5-point Likert scale ranging from 1 = *(strongly disagree)* to 5 = *(strongly agree)*. Internal consistency (reliability) coefficients for subscales or "facets" are reported to range from .62 to .82 (Costa and McCrae, 1992a).

3.2.1.2 The Sixteen Personality Factor Questionnaire Fifth Edition (16PF5). The 16PF was first published in 1949 and has originated from Raymond Cattell's (1945) factor analytic research of personality trait descriptors present in the English language. The 16PF underwent four revisions (1956, 1962, 1967-1969, 1988) since its initial publication in 1949(Conn & Rieke, 1994). The 16PF fifth edition (Conn & Rieke, 1994) consists of 185 items measuring 16 "primary" factor scales, with 10 to 15 each and an Impression Management scale of 12 items. Each item is assigned

a three-response category format. Internal consistency (reliability) estimates for the primary scales are reported to range from .68 to .87 (Chernyskhenko et al., 2001; Conn & Rieke, 1994). The 16PF was administered in the fall of 1996.

3.2.1.3 The Hogan Personality Inventory (HPI). The HPI was developed mainly for use in personnel selection, development, individual assessment, and career-related decision making (Hogan & Hogan, 2007). The 1992 HPI revised edition contains seven higher-order primary scales and a validity scale. These seven scales comprise 206 items arranged in 41 subscales known as Homogeneous Item Composites (HIC). The primary scales are adjustment, ambition, sociability, interpersonal sensitivity, prudence, inquisitive, and learning approach (Hogan & Hogan, 2007). Each item is assigned a "Yes"/"No" response category format. Internal consistency (reliability) estimates for the primary scales are reported to range from .57 to .82 (Hogan & Hogan, 2007). The reliabilities for the HICs are reported to range from .22 to .76 (Hogan & Hogan, 2007). However, the HICs are expected to have lower reliabilities as they consist of only 3-5 items. The HPI was administered in the winter of 1997.

3.2.1.4 Temperament and Character Inventory-Revised (TCI-R). The TCI-R (Cloninger, 1999; Cloninger et al., 1994) is a 240-item inventory based on Cloninger's psychobiological model of personality. This model comprises seven factors and combines "temperament" scales of Novelty-seeking, Harm Avoidance, and Reward Dependence from his original model with Persistence, a "temperament" scale, and "character" scales of Self-directedness, Cooperativeness, and Self-transcendence from his most recent work. All four "temperament" scales were scored by four lower-level subscales while the "character" scales were scored by three to five lower-level subscales. Items response format ranged from 1 = *(definitely false)* to 5 = *(definitely true)*. The TCI-R was

administered in the spring of 1997. The three Self-transcendence scales (spiritual acceptance, idealistic, and enlightened) were omitted from analyses as many researchers are likely to be of the view that scales that include religiosity or spirituality content measure an important individual difference variable that falls outside the personality domain (Ashton, Lee, & Goldberg, 2004).

3.2.1.5 The Multidimensional Personality Questionnaire (MPQ). The MPQ (Tellegen, 1982, Tellegen & Waller, 2008), administered in the summer of 1999, is a 300 item, true/false, factor-analytically derived personality inventory measuring 11 primary scales, which can be subsumed within three or four second-order factors. The 11 primary scales are based on 272 items, and scale reliabilities generally exceed .80.

3.2.1.6 The Jackson Personality Inventory-Revised (JPI-R). The JPI-R (Jackson, 1994), administered in the fall of 1999, is a revised version of the original JPI developed in 1976. Like the JPI, the JPI-R is primarily intended for use in normal populations as opposed to populations of psychiatrically disturbed or deviant individuals. The JPI-R consists of 300 True-False items measuring 15 scales, which have scale reliabilities ranging from .66 to .87 with a medium of .79 (Jackson, 1994).

3.2.1.7 The Six-Factor Personality Questionnaire (6FPQ). The 6FPQ (Jackson et al., 2000) is a 108-item inventory measuring six higher-level personality dimensions labelled Extraversion, Agreeableness, Methodicalness, Independence, Openness to Experience, and Industriousness each comprising three lower-level subscales. Items are scaled with a 5-point Likert scale ranging from 1 = *(strongly disagree)* to 5 *(strongly agree)*. The internal consistency of factor scales range from .76 to .86. The 6FPQ was also administered in the fall of 1999.

3.2.1.8 The HEXACO Personality Inventory (HEXACO-PI). The HEXACO-PI (Lee & Aston, 2004), administered in spring of

2003, is a 192-item personality inventory measuring six higher-level domains, labelled Honesty-Humility (H), Emotionality (E), eXtraversion (X), Agreeableness (A), Conscientiousness (C), and Openness to Experience (O) each consisting of four lower-level facets. Item response format ranged from 1 = *(strongly disagree)* to 5 = *(strongly agree)*. Internal consistency (reliability) coefficients for domain scales are reported to range from .89 to .92 and for facets from .75 to .88.

3.2.1.9 AB5C scales from the International Item Pool (AB5C-IPIP). Goldberg (1999) developed a 45-scale AB5C-IPIP personality inventory to measure the 45 bipolar dimensions in the lexical AB5C model of the Big Five proposed by Hofstee, et al. (1992). Moreover, the 45 AB5C-IPIP facet scales were created on the basis of the content of the lexical AB5C facets. The AB5C-IPIP consist of 485 items measuring nine facets for each Big Five dimension – one pure factor and eight with secondary loadings –, each assessed by 9-13 items. Each item is rated on a 5-point Likert scale ranging from 1 = *(very inaccurate)* to 5 = *(very accurate)*. The internal consistency-reliabilities for facets range from .67 to .90. All forty-five scales of the AB5C-IPIP personality inventory were included in the analyses. Different items from AB5C-IPIP scales were administered in the Spring of 1994, fall of 1995, and fall of 1996.

3.2.2 Data Analysis Techniques for Deriving the Lower-order Structure of Big Five Factors

3.2.2.1 Exploratory factor analysis. In this study, the data-driven, Exploratory Factor Analysis (EFA) approach was preferred over a theory-oriented confirmatory factor analysis (CFA) for deriving an initial lower-order structure of each Big Five factor. CFA requires researchers to have explicit hypotheses as to which factors exists, and how factors relate to the variables as well as

each other (Gorsuch, 1997). Gorsuch further noted that devoid of such presumptions, exploratory analyses are needed. As Finch and West (1997) purported, when the researcher does not have any explicit hypotheses which can guide the probing of the underlying structure of data, EFA techniques are most suitable. Currently, there is no empirical or theoretical underpinning for the lower-order taxonomy of each Big Five factor (Conscientiousness, Extraversion, Emotional Stability, Agreeableness, and Openness to Experience). As a consequence, there is no basis on which to make sound assumptions about the number of lower-order factors that comprise each Big Five personality factor or what particular personality scales they influence. In this context, EFA was used as it is likely to be a more practicable approach than CFA, because the number of plausible alternative models is so great it would be infeasible to test each pattern in CFA (Fabrigar et al., 1999). Exploratory analyses may be useful in a preliminary study to generate and focus hypotheses that can be subjected to confirmatory analyses (Gorsuch, 1997; MacCallum, Widaman, Zhang, & Hong, 1999).

EFA extraction methods, maximum likelihood estimation (MLE) and principal-axis factoring generally produce the best results (Costello & Osborne, 2005). In this investigation, the EFA factor extraction technique, maximum likelihood estimation (MLE) was used to fit the common factor model to the data. The main advantages of the MLE procedure is that it allows for the computation of a wide range model-data fit statistics; it produces goodness of fit information that can be used to determine the number of factors to retain (Fabrigar, et al., 1999). In this study, the root mean square error of approximation goodness of fit index (RMSEA; Browne & Cudeck, 1993; Steiger & Lind, 1980), which is one of the goodness of fit statistics produced by MLE (Fabrigrar et al., 1999), was one of the techniques used determine how many lower-order factors to retain for each of the Big Five factors. RMSEA

is a measure of fit based on the chi-square value and the degrees of freedom (Browne & Cudeck, 1993; Steiger & Lind, 1980). Moreover, RMSEA can be calculated using the chi-square and the degrees of freedom produced by maximum likelihood factor analysis (Browne & Cudeck, 1993). This is the main reason why MLE was chosen over the principal-axis factoring extraction method. Furthermore, MLE allows for the computation of statistical significant tests of factor loadings and correlations among factors and of confidence intervals for these parameter estimates (Fabrigar, et al., 1999). Also, MLE have the added advantage of accuracy in large samples over other extraction methods such as principal factor analysis (Finch & West, 1997). The major drawback of MLE is its assumption of multivariate normality of the measured variables (Fabrigar et al., 1999). MLE can produce distorted results when the assumption of multivariate normality is severely violated (Curran, West, and Finch, 1996). Thus, MLE is the best choice of the factor extraction methods when data is relatively normally distributed (Fabrigar et al., 1999). As a consequence, the univariate skewness and kurtosis values for individual scales were investigated according to the guidelines of severe nonnormality (i.e., skew> 2; kurtosis > 7) proposed by West, Finch, and Curran (1995). Furthermore, Ferguson and Cox (1993) purported that the final solution in EFA is not adversely affected by an acceptability level of 25% of variables showing non-normality. In addition, Mardia's (1970) coefficient was conducted to test for multivariate normality of measured variables. If the distribution only deviates marginally from that of a normal distribution, Mardia's coefficient will be close to 0.00 with a nonsignificant normalized estimate. Mardia's values outside the range of – 3.00 to +3.00 indicate a departure from multivariate normality (Bentler, 2006).

Scales from the nine personality inventories together were subjected to MLE extraction with orthogonal (varimax) rotation to

determine which of the Big Five domains each facet had its highest loading. This empirical approach to determining where the scales fit within the Big Five domains was preferred because: "the fact that a scale has been conceptually located in one of the Big Five domains may not be the best guide to determine whether the scale is statistically located in that domain" (DeYoung et al., 2007, p. 885). In addition, facets with their highest loading on each of the Big Five domains were then subjected to separate EFAs, MLE extractions with oblique (promax) rotation. Goldberg and Velicer (2006) recommended that researchers used an orthogonal rotation if the emphasis is on higher-level factors and an oblique rotation if they seek lower level factors in a single domain.

3.2.2.1.1 Sample size requirements for studies using EFA. In the factor analysis or component analysis literature several rules of thumb have been suggested for estimating an adequate sample size intended for Exploratory Factor EFA and Principal Component Analysis (PCA). These rules of thumb are typically stated as either the minimum necessary sample size (*N*), or as a function of sample size to the number of variables (*N-to-p* ratio) (Guadagnoli & Velicer, 1988; MacCallum et al., 1999). With reference to minimum sample size rules, N of 100 to 200 have been often suggested (Gorsuch, 1983; Guildford, 1954; Loo, 1983) yet Comrey and Lee (1992) have argued that sample sizes of 500 or more observations should be obtained whenever possible in factor analytic studies. They proposed a rating scale for adequate sample size in factor analysis: 100 = poor, 200 = fair, 300 = good, 500 = very good, 1,000 or more = excellent.

Recommendations for the *N-to-p ratio* rules have ranged from 2:1 to 20:1 (for example, Cattell, 1978; Gorsuch, 1983; Lindeman, Merenda, & Gold, 1980; Nunnally, 1978). Guadagnoli and Velicer (1988) noted that *N-to-p ratio* rules appear to be based on research on shrinkage in multiple regressions, while minimum sample size

rules are most likely founded on the line of reasoning that a correlation coefficient becomes an adequate estimator of the population correlation coefficient when sample sizes of 100 to 200 are obtained. Furthermore, these recommendations were not based on agreement among authorities, empirical research or theory, but rather on an author's experience, uncited communications for expert sources, or unstated beliefs (Guadagnoli & Velicer, 1988; Velicer & Fava, 1998). Limited studies have found some support for the minimum *N* rules, but no support for the rules that recommend *N-to-p* ratios (Arrindell & van der Ende, 1985; Barrett & Kline, 1981).

Research studies have indicated that adequate sample size is partly determined by the interaction between sample size and the characteristics of the data (Guadagnoli & Velicer, 1988; MacCallum et al., 1999; Velicer & Fava, 1998). Guadagnoli and Velicer (1988) conducted a Monte Carlo simulation to determine adequate sample size for PCA. This study systematically manipulated the following conditions: sample size (50, 100, 200, 300, 400, 500, and 1000), number of variables (ranged from 36 to 144), number of components (3, 6, and 9), and component saturation or observed variables loadings on components (.80, .60, and .40). In summary, the findings of this study indicated that when component saturations were well-defined (.80), a sample size of 100 was adequate; when observed variables had loadings in the region of .60, a minimum sample size of 150 was adequate across conditions; when observed variables had loadings in the locality of .40, a sample size in the range of 300 to 400 was adequate across conditions.

Velicer and Fava (1998) conducted a follow-up Monte Carlo study including principal analysis, image component analysis, and maximum likelihood EFA as the methods of analysis as well as patterns of loadings (equal and unequal) and magnitude of the

average loading (.40, .60, .80). The results of their study suggest that little benefit could be derive from having more than 100 subjects for EFA and PCA with loadings of .60 and 400 subjects for EFA and PCA with loadings of .40. In this study only loadings of observed variables on factors of .40 and above would be considered acceptable. Furthermore, in social sciences the more common magnitudes are low to moderate observed variable communalities of .40 to .70 (Costello & Osbourne, 2005). In addition, Tabachnick and Fidell (2001) recommend .32 as a good rule for the minimum loading of a variable.

MacCallum et al. (1999) conducted a Monte Carlo simulation study to determine sample size requirements for maximum likelihood EFA under different conditions of communality, overdetermination, and sample size. The study failed to validate common rules of thumb relating to minimum sample size, or the minimum ratio of sample size to the number of variables. The authors concluded that adequate sample size is influenced by degree of overdetermination of the factors and the level of communality of the variables. The general findings of their study indicated that sample size and level overdetermination had very little effect on solutions when communality was high, but influenced the quality of results when some or all the communalities were low. In addition, when the level of communality was high or wide, a sample size of 100 was adequate at all levels of the overdetermination condition while under all conditions a sample size of 200 or 400 was sufficient except where there was an observed variable: factors ratio of 20:7 and low communalities. In such situations, they recommend samples above 500.

Goldberg and Velicer (2006) purported that factor analysis should be regarded as inherently a subject-intense activity for the reason that a set of factor-univocal variables are uncommon for an exploratory factor study; hence, samples of no less than a few

hundred subjects will be necessary to achieve robust findings, and samples ranging between 500-1000 are preferred. Tabachnick and Fidell (2007) noted that when computing factor analysis a sample size of at least 300 cases would be adequate. What is clear from the above discussion is that a sample of 300 or more would probably yield a stable factor solution.

In summary, research has demsonstrated that common rules of thumb relating to minimum sample size, or the minimum ratio of sample size to the number of variables are not valid and useful (for example, MacCallum et al., 1999; Preacher & MacCallum, 2002). Moreover, the literature on sample size recommendations has shown that adequate sample size is the function of several data parameters such as minimum sample size varies depending on the level of communalities, loadings, number of variables per factor, and the number of factors (Costello & Osborne, 2005; de Winter, Dodou, & Wieringa, 2009; Fabrigar et al., 1999; MacCallum et al., 1999; Preacher & MacCallum, 2002). Costello and Osborne (2005) noted that uniformly high communalities without cross loadings, in addition to several variables loading strongly on each factor signify “strong data” in factor analysis. Furthermore, Preacher and MacCallum (2002) purported that "as long as communalities are high, the number of expected factors is relatively small, and model error is low (a condition which often goes hand-in-hand with high communalities), researchers and reviewers should not be overly concerned about small sample sizes." (p. 160).

3.2.2.1.1.1 Sample and Participants. Participants were 375 members of the Eugene-Springfield (Oregon) Community Sample (ESCS; 217 women, 158 men), ranging in age from 20 to 82 years (M =51.5, SD = 12), who completed all nine personality inventories included in the current analyses. The ESCS had been recruited in 1993 from a list of home owners and agreed to complete several mailed questionnaires for honorarium cheques that ranged from $10

to $25 for at least 5 to 10 years. In 1993, the initial sample consisted of approximately 500 men and 500 women who ranged in age from 18 to 85 (M =51, SD = 13). Of the participants included in the current analyses, 98% were white, and more than half (56%) were college graduates. The sample characteristics for this study are outlined in more detail in Appendix B. Data on ESCS is currently maintained by the Oregon Research Institute (ORI) and was obtained from Lewis R. Goldberg, ORI.

3.2.2.2 Determining the optimal number of lower-order factors to retain. In this study, the primary purpose was to determine how many lower-order factors to retain for each of the Big Five factors. A number of procedures were used to determine the optimal number of factors underlying each of the Big Five factors. Two techniques, parallel analysis, a method based on the generation of random variables (Horn, 1965) and RMSEA (Browne & Cudeck, 1993; Steiger & Lind, 1980) were used to identify an initial number of factors. The Kaiser-Guttman rule of computing the eigenvalues for correlation matrix, which recommend that the number of factors to be extracted is determined by the number of eigenvalues greater than 1 (Guttman, 1954; Kaiser, 1960) was not used in this study because the application of this rule to eigenvalues of the reduced correlation matrix rather than eigenvalues of the unreduced correlation matrix is an invalid procedure (Fabrigar et al., 1999). Additionally, simulation studies found that the Kaiser-Guttman procedure led to considerable overfactoring, often by 30-50% and occasionally to underfactoring (Gorsuch, 1983; Hakstian, Rogers, & Cattell, 1982; Velicer, Eaton, & Fava, 2000; Zwick & Velicer, 1982, 1986).

Parallel analysis was proposed by Horn (1965) as means to improving the Kaiser-Guttman rule by providing a comparison baseline. In this method, actual sample data eigenvalues from the correlation matrix obtained in principal factors or PCA are compared

against the eigenvalues obtain from random data correlation matrices based on the same sample size and the number of variables (Fabrigrar et al., 1999; Horn, 1965). For parallel analysis, the optimal number of factors is determined by the number of eigenvalues from the actual sample data correlation matrix that are greater than the corresponding mean eigenvalue from the random data correlation matrices (Finch & West, 1997; Horn, 1965; Humphreys & Montanelli, 1975; O'Connor, 2000). Whereas Horn (1965) proposed the use of mean eigenvalues from the random data as the comparison baseline, the current recommended practice is to use the eigenvalues that correspond to the 95th percentile point of the distribution of eigenvalues from random data matrices (Longman, Cota, Holden, & Fekken, 1989). Simulation research has indicated that parallel analysis is one of the most consistently accurate methods for determining the number of factors to be retained (Humphreys & Montanelli, 1975; Longman et al., 1989; Velicer et al. 2000; Zwick & Velicer, 1986).

RMSEA goodness of fit index was introduced by Steiger and Lind (1980) for evaluating covariance structure models. The advantages of RMSEA index is the availability of both a point of estimate and corresponding confidence interval (Steiger, 1989, 1990). As a result, many of problems and paradoxes apparent in testing models with large sample sizes are reduced (Steiger, 1989, 1990). The RMSEA index of fit is one of the goodness of fit statistics produced by the MLE (Fabrigrar et al., 1999) and CFA (Hair et al., 2006). As mentioned above, RMSEA can be calculated using the chi-square and the degrees of freedom produced by maximum likelihood factor analysis (Browne & Cudeck, 1993). To use the RMSEA goodness of fit index to determine the optimal number of factors, RMSEA statistics was computed for factor analysis model of increasing complexity until a RMSEA index of .05 or less is obtained. A RMSEA index of fit of .05 represents good fit (Brown & Cudeck,

1993; Steiger, 1989). The aim of such an approach is to select a model that explains the data substantially better than alternative models with fewer factors, but performs as well or almost as well as alternative models with more factors (Fabrigrar et al., 1999).

3.3 Results

3.3.1 Outliers and normality. Before factoring the facets within each of the Big Five domains separately, the factor structure of all 229 facets together was examined to determine which of the Big Five domains each facet had its highest loading. The mean, standard deviation, internal consistency (alpha), skewness, and kurtosis for each of the scales are reported in Appendix C. The univariate skewness and kurtosis values for individual scales were investigated according to the guidelines of severe nonnormality (i.e., skew> 2; kurtosis > 7) proposed by West et al. (1995). Skewness for scales ranged between (-.00) and (-2.58) while Kurtosis for scales ranged between (.01) and (7.75), and thus were well within the robustness thresholds for normality (West et al., 1995). To examine if the data met the assumption of multivariate normality, the Mardia's coefficient (Mardia, 1970) using PRELIS 2.5, the companion software package to Lisrel, was computed. In addition, the multivariate test for kurtosis, z = -2.340 and for skewness, z = -2.292, did not show a departure from multivariate normality as Mardia's values were within the range of – 3.00 to +3.00 (Bentler, 2006). These results allowed the use of the MLE extraction method in the EFA.

3.3.2 Selecting scales related to each Big Five domain from the nine personality inventories. First, all 229 scales were subjected to an initial MLE extraction with orthogonal (varimax) rotation to determine which of the Big Five domains each facet loaded on. After extracting and rotating five factors, 67 of the 229

scales were removed from the analyses as they either cross-loaded (loaded on more than one factor and the difference between loadings was less than .1) or did not load on a factor (loaded less than .4 on a factor). The most commonly used criteria in judging a factor loading as significant in EFA is .40 (Hinkin, 1998). Then, the 162 remaining scales were subjected to MLE extraction with orthogonal (varimax) rotation, extracting five factors. The sample size (N =375) was deemed adequate for subjecting the remaining 162 scales to factor analysis given sample size considerations previously mentioned for EFA (for example, Costello & Osborne, 2005; Fabrigar et al., 1999; MacCallum et al., 1999; Preacher & MacCallum, 2002). The properties of the 162 facet scales were acceptable: all 162 scales had communalities above .5, there were no cross loadings, all loadings were above .4, and there was high overdetermination of factors (factor-to-variable ratio). It is important to note that in the social sciences low to moderate communlaities of .4 to .7 are more common (Costello & Osborne, 2005). Fabrigar et al. (1999) purported that a sample size of 200 or more is desirable under conditions of moderate communality (.4 to .7) and moderate overdetermination of factors. The first 10 eigenvalues for the data matrix were 6.88, 4.22, 3.62, 2.61, 2.53, 1.82, 1.76, 1.64, 1.59, and 1.55 respectively. Of the 162 scales, 37 had their highest loading on Emotional Stability, 33 had their highest loading on Extraversion, 32 had their highest loading on Openness to Experience factor, 34 had their highest loading on Conscientiousness, and 26 had their highest loading on Agreeableness (Appendix D). Next, as facets within each Big Five domain are expected in theory to correlate, and the objective was to seek lower level factors in each of the Big Five domains, it was decided to subject scales with their highest loading on each of the Big Five domains to separate MLE extraction with oblique (promax) rotation analyses.

3.3.3 Extraversion domain analysis. The parallel analysis and RMSEA results that were used to determine the optimal number of lower-order Extraversion factors to retain is presented in Table 1. The first ten eigenvalues that emerged from factor analysing real data are shown in Column 2; the mean eigenvalues obtained by factoring 100 random data sets are presented in Column 3; The RMSEA goodness-of-fit statistics obtained by fitting models of increasing complexity to the sample data until a RMSEA index of .05 or less is obtained are given in Column 4. A comparison of Columns 2 and 3, parallel analysis suggested a six factor model as the first six eigenvalues from the real data of 1 and above (12.02, 4.82, 3.19,1.86,1.63,1.38) were larger than those obtained from the random data (1.61, 1.53, 1.47,1.42,1.37,1.33). In addition, the RMSEA goodness-of-fit criteria of .05 suggested a six factor solution. The MLE chi-square value for the six-factor solution indicated poor fit (X^2 = 10,122, df = 521, $p < .001$). The literature has noted that the chi-square statistic is susceptible to sample sizes (e.g., Fabrigar et al. 1999; Humphreys & Montanelli, 1975). Fabrigar et al. (1999) noted that even small discrepancies between the model and the data are likely to lead to rejection of the model with any reasonable number of factors when N is large. Whereas, when *N* is small, even large discrepancies between the model and the data may are likely to result in acceptance of the model, thereby leading to underfactoring.

Table 1:

Comparison of Eigenvalues for the Sample and Random Data and the Root Mean Square Error of Approximation Statistics for the Sample Data for Extraversion Scales

Factor Number	Eigenvalues for sample data	Average eigenvalues for 100 sets of random data	RMSEA
1	12.02	1.61	.10
2	4.82	1.53	.09
3	3.19	1.47	.08
4	1.86	1.42	.07
5	1.63	1.37	.06
6	1.38	1.33	**.05**
7	.92	1.29	
8	.84	1.25	
9	.80	1.22	
10	.77	1.18	

Note. RMSEA goodness-of-fit criteria of .05 is in bold.

The 33 Extraversion scales were subjected to a MLE extraction oblique (promax) rotation, extracting the suggested number of factors to be retained. Table 2 presents the factor loadings for the MLE extraction oblique (promax) rotation (structure matrix) from the six-factor solution. None of the nine personality inventories used in this study had scales that fell within more than four of the Extraversion lower-order facets, indicating that these personality inventories do not provide systematic coverage of the entire Extraversion domain. Therefore, the factor structure of the Extraversion derived in this study is more comprehensive.

The six lower-order factors can be interpreted and labelled on the basis of careful denotations of the most high-loading scales as well as the test's descriptions of those scales. The first factor, named social boldness, assesses an individual's tendency to exhibit confidence in social situations. High scorers tend to initiate social contacts, and are willing to speak within a public setting, whereas

low scorers tend to be shy and timid with strangers and find speaking in front a group a difficult experience.

The second factor, named sociability, assesses an individual's tendency to enjoy and be stimulated by social interaction and social events. High scorers prefer large crowds and parties and enjoy socialising with exciting people. On the contrary, low scorers tend not to seek out and may actively avoid exciting, stimulating situations and prefer a life that high scorers may report as dull.

The third factor, named affiliation, assesses an individual's tendency to enjoy and desire close interpersonal relationships. High scorers on this scale make friends easily, and enjoy and value close interpersonal bonds. On the contrary, low scorers tend to be more reserved, distant, and detached.

The fourth factor, named expressiveness, assesses an individual's tendency to be talkative and dramatic. High scorers tend to be talkative, boastful, and dramatic in one's interpersonal style, whereas low scorers tend to dislike talking about themselves, are not open to others, and are not animated in conversation.

The fifth factor, named assertiveness, reflects an individual's tendency to be socially dominant, enjoy leadership roles, and be assertive. High scorers tend to enjoy leadership roles, be socially dominant, persuasive, competitive and influential. On the other hand, low scorers do not have a preference for leadership roles and find it difficult to influence others.

The sixth factor, named enthusiasm, assesses an individual's tendency to be enthusiastic and energetic. Higher scorers tend to be cheerful, optimistic, high spirited, and lively. Low scorers tend to react slowly, prefer a leisurely lifestyle, and tend not to feel especially jovial or dynamic.

Table 2:

The Six-Factor Solution for the 33 Extraversion-Related Scales

	Factor					
	Social Boldness	Sociability	Affiliation	Expressiveness	Assertiveness	Enthusiasm
JPIR Social Confidence	**.87**	.47	.54	.58	.49	.30
16PF Social Boldness	**.87**	.52	.58	.56	.50	.22
TCI Shyness with Strangers	**-.87**	-.46	-.41	-.41	-.49	-.34
HEXACO Social Boldness	**.84**	.41	.59	.43	.38	.42
AB5C Poise	**.81**	.49	.28	.20	.66	.21
HPI No Social Anxiety	**.81**	.33	.39	.33	.30	.33
6FPQ Exhibition	**.76**	.59,	.53	.54	.46	.31
JPIR Sociability	.44	**.83**	.28	.46	.37	.34
NEO Gregariousness	.47	**.82**	.32	.49	.44	.33
HEXACO Sociability	.55	**.80**	.40	.51	.49	.46
16PF Self-Reliance	-.25	**-.78**	-.14	-.41	-.34	-.36
AB5C Sociability	.28	**.78**	.28	.30	.27	.27
AB5C Gregariousness	.52	**.70**	.50	.44	.43	.37
HPI Likes Parties	.46	**.66**	.44	.33	.35	.35
16PF Liveliness	.38	**.64**	.37	.45	.43	.49
TCI Attachment	.43	.35	**.90**	.37	.28	.36
TCI Warm Communication	.57	.56	**.88**	.21	.38	.34

AB5C Friendliness	.63	.54	**.82**	.33	.27	.37
16PF Privateness	-.42	-.39	**-.80**	-.43	-.18	-.32
MPQ Social Closeness	.45	.50	**.71**	.21	.27	.43
16PF Warmth	.39	.46	**.69**	.22	.20	.31
HPI Likes People	.42	.40	**.68**	.20	.30	.32
6FPQ Affiliation	.50	.48	**.62**	.37	.36	.40
AB5C Talkativeness	.45	.30	.43	**.71**	.42	.21
HEXACO Expressiveness	.50	.25	.49	**.70**	.45	.45
HPI Exhibitionistic	.40	.24	.22	**.65**	.25	.24
HPI Entertaining	.41	.32	.28	**.63**	.41	.32
AB5C Self-Disclosure	.36	.36	.41	**.57**	.17	.28
MPQ Social Potency	.61	.37	.34	.66	**.85**	.27
AB5C Leadership	.65	.17	.19	.54	**.81**	.45
NEO Assertiveness	.64	.22	.35	.52	**.79**	.33
NEO Positive Emotion	.42	.39	.50	.31	.32	**.79**
HEXACO Liveliness	.53	.34	.43	.33	.33	**.66**

Note. N = 375. Maximum Likelihood Estimation extraction with oblique (promax) rotation (structure matrix). NEO = The revised NEO Personality Inventory; 16PF = The Sixteen Personality Factor Questionnaire Fifth Edition; HPI = Hogan Personality Inventory; TCI = Temperament and Character Inventory Revised; MPQ = The Multidimensional Personality Questionnaire; JPIR = The Jackson Personality Inventory Revised; 6FPQ = The Six Factor Questionnaire; HEXACO = The HEXACO Personality Inventory; AB5C = AB5C scales from the International Item Pool.

3.3.4 Openness to Experience domain analysis. For the 32 scales identified as related to the Openness to Experience domain, both parallel analysis and the RMSEA goodness-of-fit criteria of .05 indicated that the optimal number of lower-order Openness to Experience factors to retain is seven (Table 3). The MLE chi-square value for the seven-factor solution indicated poor fit (X^2 = 7869.55 df = 371, p < .001).

Table 3:

Comparison of Eigenvalues for the Sample and Random Data and the Root Mean Square Error of Approximation Statistics for the Sample Data for Openness to Experience Scales

Factor Number	Eigenvalues for sample data	Average eigenvalues for 100 sets of random data	RMSEA
1	13.74	1.60	.12
2	2.60	1.51	.11
3	2.24	1.45	.10
4	2.04	1.40	.09
5	1.72	1.36	.08
6	1.49	1.31	.07
7	1.32	1.28	**.05**
8	1.17	1.24	
9	1.08	1.20	
10	.83	1.17	

Note. RMSEA goodness-of-fit criteria of .05 is in bold.

Table 4 presents the factor loadings for the rotated structure matrix from the seven-factor solution. The seven-factor structure of Openness to Experience derived here is more comprehensive than that found in the nine personality inventories used in this study. None of the personality inventories had scales that were subsumed by more than four of the Openness to Experience facets, indicating that these personality inventories do not provide a systematic coverage of the entire Openness to Experience domain. The first

factor, named culture or artistic interest, assesses an individual's tendency to be interested in culture and a deep appreciation for the arts, and natural beauty versus a relative lack of interest in culture, the arts and natural beauty.

The second factor, named creativity, assesses one's inclination to be creative and inventive. High scores tend to be creative and inventive in thought and action, and have the ability to quickly generate new ideas and enjoy solving complex problems, whereas low scorers tend to be less original and inventive in thought and action, and have little inclination for complexity.

The third factor, named imagination, assesses an individual's degree of imaginativeness. High scorers tend to have a vivid imagination and enjoy fantasising and daydreaming, whereas low scorers tend not to have a good imagination and rarely get lost in thought.

The fourth factor, named change or variety seeking, assesses an individual's preference for non-routine, experimentation, adventure, novelty and variety, and openness to change at one end to a preference for routine, safe activities, and no change.

The fifth factor, named intellect, assesses an individual's preference for intellectuality. High scorers have a greater preference for abstract theories and understanding abstract ideas and tend to be more analytical, and place a stronger emphasis on knowledge than low scorers.

The sixth factor, named traditionalism, assesses one's preference for established traditional values and rules, and obedience to authority. High scorers tend to comply with current customs, norms, rules, and expectations, dislike changes in traditional values, and obey authority, whereas low scorers tend not to be conservative or traditionalist, do not hold authoritarian beliefs and attitude, and are open to unconventional behaviour, ideas and approaches.

The seventh factor, named intellectual curiosity, assesses one's desire to learn and know more about something for their own sake. High scorers tend to be curious by nature and have a strong desire to learn and know more about something for their own sake, whereas low scorers tend not to have a natural curiosity about the world around them.

Table 4:

The Seven-Factor Solution for the 32 Openness to Experience-Related Scales

	Factor						
	I	II	III	IV	V	VI	VI
HEXACO Aesthetic	**.91**	.33	.44	.38	.50	.46	.36
NEO Aesthetics	**.87**	.42	.58	.44	.43	.46	.27
6FPQ Breath of Interest	**.84**	.42	.35	.60	.60	.45	.51
JPIR Breath of Interest	**.80**	.40	.34	.52	.53	.38	.45
HPI Culture	**.74**	.21	.38	.35	.47	.40	.36
AB5C Ingenuity	.28	**.86**	.40	.44	.45	.39	.46
JPIR Innovation	.42	**.81**	.59	.59	.45	.45	.54
HEXACO Creativity	.51	**.77**	.59	.54	.41	.47	.48
HPI Generates Ideas	.28	**.76**	.34	.45	.36	.35	.42
AB5C Creativity	.35	**.71**	.47	.42	.58	.51	.52
TCI Self-forgetful	.52	.44	**.76**	.38	.26	.28	.25
MPQ Absorption	.56	.32	**.72**	.38	.28	.25	.23
16PF Abstractness	.37	.30	**.71**	.43	.34	.43	.29
NEO Fantasy	.44	.51	**.64**	.39	.35	.52	.31
AB5C Imagination	.46	.47	**.58**	.42	.42	.51	.37
TCI Exploratory Excitability	.44	.53	.42	**.75**	.29	.38	.34
HPI Experience-seeking	.36	.49	.45	**.72**	.32	.34	.45
NEO Actions	.51	.47	.38	**.69**	.37	.45	.18
6FPQ Change	.43	.32	.40	**.69**	.33	.35	.27

16PF Openness to Change	.45	.44	.45	**.64**	.50	.52	.48
HPI Impulse Control	-.21	-.33	-.42	**-.53**	-.16	-.39	-.25
AB5C Intellect	.47	.61	.39	.34	**.79**	.51	.60
6FPQ Understanding	.61	.31	.39	.44	**.76**	.45	.49
NEO Ideas	.49	.59	.48	.43	**.73**	.45	.58
AB5C Quickness	.32	.54	.25	.37	**.71**	.42	.51
JPIR Complexity	.55	.36	.53	.42	**.69**	.67	.49
HPI Reading	.37	.22	.23	.22	**.58**	.33	.19
MPQ Traditionalism	-.38	-.31	-.37	-.39	-.47	**.87**	-.28
NEO Values	.37	.35	.29	.36	.37	**-.72**	.22
HEXACO Unconventionality	.47	.48	.65	.51	.62	**-.68**	.53
HPI Science Ability	.21	.41	.22	.27	.30	.17	**.71**
HEXACO Inquisitiveness	.55	.36	.31	.40	.58	.34	**.67**

Notes. N = 375. Maximum Likelihood Estimation extraction with oblique (promax) rotations (structure matrix). I = Culture/ Artistic Interest, II = Creativity, III = Imagination, IV = Change/Variety Seeking, V = Intellect, VI = Traditionalism, VII = Intellectual Curiosity. NEO = The revised NEO Personality Inventory; 16PF = The Sixteen Personality Factor Questionnaire Fifth Edition; HPI = Hogan Personality Inventory; TCI = Temperament and Character Inventory Revised; MPQ =The Multidimensional Personality Questionnaire; JPIR = The Jackson Personality Inventory Revised; 6FPQ = The Six Factor Questionnaire; HEXACO = The HEXACO Personality Inventory; AB5C = AB5C scales from the International Item Pool.

3.3.5 Conscientiousness domain analysis. For the 34 scales identified as related to the Conscientiousness domain, both parallel analysis and the RMSEA goodness-of-fit criteria of .05 indicated that the optimal number of lower-order Conscientiousness factors to retain is four (Table 5). The MLE chi-square value for the four-factor solution indicated poor fit (X^2 = 7887, df = 372, p < .001).

Table 5:

Comparison of Eigenvalues for the Sample and Random Data and the Root Mean Square Error of Approximation Statistics for the Sample Data for Conscientiousness Scales

Factor Number	Eigenvalues for sample data	Average eigenvalues for 100 sets of random data	RMSEA
1	10.27	1.62	.10
2	2.43	1.54	.09
3	2.06	1.48	.07
4	1.81	1.43	**.05**
5	1.14	1.38	
6	1.03	1.34	
7	.82	1.30	
8	.79	1.26	
9	.70	1.23	
10	.64	1.19	

Note. RMSEA goodness-of-fit criteria of .05 is in bold.

Table 6 presents the factor loadings for the rotated structure matrix from the four-factor solution. Of the nine personality inventories used in this study, only the NEO-PIR had scales that loaded on each of the Conscientiousness facets. The first factor, named achievement, assesses an individual's tendency to be ambitious, strongly motivated to achieve, and prefer working to challenging goals and targets. High scorers tend to be determined, have high levels of aspiration, work hard to achieve their goals, and

accept challenging goals and targets, whereas low scorers are not highly motivated to achieve and tend to be less ambitious.

The second factor, named orderliness, assesses an individual's tendency to plan and organise tasks and activities, prefer order in physical surroundings as well as pay attention to personal appearance. High scorers tend to plan and organise tasks and activities, keep things tidy, pay attention to personal appearance, and are perfectionistic, whereas low scorers tend to have a less structured approach to tasks and activities, and do not have a preference for order in physical surroundings.

The third factor, named self control, refers to an individual's tendency to be cautious, self-controlled, and deliberate. High scorers tend to be self-controlled, moderate, careful, practical, deliberate, and able to delay indulgence, and extravagance, whereas low scorers tend to be impulsive, reckless, and enjoy taking risk.

The fourth factor, named industriousness, assesses an individual's tendency to be productive, resourceful, self-disciplined, and attentive to detail and exacting in their work. High scorers tend to be self-disciplined, resourceful, and are thorough and exacting in their work, whereas low scorers tend to neglect details, procrastinate on tasks, and are easily distracted.

Table 6:

The Four-Factor Solution for the 34 Conscientiousness-Related Scales

	Factor			
	Achievement	Orderliness	Self-Control	Industriousness
TCI Perfectionist	**.85**	.40	.26	.39
TCI Ambitious	**.81**	.36	.21	.37
MPQ Achievement	**.81**	.27	.18	.25
HEXACO Diligence	**.76**	.44	.29	.53
TCI Work Hardened	**.74**	.31	.24	.35
NEO Achievement Striving	**.69**	.44	.38	.52
6FPQ Endurance	**.67**	.24	.23	.29
TCI Eagerness of Effort	**.64**	.34	.15	.44
6FPQ Achievement	**.61**	.25	.24	.34
NEO Order	.30	**.85**	.54	.43
HEXACO Organization	.27	**.83**	.43	.43
16PF Perfectionism	.43	**.83**	.55	.45
6FPQ Order	.29	**.81**	.47	.41
AB5C Orderliness	.30	**.80**	.49	.49
JPIR Organization	.42	**.80**	.52	.56
AB5C Perfectionism	.46	**.73**	.42	.27
AB5C Rationality	.43	**.58**	.48	.43
HPI Mastery	.46	**.50**	.39	.28
HEXACO Perfectionism	.39	**.50**	.40	.18
6FPQ Deliberateness	.26	.50	**.80**	.49
MPQ Control	.15	.54	**.79**	.42
NEO Deliberation	.25	.40	**.79**	.41

AB5C Cautiousness	.15	.44	**.73**	.36
HEXACO Prudence	.36	.40	**.72**	.51
TCI Impulsiveness	-.30	-.42	**-.66**	-.14
6FPQ Cognitive Structure	.20	.56	**.65**	.29
AB5C Purposefulness	.42	.56	.52	**.91**
AB5C Efficiency	.54	.63	.46	**.90**
NEO Self-Discipline	.48	.60	.46	**.81**
AB5C Conscientiousness	.43	.67	.57	**.77**
AB5C Organization	.47	.54	.52	**.65**
NEO Dutifulness	.37	.38	.40	**.50**
AB5C Competence	.45	.18	.27	**.49**
AB5C Dutifulness	.22	.30	**.**36	**.49**

Notes. N = 375. Maximum Likelihood Estimation extraction with oblique (promax) rotation (structure matrix). NEO = The revised NEO Personality Inventory; 16PF = The Sixteen Personality Factor Questionnaire Fifth Edition; HPI = Hogan Personality Inventory; TCI =Temperament and Character Inventory Revised; MPQ = The Multidimensional Personality Questionnaire; JPIR = The Jackson Personality Inventory Revised; 6FPQ = The Six Factor Questionnaire; HEXACO = The HEXACO Personality Inventory; AB5C = AB5C scales from the International Item Pool.

3.3.6 Agreeableness domain analysis. For the 26 scales identified as related to the Agreeableness domain, both the parallel and the RMSEA goodness-of-fit criteria of .05 pointed to six lower-order Agreeableness factors (Table 7). The MLE chi-square value for the six-factor solution indicated poor fit (X^2 = 4039.48, df = 203, p < .001).

Table 7:

Comparison of Eigenvalues for the Sample and Random Data and the Root Mean Square Error of Approximation Statistics for the Sample Data for Agreeableness Scales

Factor Number	Eigenvalues for sample data	Average eigenvalues for 100 sets of random data	RMSEA
1	9.88	1.51	.11
2	3.16	1.43	.10
3	1.88	1.34	.08
4	1.67	1.33	.07
5	1.40	1.26	.06
6	1.27	1.23	**.05**
7	1.08	1.20	
8	1.01	1.16	
9	.81	1.13	
10	.71	1.09	

Note. RMSEA goodness-of-fit criteria of .05 is in bold.

The factor loadings from the rotated structure matrix from the six-factor solution are displayed in Table 8. None of the nine personality inventories had scales that fell within more than five of the Agreeableness lower-order facets, indicating that these personality inventories do not provide systematic coverage of the entire Agreeableness domain. Therefore, the factor structure of Agreeableness derived here is more comprehensive than that found in the personality inventories.

The first factor, named sympathy, assesses an individual's attitude of sympathy for others. Higher scorers have the capacity to share the feelings of others and identify with others on an emotional level, and are tender-minded and sentimental, whereas low scorers rarely sympathise with the feelings of others and show pity for the distress or suffering others.

The second factor, named compassion, assesses one's tendency to be concerned for others' well-being, and unselfishly assist others in need of help. High scorers tend to show compassion, kind-heartedness, care, and warmth for the feelings and needs of others, and support and assist others in need of help, whereas low scorers are somewhat more unconcerned for others and self-centred, and tend not to be interested in the problems of others.

The third factor, named cooperation, assesses one's willingness to be cooperative and compliant. Higher scorers tend to be more cooperative than assertive, willing to set aside their wishes and feelings to accommodate others, understanding and respectful of the preferences of others, and are less willing to criticise others and avoid arguments. In contrast, low scorers tend to be more contentious, competitive, and self-absorbed. They have a tendency to impose their wishes and opinions on others, and are unobliging and less willing to compromise.

The fourth factor, named peacefulness, assesses one's tendency to pursue and maintain harmonious relationships with others. High scorers tend to be amicable, pleasant, broad-minded or tolerant, polite, respectful, forgiving, and cordial. Conversely, low scorers are more argumentative, sarcastic, unforgiving, suspicious, rude, and aggressive.

The fifth factor, named modesty, assesses an individual's tendency to be unassuming and humble. High scorers tend to be modest in behaviour and attitude, unassuming, and not prideful.

They do not view themselves as superior to others. Conversely, low scorers tend to be more arrogant and boastful, and are more inclined to have an exaggerated sense of self-importance.

The sixth factor, named morality, epitomises beliefs and behaviours associated with adherence to principles of righteousness, morality, and honesty. High scorers have a greater tendency to behave in accordance with accepted conventions of good or moral behaviour, whereas low scorers have a greater tendency to behave unethically. Moreover, high scorers tend to be more sincere and frank, whereas low scorers tend to be more disingenuous and are willing to manipulate others through deception or flattery.

Table 8:

The Six-Factor Solution for the 26 Agreeableness-Related Scales

	Factor					
	Sympathy	Compassion	Cooperation	Peacefulness	Modesty	Morality
AB5C Sympathy	**.79**	.56	.47	.23	.24	.52
JPIR Empathy	**.77**	.46	.30	.20	.15	.27
AB5C Tenderness	**.77**	.51	.39	.24	.16	.33
TCI Sentimentality	**.76**	.59	.50	.20	.31	.22
HEXACO Sentimentality	**.76**	.50	.34	.19	.23	.27
NEO Tender-mindedness	**.69**	.40	.45	.18	.31	.30
16PF Sensitivity	**.48**	.33	.22	.19	.10	.28
AB5C Warmth	.61	**.83**	.53	.16	.13	.45
AB5C Understanding	.55	**.77**	.48	.11	.18	.44
TCI Empathy	.52	**.74**	.45	.11	.15	.25
AB5C Empathy	.55	**.70**	.40	.16	.11	.47
HPI Caring	.44	**.62**	.28	.14	.08	.24
TCI Helpfulness	.34	**.61**	.43	.33	.21	.36
NEO Altruism	.47	**.60**	.48	.19	.26	.40
AB5C Cooperation	.29	.37	**.80**	.35	.31	.57
AB5C Nurturance	.50	.55	**.76**	.18	.47	.59
NEO Compliance	.22	.28	**.69**	.43	.35	.40
TCI Dependence	.34	.34	**.56**	.25	.33	.31
AB5C Pleasantness	.32	.57	.37	**.81**	.31	.45

TCI Compassion	.24	.49	.48	**.70**	.39	.41
MPQ Aggression	-.20	-.30	-.46	**-.68**	-.24	-.38
TCI Social Acceptance	.27	.49	.50	**.63**	.39	.21
HEXACO Modesty	.24	.24	.40	.27	**.78**	.35
NEO Modesty	.27	.17	.36	.19	**.64**	.30
NEO Straightforwardness	.20	.23	.50	.33	.39	**.66**
HEXACO Fairness	.28	.38	.36	.25	.32	**.57**

Note. N = 375. Maximum Likelihood Estimation extraction with oblique (promax) rotation (structure matrix). NEO = The revised NEO Personality Inventory; 16PF = The Sixteen Personality Factor Questionnaire Fifth Edition; HPI = Hogan Personality Inventory; TCI = Temperament and Character Inventory Revised; MPQ = The Multidimensional Personality Questionnaire; JPIR = The Jackson Personality Inventory Revised; 6FPQ =The Six Factor Questionnaire; HEXACO = The HEXACO Personality Inventory; AB5C = AB5C scales from the International Item Pool.

3.3.7 Emotional Stability domain analysis. For the 37 scales identified as related to the Emotional Stability domain, both parallel analysis and the RMSEA goodness-of-fit criteria of .05 indicated that the optimal number of lower-ordered Emotional Stability factors to retain is six (Table 9). The MLE chi-square value for the six-factor solution indicated poor fit (X^2 = 9126.33, df = 459, p < .001).

Table 9:

Comparison of Eigenvalues for the Sample and Random Data and the Root Mean Square Error of Approximation Statistics for the Sample Data for Emotional Stability Scales

Factor Number	Eigenvalues for sample data	Average eigenvalues for 100 sets of random data	RMSEA
1	15.72	1.66	.11
2	3.84	1.57	.10
3	2.36	1.51	.09
4	2.11	1.46	.08
5	1.81	1.42	.07
6	1.41	1.37	**.05**
7	1.19	1.33	
8	1.06	1.30	
9	.90	1.26	
10	.85	1.22	

Note. RMSEA goodness-of-fit criteria of .05 is in bold.

The factor loadings from the rotated structure matrix from the six-factor solution are displayed in Table 10. None of the nine personality inventories had scales that fell within more than five of the Emotional Stability lower-order facets, indicating that these personality inventories do not provide systematic coverage of the entire Neuroticism domain. Therefore, the factor structure of Emotional Stability uncovered here is more comprehensive than that found in the personality inventories. The first factor, named

fearlessness/low anxiety, assesses an individual's tendency not to be anxious and fearful. High scorers on this scale tend to be confident and reassured in almost all situations, and typically do not worry in facing difficult situations. Conversely, low scorers tend to be more anxious, apprehensive, and fearful in almost all situations. They tend to feel unable to cope with stress.

The second factor, named even-tempered, assesses an individual's tendency not to easily experience anger or frustrated or related states. High scorers tend to be slow to anger, even-tempered, and patient. In contrast, low scorers tend to be easily irritated or annoyed, touchy or temperamental, and defensive.

The third factor, named optimism, assesses normal individual difference in the tendency to experience depressive affect. Low scorers have a tendency to be preoccupied with thoughts and feelings of dejection, hopelessness, guilt or regret, and worthlessness, whereas high scorers rarely experience such thoughts or feelings, are more optimistic and not easily discourage.

The fourth factor, named stability, assesses an individual's tendency to be in control of their emotions and behaviour. High scorers tend to be composed, controlled, imperturbable, and are rarely emotional. They are able to control their cravings and urges as well as remain calm under pressure. On the contrary, low scorers tend to be unstable, moody, and easily excitable. They tend to experience emotions intensely and have difficulty controlling their emotions.

The fifth factor, named trust, assesses an individual's tendency to trust rather than be suspicious of others' motives and intentions. High scorers tend to trust others and believe that they are honest and well-intentioned. Low scorers tend to be cynical and suspicious, and expect to be taken advantage of by others.

The sixth factor, named adaptability, assesses an individual's capacity to be flexible. Higher scorers tend to be flexible or able to

adjust easily to different situations, and resilient, whereas low scorers tend to find it difficult to cope with changes in circumstances, take offense easily and not accept criticism readily.

Table 10:

The Six-Factor Solution for the 37 Neuroticism-Related Scales

	Factor					
	Fearlessness /Low Anxiety	Even-Tempered	Optimism	Stability	Trust	Adaptability
MPQ Stress Reaction	**-.85**	-.54	-.63	-.47	-.24	-.53
JPIR Anxiety	**-.84**	-.61	-.54	-.46	-.10	-.51
NEO Anxiety	**-.84**	-.39	-.51	-.47	-.15	-.64
AB5C Happiness	**.83**	.41	.72	.58	.32	.71
AB5C Toughness	**.78**	.42	.45	.58	.12	.64
HEXACO Anxiety	**-.77**	-.45	-.45	-.37	-.18	-.39
TCI Worry & Pessimism	**-.76**	-.45	-.65	-.36	-.32	-.51
NEO Depression	**-.76**	-.34	-.67	-.64	-.33	-.68
HPI Not Anxious	**.74**	.48	.55	.30	.09	.42
16PF Apprehension	**-.73**	-.28	-.47	-.44	-.27	-.36
NEO Vulnerability	**-.71**	-.32	-.55	-.60	-.14	-.70
NEO Self-Consciousness	**-.71**	-.20	-.51	-.51	-.43	-.42
16PF Emotional Stability	**.71**	.43	.51	.56	.23	.56
HPI No Somatic Complaints	**.48**	.18	.43	.38	.11	.20
AB5C Calmness	.58	**.83**	.43	.48	.16	.69
HEXACO PATIENCE	.29	**.79**	.15	.22	.12	.37
6FPQ Even-tempered	.35	**.78**	.27	.34	.16	.40

NEO Angry Hostility	-.51	**-.77**	-.37	-.52	-.22	-.71
HPI Empathy	.46	**.72**	.44	.22	.18	.39
HPI Even-tempered	.43	**.66**	.43	.45	.18	.45
HPI Calmness	.44	**.57**	.40	.42	-.06	.45
HPI No Depression	.57	.32	**.87**	.44	.34	.46
HPI Identity	.43	.24	**.64**	.35	.27	.31
HPI Self-Confidence	.58	.08	**.63**	.41	.19	.27
HPI No Guilt	.55	.34	**.63**	.53	.45	.31
TCI Responsibility	.41	.28	**.55**	.33	.41	.30
TCI Fatigability & Asthenia	-.41	-.15	**-.55**	-.40	-.12	-.31
AB5C Moderation	.59	.40	.62	**.77**	.23	.55
AB5C Stability	.55	.53	.51	**.76**	.09	.56
NEO Impulsiveness	-.43	-.39	-.43	**-.70**	-.13	-.39
AB5C Imperturbability	.42	.27	.21	**.59**	-.17	.36
AB5C Tranquility	.42	.48	.38	**.59**	-.14	.45
16PF Vigilance	-.28	-.35	-.33	-.21	**-.72**	-.26
HPI Trusting	.34	.34	.41	.16	**.65**	.27
NEO Trust	.38	.40	.42	.25	**.58**	.38
6FPQ Good-natured	.24	.45	.13	.15	.09	**.65**
16PF Tension	-.34	-.40	-.31	-.26	-.27	**-.58**

Notes. N = 375. Maximum Likelihood Estimation extraction with oblique (promax) rotation (structure matrix). NEO = The revised NEO Personality Inventory; 16PF = The Sixteen Personality Factor Questionnaire Fifth Edition; HPI = Hogan Personality Inventory; TCI = Temperament and Character Inventory Revised; MPQ = The Multidimensional Personality Questionnaire; JPIR = The Jackson Personality Inventory Revised; 6FPQ =The Six Factor Questionnaire; HEXACO = The HEXACO Personality Inventory; AB5C = AB5C scales from the International Item Pool.

3.3.8 Convergent and discriminant validity. Correlations were used to examine the convergent and discriminant validity of the tweny-nine as well as to confirm that there were no redundant facets within the respective Big Five domains. First, scale scores for the 162 scales were standardised to z-score metric by subtracting the mean from a score and dividing by the standard deviation so that scales from different inventories were on the same metric. Based on the EFA results for each Big Five domain (Tables 2, 4, 6, 8, and 10), the standardised scores for scales that loaded on a facet were summed to obtain a single score for that facet.

Table 11 presents the correlation matrix for the twenty-nine facet indicators of the Big Five. An examination of the mean correlations between facets of each Big Five domain provided evidence of fairly strong higher-order factors as well as suggested that there were no redundant facets within the respective Big Five domains, given the size of correlations between facets. Thus, the facets of each Big Five domain appeared to be occupying a relatively unique space in their respective Big Five domains. Correlations between the six Extraversion facet indicators ranged from .42 (expressiveness and enthusiasm) to .67 (sociability and social boldness) with a mean correlation between facets of .54. Correlations between the seven Openness to experience facet indicators ranged from -.28 (intellectual curiosity and traditionalism) to .61 (intellect and creativity) with a mean correlation between facets of .49. Correlations between the six Emotional Stability facet indicators ranged from .20 (fearlessness/low anxiety and adaptability) and .60 (even-tempered and stability) with a mean correlation between facets of .38. Correlations between the six Agreeableness facets ranged from .27(modesty and compassion) to .68 (sympathy and compassion) with a mean correlation between facets of .44. Correlations between the four Conscientiousness facet indicators ranged from .30 (self-

control and achievement) to .68 (orderliness and industriousness) with a mean correlation between facets of .56.

To test for convergent and discriminant validity, Pearson's correlations between facet indicators and the Big Five global factor indicators were computed. The size of the correlation between a facet indicator and its overall Big Five domain composite (the composite was created by summing standardized scores for all facets in the Big Five domain excluding the studied facet) was compared against the correlation between the respective facet and the other four Big Five global factor indicators. For example, correlations between affiliation (an indicator of Extraversion) and the four Big Five global indicators (Conscientiousness, Emotional Stability, Agreeableness, and Openness to Experience) were compared to the correlation of affiliation with an overall Extraversion composite of social boldness, sociability, expressiveness, assertiveness, and enthusiasm, excluding affiliation.

The results for convergent and discriminant validity are shown in Table 12. Generally, the results are in support of convergent and discriminant validity. All of the Extraversion facets and Conscientiousness facets showed good patterns of convergent and discriminant validity in that they correlated most highly with their respective domains and modestly with the other four Big Five domains. Moreover, of the Openness to Experience facets, evidence for discriminant validity was less clear for the traditionalism facet. Although Traditionalism correlated most highly with Openness to Experience (-.51), this facet also correlated highly with Conscientiousness (.42). Additionally, two of the Agreeableness facets demonstrated less clear patterns of discriminant validity: peacefulness (showed high correlations with both Agreeableness [.57] and Emotional Stability [.44]), and modesty (showed correlations of similar magnitude with Extraversion [-.41] and

Agreeableness [.47]). Also, of the Emotional Stability facets, evidence for discriminant validity was less clear for the trust facet. Trust showed correlations of comparable magnitude with Emotional Stability [.45] and Agreeableness [.40].

Table 11:

Correlations between Facet Composites of Big Five Factors

Facet Composites	1	2	3	4	5	6	7	8	9	10	11	12
1. Affiliation												
2. Social Boldness	.62											
3. Sociability	.67	.61										
4. Expressiveness	.51	.64	.57									
5. Assertiveness	.46	.71	.47	.51								
6. Enthusiasm	.55	.51	.42	.48	.44							
7. Culture/Artistic Interest	.20	.25	.16	.17	.17	.26						
8. Creativity	.21	.51	.15	.40	.45	.35	.57					
9. Imagination	.10	.14	.13	.32	.18	.18	.60	.57				
10. Traditionalism	.07	.12	-.05	-.11	.16	.11	-.38	-.43	-.28			
11. Change/Variety Seeking	.17	.34	.21	.26	.32	.31	.58	.59	.52	-.36		
12. Intellectual Curiosity	-.03	.23	-.01	.12	.17	.14	.52	.55	.44	-.28	.41	
13. Intellect	.10	.25	-.01	.09	.29	.19	.50	.61	.54	-.42	.53	.55
14. Orderliness	.01	.04	-.01	-.11	.13	.02	-.16	-.04	-.23	.35	.15	-.01
15. Achievement	.12	.23	.05	.07	.36	.27	.11	.40	.06	.26	.24	.25
16. Industriousness	.16	.26	.01	.03	.32	.23	.01	.35	-.08	.22	.21	.17
17. Self Control	-.08	-.04	-.21	-.35	.01	-.08	-.15	-.09	-.34	.17	-.20	.05

Note. N =375.

Table 11 continued

Correlations between Facet Composites of Big Five Factors

Facet Composites	1	2	3	4	5	6	7	8	9	10	11	12
18. Compassion	.35	.22	.20	.05	.02	.13	.06	.03	.12	.05	.06	-.04
19. Peacefulness	.32	.04	.08	-.03	-.10	.12	.07	.05	.04	.02	.03	-.02
20. Cooperation	.31	.28	.09	-.02	.02	.05	.05	.06	.10	.04	.05	-.05
21. Morality	.14	.01	-.10	-.13	-.16	.02	.01	.04	.04	.06	.01	-.07
22. Sympathy	.37	.05	.24	.15	-.05	.04	.11	-.10	.14	.02	.02	-.14
23. Modesty	-.04	-.26	-.13	-.05	-.40	-.02	-.04	-.02	-.06	.02	-.10	-.09
24. Fearlessness/Low Anxiety	-.13	-.43	-.09	-.14	-.23	-.36	-.08	-.25	.07	-.05	-.19	-.11
25. Stability	-.01	.18	-.08	-.22	.14	.02	.02	.10	-.22	.01	.07	.13
26. Optimism	.33	.39	.11	.07	.28	.46	.15	.30	.11	.02	.18	.14
27. Even-Tempered	.11	.09	.06	-.19	-.12	.20	.12	.01	.12	.04	.07	.09
28. Trust	.35	.20	.19	-.07	-.03	.21	.08	-.07	-.05	.16	.12	-.02
29. Adaptability	.09	-.07	.06	-.15	-.16	-.12	.06	-.15	-.01	.05	.04	-.03

Note. N =375.

Table 11 continued

Correlations between Facet Composites of Big Five Factors

Facet Composites	13	14	15	16	17	18	19	20	21	22	23
13. Intellect											
14. Orderliness	-.11										
15. Achievement	.20	.49									
16. Industriousness	.24	.68	.67								
17. Self Control	.02	.58	.30	.63							
18. Compassion	.05	.03	.04	.06	.11						
19. Peacefulness	.01	-.11	.06	.07	.12	.61					
20. Cooperation	.05	.05	.07	.15	.15	.55	.40				
21. Morality	.02	.06	.15	.11	.12	.43	.36	.53			
22. Sympathy	.04	.07	-.05	-.06	-.13	.68	.34	.55	.29		
23. Modesty	.15	-.01	-.14	-.10	-.08	.27	.33	.43	.43	.35	
24. Fearlessness/Low Anxiety	-.13	.06	-.08	-.25	.11	-.03	-.18	-.04	-.05	.20	.05
25. Stability	.11	.12	.16	.34	.31	-.05	.28	.02	.07	-.24	-.09
26. Optimism	.17	.12	.25	.35	.28	.13	.27	.07	.08	-.04	-.11
27. Even-tempered	.05	-.11	.01	.14	.19	.03	.64	.04	.10	.01	.14
28. Trust	.02	.04	.07	.11	.02	.16	.31	.12	.11	.13	.02
29. Adaptability	-.07	-.16	.09	.17	.14	.09	.30	.03	.06	-.06	.16

Note. N =375.

Table 11 continued

Correlations between Facet Composites of Big Five Factors

Facet Composites	24	25	26	27	28
24. Fearlessness/Low Anxiety					
25. Stability	.56				
26. Optimism	.54	.47			
27. Even-tempered	.43	.60	.41		
28. Trust	.32	.30	.37	.38	
29. Adaptability	.20	.24	.21	.39	.27

Note. N =375.

Table 12:

Correlations of Facet Composites with Big Five Factors

	Big Five Composites				
	E	O	C	A	ES
Extraversion Facets					
Affiliation	**.68**	.11	.13	.44	.28
Social Boldness	**.75**	.31	.21	.13	.10
Sociability	**.63**	.07	-.06	.22	.05
Expressiveness	**.71**	.28	-.10	-.05	-.29
Assertiveness	**.59**	.30	.25	-.13	-.06
Enthusiasm	**.64**	.27	.34	.27	.20
Openness to Experience Facets					
Culture/Artistic Interest	.21	**.69**	-.05	.25	.16
Creativity	.38	**.73**	.26	.03	.05
Imagination	.27	**.58**	-.11	.31	-.02
Traditionalism	.01	**-.51**	**.42**	.12	.09
Change/Variety Seeking	.35	**.53**	.14	.09	.08
Intellectual Curiosity	.10	**.55**	.19	-.10	.04
Intellect	.08	**.57**	.17	-.01	.05
Conscientiousness Facets					
Orderliness	.01	-.12	**.65**	.02	-.01
Achievement	.30	.35	**.64**	.03	.09
Industriousness	.28	.21	**.72**	.13	.32
Self-Control	-.20	-.11	**.61**	.09	.29
Agreeableness Facets					
Compassion	.36	.18	.11	**.73**	.31
Peacefulness	.11	.17	-.05	**.57**	**.44**
Cooperation	.26	.01	.24	**.60**	.37
Morality	-.09	.02	.27	**.52**	.29
Sympathy	.32	.01	-.02	**.71**	-.01
Modesty	**-.41**	-.19	-.11	**.47**	.15
Emotional Stability Facets					
Fearlessness/Low Anxiety	-.28	-.06	-.05	.01	**.66**
Stability	-.10	-.01	.29	-.01	**.59**
Optimism	.36	.14	.30	.27	**.55**
Even-tempered	.02	.03	.04	.34	**.61**
Trust	.16	-.01	.13	**.40**	**.45**
Adaptability	-.02	-.01	-.17	.15	**.42**

Note. N = 375. Big Five Domain Composites were computed by summing all of their respective standardized facet scores except the studied facet. Big Five Global Indicators were computed by summing all of their respective facet standardized scores.
E = Extraversion, O = Openness to Experience, C = Conscientiousness,
A = Agreeableness, and ES = Emotional Stability.

3.3.9 Summary of Results. Study 1 empirically derived an initial lower-order structure of the Big Five by factor analysing scales from nine personality inventories related to each of the Big Five personality factors separately so as to establish a shared overall structure for each of the Big Five personality domains. A total of 161 scales were included in the analyses. An MLE with orthogonal rotation of the 162 scales resulted in 37 scales having their highest loading on Emotional Stability, 33 scales on Extraversion, 32 scales on Openness to Experience, 34 scales on Conscientiousness, and 26 scales on Agreeableness.

Overall, twenty-nine facets of the Big Five emerged from separate factor analyses of scales empirically related to each Big Five personality factors. Factor analyses of 33 scales empirically related to Extraversion resulted in six lower-order facets: affiliation, social boldness, sociability, expressiveness, assertiveness, and liveliness. These six lower-order facets demonstrated good convergent validity (correlated substantially with the Extraversion global factor) and sufficient discriminant validity (correlated modestly with the other Big Five Factors). With regard to Openness to Experience, seven lower-order facets emerged from factor analyses of 32 scales empirically related to that domain: culture/artistic interest, creativity, imagination, traditionalism, change/variety seeking, intellectual curiosity, and intellect. All seven facets of Openness to Experience showed adequate convergent validity, and only traditionalism demonstrated a less clear pattern of discriminant validity. As for Conscientiousness, factor analyses of 34 scales empirically related to this domain resulted in four lower-order facets: orderliness, achievement, industriousness, and self control. All of the derived Conscientiousness facets demonstrated good convergent validity and acceptable discriminant validity. With respect to Agreeableness, six lower-order facets emerged from factor analyses of 26 scales empirically related to that domain:

sympathy, compassion, peacefulness, cooperation, morality, and modesty. All seven facets of Agreeableness demonstrated adequate convergent validity, and two of the facets showed less clear patterns of discriminant validity: peacefulness and modesty. As regards to Emotional Stability, factor analyses of 37 scales empirically related to this domain resulted in six lower-order facets: fearlessness/low anxiety, stability, optimism, even-tempered, trust, and adaptability. All of the facets of Emotional Stability demonstrated adequate convergent validity, and only trust demonstrated a less clear pattern of discriminant validity

None of the nine personality inventories had scales that fell within all of the twenty-nine lower-order facets, indicating that these personality inventories do not provide systematic coverage of the entire trait domain of the Big Five. Therefore, the lower-order factor structure of the Big Five derived here is more comprehensive than that found in the nine personality inventories.

3.4 Study 1 discussion

This study sought to investigate the shared overall lower-order structure of each of the Big Five personality factors based on nine personality inventories, all developed under different theoretical and empirical considerations. This study is the first to the best of this author's knowledge to explore the lower-order structure of each of the Big Five using scales drawn from several validated personality inventories. Moreover, this study included the most personality inventories ever in one study to investigate the lower-order structure of the Big Five.

The lower-order factor structure of Extraversion derived in this study represents core features of extraversion identified in various models discussed in Chapter 2. For example, Depue & Collins (1999), Hough & Ones (2001), Lucus et al., (2000), Watson & Clark, (1997) identified facets that are comparable to this study's

affiliation, sociability, and assertiveness facets. Moreover, this study's enthusiasm facet reflects the conception of Extraversion as closely associated with positive emotionality and activity, which are direct manifestations of their positive incentive motivation system (Depue & Collins, 1999; Watson & Clark, 1997). In addition, the lower-order factor structure of Extraversion derived here also has some similarity with previous lexical and questionnaire research. For instance, previous lexical research also identified an assertiveness facet (Peabody & De Raad, 2002; Saucier & Ostendorf, 1999), an enthusiasm-related facet (exuberance; Perugini & Gallucci, 1997), and a sociability facet (Saucier & Ostendorf, 1999).

The lower-order factor structure of Openness to Experience derived in this investigation captures the two distinct aspects of the domain; Intellect and Openness (DeYoung, et al., 2005). For example, the imagination, change or variety seeking, and culture or artistic interest depict the Openness aspect of the domain while the intellect facet represents the Intellect aspect of the domain, and the creativity and curiosity facets may depict either the Intellect or Openness aspects of the domain. It also shared similar features with structures derived by conceptual and lexical research. For example, five of the six facets identified by Hough and Ones's (2001) conceptual review corresponded to this study's intellect, creativity, culture or artistic interest, intellectual curiosity, and change/variety seeking facets. Additionally, similar to previous lexical research (Peabody & De Raad, 2002; Saucier & Ostendrof, 1999), this study identified facets related to imagination-creativity (this study's creativity/innovation), intellect (intellect), and imaginativeness (imagination).

Furthermore, the evidence for convergent and discriminant validity of the Openness to Experience facets both corroborated and extended previous research. The Openness to Experience facets demonstrated good convergent validity, but evidence for

discriminant validity was less clear for traditionalism. Traditionalism demonstrated correlations of similar magnitude with both Openness to Experience and Conscientiousness, and may be best considered as a compound trait of Openness to Experience and Conscientiousness. This finding is consistent with Hough and Ones (2001) conceptual model which viewed traditionalism as a compound trait of Openness to Experience and Conscientiousness (low Openness to Experience, high Conscientiousness). Similarly, taxonometric research has found traditionalism to be strongly correlated with both Openness to Experience and Conscientiousness (Roberts et al., 2004; Roberts et al., 2005).

The taxonomy of Conscientiousness derived here has common features with that discovered by Roberts et al. (2005) in their analysis of scales conceptually related to Conscientiousness from seven different personality inventories using the same sample. Similar to their study, order (this study's orderliness), industriousness, and self-control facets were identified in this study as facets of Conscientiousness. The taxonomy of Conscientiousness derived here also shared similar elements with structures derived by conceptual and lexical research. For example, Hough and One's (2001) conceptual review identified facets of Conscientiousness that corresponded to this study's industriousness, achievement, self-control, and order facets. In addition, similar to previous lexical research (Peabody & De Raad, 2002; Pergugini & Gallucci, 1997; Roberts et al., 2004; Saucier & Ostendorf, 1999), this study identified facets related to recklessness and impulse control (our self-control), orderliness (orderliness), and industriousness (industriousness).

The lower-order factor structure of Agreeableness that has emerged from this investigation has similar elements with structures derived by conceptual and lexical research. For example, the compassion facet was associated with the nurturance facet

identified by Hough and One's (2001) conceptual model. In addition, like pervious lexical research (Peabody & De Raad, 2002; Pergugini & Gallucci, 1997; Saucier & Ostendorf, 1999), this study identified facets associated with warmth/affection and generosity (our compassion), tender-mindedness (sympathy), and peacefulness (peacefulness).

Further, the evidence for convergent and discriminant validity of the Agreeableness facets both corroborated and extended previous research. The Agreeableness facets demonstrated adequate convergent validity, but evidence of discriminant validity was less clear for the peacefulness and modesty. Peacefulness recorded correlations of comparable magnitude with both Agreeableness and Emotional Stability, and so may be best regarded as a compound trait of Emotional Stability and Agreeableness. A possible explanation for this finding is the fact that some of the scales that loaded highly on peacefulness include content associated with the positive pole of irritability, an element of Emotional Stability (low Neuroticism). In lexical research, rotational variants of Emotional Stability and Agreeableness have emerged in many languages, including English that are different from the classic Big Five variants of those domains (Ashton et al., 2004). Whereas in the classic Big Five structure and the Five-Factor Model, anger-related traits are located at the negative pole of the Emotional Stability domain, in lexical studies such content is usually grouped with traits related to low Agreeableness (Ashton et al., 2004). Saucier and Goldberg's (2001) review of lexical studies of personality structure, identified irritability as a distinct trait cluster of emotional stability, but indicated that in some studies irritability was grouped with Agreeableness. Furthermore, in Saucier's (2004) integrative scheme for five-, six-, and seven-factor models developed from previous lexical research, the peacefulness content cluster loaded most highly on Emotional stability in the five-factor

model, Agreeableness in the six-factor model, and Even Temper in the seven-factor model. Modesty recorded correlations of similar magnitude with both Extraversion and Agreeableness, and thus may be best considered as a compound trait of Agreeableness and Extraversion (this is consistent with Hough and Ones's conceptual model).

Similar to the other Big Five domains, the lower-order factor structure of Emotional Stability derived here has similar elements with structures derived by conceptual and lexical research. For example, Hough and One's (2001) conceptual review identified low anxiety and even tempered facets, which corresponded to this study's fearlessness/low anxiety and even-tempered facets. In addition, similar to pervious lexical research (Peabody & De Raad, 2002; Pergugini & Gallucci, 1997; Saucier & Ostendorf, 1999), this study identified facets related to irritability (our even-tempered), stability (stability), and fearfulness (Fearlessness/low anxiety).

The Emotional Stability facets demonstrated adequate convergent validity, but evidence for discriminant validity was less clear for trust. Trust registered a correlation of comparable magnitude with both Emotional Stability and Agreeableness, and therefore may be considered as a compound trait of Emotional Stability and Agreeableness. This finding is consistent with Hough and Ones (2001) conceptual model, which viewed trust as compound trait of Emotional Stability and Agreeableness (high Emotional Stability, high Agreeableness).

It should be kept in mind that despite including the most personality inventories ever in one study to examine the optimal number of lower-order facets that make up each of the Big Five personality factors, the present study did not assess all existing personality inventories. Therefore, the starting set of lower-level scales contained in the nine personality inventories used here cannot claim to be fully exhaustive. Moreover, as a result of the

variable set used in analyses (161 facets from nine personality inventories), there is likely to be an underrepresentation or non representation of constructs, and thus this study cannot claim examine the lower-order structure of personality. Furthermore, other constructs that are independent of the twenty-nine facets are likely to be underrepresented here because of our focus on using the Big Five Model as an organising taxonomy. Further taxonometric work into the lower-order structure of the Big Five may include other personality scales, such as scales more suitable for clinical settings (for example, Minnesota Multiphasic Personality Inventory—2, MMPI-2; Butcher, Dahlstrom, Graham, Tellegen, & Kaemmer, 1989), those newly developed (for example, Global Personality Inventory, GPI; Schmit, Kihm, & Robie, 2000), or those in existence, not included here (for example, CPI; Gough, 1987), which could enhance our understanding of the lower-ordered taxonomy of the Big Five domains. All in all, there is need for further taxonometric work with regard to the number and nature of lower-order facets of the Big Five domains before settling on a final model. Future research should attempt to recover the twenty-nine facets across different languages and cultures, and different rating sources. However, this study is useful as it does provide information about the shared overall lower-order structure of nine wide used personality inventories.

Even though the taxonomy of lower-order facets discovered here may not be optimal, nonetheless, it could prove useful to gain more knowledge about the factor structure of the Big Five. It does identify some of the specific features for a sufficiently comprehensive lower-order taxonomy of the Big Five personality factors. Any personality inventory that omits content of the lower-order factor structure derived in the present study is unlikely to be truly comprehensive. Thus, the lower-order taxonomy of the Big Five personality factors identified in this study may be used to

assess the comprehensiveness of hierarchically structured personality inventories that combine lower-order facets and more global higher-order Big Five traits. In addition, for future studies seeking to develop a lower-level taxonomy of the Big Five personality factors, taxonomy derived here may prove a useful starting point as it might constitute the beginning of a comprehensive list of narrow traits.

Further, the lower-ordered taxonomy of the Big Five uncovered here is arguably the most comprehensive when compared to the factor structure found in the nine personality inventories. None of the nine personality inventories had scales that fell within all of the twenty-nine lower-order facets found to represent the Big Five domains in this study. However, the author is mindful that this study only constitutes an initial step towards the development of an exhaustive and replicable taxonomy of lower-order facets that make up each of the Big Five domains. Defining a stable and generalizable hierarchical structure in the personality domain that comprehensively captures the basic lower-order facets of personality, with the Big Five at the broader-bandwith level would have the distinct advantage of combining specificity with generality and parsimony with representativeness. Moreover, facets are often more powerful predictors of criteria and in explaining behavior than broader personality factors because of their position on the explanation level (Craver, 1989). The twenty-nine facets of the Big Five should be differentially related to various criteria as they were found to be sufficiently heterogeneous as well as provide incremental validity above and beyond the broad Big Five factors. Therefore, the taxonomy of lower-order facets derived here may enhance our understanding of the associations between specific lower-order facets and various criteria on the one hand as well as the associations between the broad Big Five personality factors and various criteria. Thus, future research focus on building criterion-

related validity for the twenty-nine facets in relation to theoretically-relevant criteria is warranted. In addition, it is hoped that the lower-order structure derived in this study will not only stimulate future taxonometric and criterion-related validity research but it will also lead to frameworks linking specific facets to specific criteria, which could increase validities and enhance understanding of such relations. Hence, the taxonomy of lower-order facets of the Big Five personality domains derived in this study can provide an excellent starting point for exploring models based on the facet level of personality (e.g., job performance, attitudes, interest, and so on).

As mentioned earlier, no existing personality instrument provides systematic coverage of the entire lower-order structure of the Big Five personality domains derived here. Thus, in order to make possible criterion-related validity research involving the twenty-nine facets and various criteria, and develop and test facet-level models linking the twenty-nine facets and criterion constructs, it is necessary to construct a personality instrument to measure the twenty-nine facets of the Big Five. Moreover, the development of a personality instrument to measure the twenty-nine lower-order facets will also allow the robustness of the lower-order structure of the Big Five domains derived in this study to be assessed in other samples. Thus, Study 2 will seek to address this objective through the development and validation of a new Big Five instrument, the Hierarchical Personality Assessment Questionnaire (HPAQ), to measure the twenty-nine facets derived in Study 1. Furthermore, as previously highlighted, the construction of an instrument to measure the twenty-nine facets may be able to reduce the amount of communality that facets in a particular domain share with the other four Big Five domains.

Chapter 4: Study 2 - Development and Validation of the Hierarchical Personality Assessment Questionnaire (HPAQ)

4.1 Introduction

The purpose of Study 2 was to develop and validate the Hierarchical Personality Assessment Questionnaire (HPAQ) to explicitly represent the twenty-nine facets identified in Study 1 of this thesis as underlying the Big Five personality factors. The construction of the HPAQ would facilitate predictive validity research allowing researchers to develop more precise knowledge about how each of the twenty-nine facets may be differentially related to various criteria. Thus, such an instrument with a standard set of lower-order facets may promote cooperative research and facilitate communication among researchers. Furthermore, the construction of an instrument to measure the twenty-nine facets of the Big Five may be able to reduce the amount of communality that facets in a particular domain share with the other four Big Five domains.

One way of conceiving this model is as a hierarchical structure with the Big Five personality dimensions represented at or near the top of the hierarchy and various lower-level facets represented below assessed by particular narrow-bandwidth personality measures (Goldberg, 1993b). In hierarchical models of personality, emphasis is on the vertical relations among variables rather than on the relationship between variables at the same level (Goldberg, 1993b). Moreover, facets are supposed to correlate substantially with their respective Big Five factor, and modestly with other factors, so that each of the Big Five factors can be characterised by the meaning of a handful of facets that load primarily on that factor (De Raad & Perugini, 2002; De Raad, 1998). Notable examples of personality questionnaires that have explicitly used the hierarchical approach for ordering lower-level facets of the FFM are: the revised NEO inventory (NEO-PIR; Costa & McCrae, 1992a); Gough's (1987,

1996) California Personality Inventory (CPI); and the 16 Sixteen Personality Factors Questionnaire (16PF; Conn & Rieke, 1994).

4.2 Scale Development

4.2.1 Scale Construction Strategy. The development of the HPAQ progressed through a number of stages, and was guided by intuitive or rational and internal strategies. Within the rational strategy of inventory construction, scientific judgement is the basis for the identification of facets within each domain (Costa & McCrae, 1998). Moreover, the rational strategy relies on the judgement of the test constructor when making decisions regarding the suitability of an item for inclusion and its direction of keying in a scale (Goldberg, 1972). In this regard, the test constructor has some dimension or personality trait in mind and attempts to select items that are conceived to relate to this dimension (Hase & Goldberg, 1967). To select a set of constructs that are hypothesised to define the five factors, a test constructor may use personality theory, theoretical distinctions, the adjectives that define the factors, and private intuitions (Costa & McCrae, 1998). Hypotheses are then confirmed, rejected, or refined through empirical research (Costa & McCrae, 1998). In study two of this thesis, the set of constructs hypothesised to define the five factors were the resulting lower-order facets from Study 1 for each of the five factors.

An advantage of the rational approach is that constructs can be operationalised in diverse ways (Costa & McCrae, 1998). Even though single adjectives may be used if adjectives are available, phrases and sentences can introduce qualifications, context, and examples that permit a more accurate assessment of the construct (Costa & McCrae, 1998). Moreover, the combination of different items into a scale produces a more reliable measurement than a single adjective rating, and allows an analysis of the construct itself (Costa & McCrae, 1998). Goldberg (1972) purported that “the very

characteristic of both the external and internal strategies that gives them their power also provides their 'Achilles' heel: namely, their dependence upon – and vulnerability to – characteristics of the particular samples used in their construction. The intuitive strategy, in contrast, is minimally dependent on sample specific characteristics; only at the stage of scale "purification" (e.g. discarding items with low correlations with scale scores) do sample characteristics have any chance to enter the scale construction process" (p.49-50). Furthermore, the content homogeneity of good intuitive scales provides a less ambiguous sample of self-report, and consequently with sets of intuitive scales the empirical linkages between self-report and other important behavioural patterns can be described more clearly and conceptualised more simply (Aston & Goldberg, 1973). Rational scales seem to perform better than or as well as scales which used contrasted group selection methods or employ subtle items (Aston & Goldberg, 1973; Goldberg, 1972; Hase & Goldberg, 1967).

With regard to the internal strategy to test construction, the sole determinant of an item scale membership and its direction of keying is the internal structure of the item pool (Goldberg, 1972). There are two main variants of the internal strategy, one aimed at the maximisation of scale homogeneity or internal consistency and the other aimed at the construction of scales through some factor analytic procedure. Goldberg (1972) noted that most test developers tend to use a mixture of scale construction strategies, first employing intuitive assembly and keying of items at the beginning of the scale construction, then "purifying" resulting scales through internal consistency analysis. In the development of the HPAQ, constructs to be measured were first identified (Study 1) and sets of items intended to tap these constructs were drawn from over 2,000 public domain items contained in the IPIP that have been administered to members of Eugene-Springfield Community

Sample (ESCS). These items were correlated with the factor scores for the twenty-nine facets and the 12 items demonstrating the highest correlations with each facet were selected for the initial pool of items. Items were also chosen on the requirement that scales should include a relatively equal number of positively and negatively keyed items so as to control for acquiescence and items should not appear too redundant. The initial item pool was administered to a large sample, and item responses were factor-analysed. For each facet, 8 final items were selected on the basis of their factor loadings and corrected item-total correlations. The construct validity of the HPAQ was evaluated with reference to the NEO-PIR.

4.2.2 Initial Item Selection. The goal in the development of the HPAQ was to create scales with 8 common items so as to ensure that the test is of a manageable length. Saucier and Goldberg (2002) noted that in most cases four-item scales seem to be a practical minimum. However, an 8- to 10-item scale is likely to produce scores with a more Gaussian distribution than would a scale comprising only four-items (Saucier & Goldberg, 2002). For the initial pool of items, 20% more items than actually needed were chosen so that an adequate quantity of good items would be available for the final version of the test (Aiken & Groth-Marnat, 2006). Hence, 12 items for each facet were included in the initial pool of items. To generate the initial item pool, over 2,000 public domain items contained in the IPIP that have been administered to members of the ESCS, who were included in analyses for Study 1, were correlated with factor scores for the twenty-nine facets from Study 1. Thus, analyses were performed using data from the 375 ESCS participants who completed all of the IPIP items and had a factor score for each of the twenty-nine facets. The IPIP is “uniquely well-suited to the empirical characterisation of factor content at the item level” (DeYoung et al., 2007, p. 885).

Therefore, the IPIP may allow for a more accurate characterisation of the twenty-nine facets.

To ensure adequate discrimination between the twenty-nine facets as well as avoid undue item cross-loading on the other Big Five domains, items were excluded if they correlated with more than one factor and the difference between correlations was less than .1. Special care was made to ensure that a balanced number of negatively and positively keyed items were included in each scale to control for acquiescence, which "is likely to be confounded with item content and social desirability responding" (Saucier & Goldberg, 2002, p. 31). Consequently, the wording for some items shown to be a good marker of a particular facet, based on the selection criteria, were changed in order to reverse their keying direction so as to maintain a roughly equal balance of negatively and positively keyed items for each of the twenty-nine facets. In total, the wording for eighteen items was changed. In addition, two new items, "Find it difficult to cope with changes in situation" and "Tend not to be flexible," were written for the Adaptability facet as most of the items with their highest correlation with this facet seem to assess an individual's ability to handle criticism. Also, four new items, "Am not considered to be a traditional person," "believe that traditional values should be obeyed and practiced," "believe that it okay to change tradition," and "believe that people should be allowed to dress the way they like," were written for the Traditionalism facet as only eight items met the selection criteria for this facet. The initial pool of 348 IPIP items to mark the twenty-nine facets was administered to a large sample of undergraduate and postgraduate students at a University in the English-speaking Caribbean with the intention of choosing 8 items that best marked each of the facets, based on their psychometric properties in the new sample.

4.2.3 Final Item Selection

4.2.3.1 Method.

4.2.3.1.1 Sample. Data was collected from 778 respondents, all of who were working and non-working undergraduate and postgraduate students at a University in the English-speaking Caribbean receiving credit for research participation. This sample size was deemed adequate given sample size considerations previously mentioned for EFA in Study One (for example, Goldberg & Velicer, 2006; MacCallum et al., 1999; Tabachnick & Fidell, 2007). Of the respondents, 253 (32.5%) were male and 525 (67.5%) were female. Average age for respondents was 26 years of age, with a range of 18 to 62 (M = 26, SD = 9.22). Most of the participants identified as Black Caribbean (92.9%) while 2.9% identified as South Asian Caribbean, and 1.4% or less identified as White Caribbean, White American, East Asian Caribbean or did not report their ethnicity. The sample characteristics for university development sample are outlined in more detail in Appendix B.

4.2.3.1.2 Measures and Procedure. A self-report version of the HPAQ scales consisting of 348 items was devised. Items were randomly ordered and scaled with a 5-point Likert-type scale of 1 = *'strongly disagree'*, 2 = '*disagree*', 3 = *'neither agree nor disagree'*, 4 = '*agree*', 5 = '*strongly agree'*. The self-report questionnaire was administered to all participants in the same location. Moreover, before participants were provided with the self-report questionnaire they were fully debriefed and informed about their right to withdraw. Participants provided the researcher with their name and student identification number. Students were assured that this information was only required so that the researcher could provide the course administrators with a list of students who participated in the study so as to facilitate the awarding of the automatic partial class credit to those individuals.

4.2.3.1.3 Data analysis techniques. For practical purposes it was decided that final scales should be no more than 8 items. Exploratory Factor Analysis (EFA) was adopted as the basis for item selection. For conducting analyses, EFA was preferred to PCA as EFA is the more appropriate choice for the researcher when goal is on identifying latent constructs that are expected to be underlying measured observed variables and thus when the researcher has an a priori assumption about the underlying structure of measured variables (Fabrigar et al., 1999; Tabachnick & Fidell, 2007). EFA is a data reduction technique, but with the assumptions of an underlying theoretical structure in the measured variables while PCA is purely a data reduction technique (Fabrigar et al., 1999; Tabachnick & Fidell, 2007). Moreover, an EFA method such as Principal-axis factoring is preferred to PCA "because the principal-components method of analysis mixes common, specific, and random error variances" (Hinkin, 1998, p. 112).

Final item selection was not solely empirical as the researcher guided the analyses in several ways. Following the recommendations of Hinkin (1998), item analyses began by calculating the inter-item correlations for the items within each facet scale prior to conducting factor analysis. Moreover, the corrected item-total correlation was used to determine if items should be retained or omitted from scales. If the corrected item-total correlation is moderately high or high (.4 and above), the item would be deemed as fitting the scale psychometrically well (Leech, Barrett, & Morgan, 2005). However, other researchers have recommended a minimum cut-off for the corrected item-total correlation of .2 (Streiner & Norman, 2000) or .3 (Nunnally & Bernstein, 1994). In this study, a lower acceptable minimum cut-off for the corrected item-total correlation of .2 was used in order to avoid placing too strict criteria for item deletion. Thus, within each

facet scale item-total correlation analysis was re-run iteratively until no items with inter-item correlations lower than .20 remained.

Items retained based on the corrected item-total correlation criteria were subjected to EFAs. First, items within each Big Five domain were subjected to Principal-axis Factoring with oblique (promax) rotation to define facets. The remaining items were then factor analysed at the Big Five domain level using Principal-axis Factoring with orthogonal (varimax) rotation. Goldberg and Velicer (2006) recommended the use of oblique rotation if the researcher seeks lower-level factors within a single domain and the use of an orthogonal rotation if the emphasis is on higher-level factors. The researcher also ensured that there were a roughly equal number of positively and negatively keyed items representing each of the facets to control for acquiescence (Saucer & Goldberg, 2002). Scales were not allowed a ratio of negatively to positively items (or vice versa) greater than 5/3. Data was screened on the basis of a number of rules. Items were omitted if:

- they loaded less than 0.4 on a factor;
- they loaded on more than one factor and the difference between loadings was less than 0.1;
- and being exploratory in nature, if they did not have their highest loading on the intended facet and Big Five domain.

Once all items that do not meet the minimum criteria for retention are removed, the reliability of scales should then be examined for internal consistency (Gerbing & Anderson, 1988). In this study, scale reliability estimates (Cronbrach's coefficient alpha) were calculated for all scales. Cronbrach's alpha is arguably the most widely used measure of reliability of a scale (Streiner, 2003), and is an estimate of internal consistency and the extent to which items in a scale are homogeneous (Cooper & Emory, 1995). There is currently no universal agreement among researchers as to minimum acceptable value of Cronbach's alpha for a scale before it

can be considered unreliable (Bryant, King, & Smart, 2007). A number of authors have proposed different criteria for minimum acceptable value of alpha. For example, Nunnally (1967) recommended a minimum acceptance alpha coefficient level of .50-.60 for research in its early stage, .80 basic research instruments, and .90 for clinical research purposes. However, in later versions of his book (Nunnally 1978, Nunnally & Bernstein, 1994), Nunnally recommended a minimum alpha coefficient level of .70. Other researchers have recommended a minimum alpha coefficient level of .60 for new scales, such as the one developed in this study (Flynn, Schroeder, & Sakakibara, 1994; Hair, Anderson, Tatham, & Black, 1998). Moreover, Kline (1998) suggested that alpha coefficients level below .50 should be avoid while alpha coefficients of .70 are adequate, .80 are good, and .90 are excellent. However, in the current study, the minimum level ($\alpha \geq .70$) was used to ensure that only reliable scales are retained in the instrument. This is in keeping with the minimum acceptance alpha coefficient level used by many researchers (Bryant et al., 2007).

4.2.3.2 Results. Eight final items to mark each of the twenty-nine facet scales from the initial item pool of 348 items were selected based on their corrected-item total correlation and factor loadings and. To accomplish this, firstly, before conducting EFAs, corrected-item total correlations for the 29 HPAQ facet scales were examined and items within each facet factor with corrected-item total correlations lower than .4 were discarded. Based on this criterion, 46 items were omitted. However, this criterion was scaled down to discarding items with corrected-item total correlations lower than .3 (the items with the highest corrected-item total correlations ranging between .3 and .4 were selected) for two items in the Enthusiasm scale, two items in the Change/Variety Seeking scale, three items in the Traditionalism scale, three items in the

intellectual curiosity scale, one item in the Adaptability scale, four items in the Cooperation scale, and two items in the modesty scale so that there were eight items within each facet factor. Secondly, items with similar or stronger corrected-item total correlations with other facet factors than within the intended facet factor were also omitted (for example, the item “complete tasks successfully,” was intended to mark the Industriousness scale but showed a similar relationship with the Achievement scale); 26 items were excluded as a result of this criterion. Thirdly, item responses within each of the Big Five domains were subjected to Principal-axis Factoring with oblique (promax) rotation to define facets. Based on this analysis, 9 items were omitted because they loaded less than .4 on the intended facet factor and 10 items were excluded because their loading on the intended facet factor was not at least .10 greater than on the other facet factors. Finally, using Principal-axis Factoring Extraction with orthogonal (varimax) rotation, a five-factor solution was extracted from all items across the Big Five domains, and 25 items were omitted because they either did not have their highest loading on the intended Big Five domain or their loading on the intended domain was not at least .10 greater than on the other domains.

The 8 final items to mark each of the twenty-nine facet scales are presented in Appendix E along with their correlation with the relevant factor score from the ESCS in Study 1 and factor loading on the relevant facet factor in the university development sample. Items were summed to create scale scores for the twenty-nine facets and scale scores for each facet within each domain were summed to create Big Five domain scores. The descriptive statistics for the HPAQ, including Cronbach’s alphas for the twenty-nine facet scales and Big Five domains for the ESCS (Mean Cronbach’s α =.77, SD =.07 and Mean Cronbach’s α = .92 , SD = .02 ,respectively) and the university development sample (Mean Cronbach’s α = .77, SD =

.05 and Mean Cronbach's α =.92, SD=.02, respectively) are reported in Table 13.

In addition, the twenty-nine HPAQ facet scale scores in the university development sample and in the ESCS were factored using principal axis factoring with varimax rotation to determine how well the internal facet structure of the HPAQ corresponds to the Big Five factor structure in these samples as a means of comparison (Tables 14 and 15). In the university development sample, the first ten eigenvalues for the data matrix were 8.47, 3.84, 2.40, 1.66, 1.22, .90, .81, .68, .56, and .53 respectively. All of the facets had their highest loading on the intended Big Five domain. Moreover, traditionalism, peacefulness, trust and modesty had strong secondary loadings on another Big Five domain (Conscientiousness, Emotional Stability, Agreeableness and Extraversion respectively). In the ESCS, the first ten eigenvalues for the data matrix were 6.32, 4.09, 3.13, 2.02, 1.34, .97, .92, .83, .77, and .74. Similarly to the university development sample five-factor solution, traditionalism, peacefulness, trust, and modesty had strong secondary loadings on another Big Five domain (Conscientiousness, Emotional Stability, Agreeableness and Extraversion respectively).

Table 13:

Means, Standard Deviations, and Internal Reliability for Hierarchical Personality Assessment Questionnaire (HPAQ) in the ESCS and University (Development) Sample

	ESCS			University		
Factor	M	SD	α	M	SD	α
Extraversion	155.88	26.02	.93	155.85	22.57	.91
Affiliation	29.56	5.91	.85	28.56	5.09	.81
Sociability	22.62	6.06	.78	22.58	5.46	.73
Social Boldness	26.35	5.98	.80	25.83	5.21	.76
Expressiveness	21.24	6.21	.82	20.50	5.72	.74
Assertiveness	26.49	6.11	.86	27.73	5.07	.80
Enthusiasm	29.78	5.28	.79	30.86	4.88	.75
Conscientiousness	154.32	17.20	.89	120.21	17.34	.93
Industriousness	31.42	4.82	.79	29.65	5.00	.78
Achievement	31.27	4.69	.77	30.38	5.13	.80
Orderliness	27.71	5.42	.77	29.54	5.76	.81
Self-Control	30.81	5.12	.77	27.99	5.32	.74
Openness to Experience	247.75	25.08	.90	204.31	21.70	.89
Culture/Artistic Interest	32.06	5.78	.83	29.07	5.57	.77
Imagination	24.05	5.76	.78	25.99	5.34	.72
Creativity	28.08	5.49	.85	29.61	4.89	.82
Intellect	26.80	4.92	.78	28.86	4.95	.75
Change/Variety Seeking	30.00	4.50	.73	31.72	4.01	.74
Traditionalism	15.32	2.81	.60	28.47	3.92	.76
Intellectual Curiosity	33.53	4.02	.69	31.97	4.07	.72
Emotional Stability	191.81	26.87	.93	151.59	23.30	.95
Fearlessness/Low Anxiety	26.42	6.33	.84	24.29	5.97	.80
Stability	28.89	5.38	.79	27.05	5.23	.74
Optimism	27.88	6.26	.85	26.17	7.25	.89
Even-tempered	30.80	6.26	.84	31.50	5.22	.78
Trust	30.64	4.98	.81	24.77	5.80	.84
Adaptability	21.26	3.72	.65	27.77	4.30	.71

Note. ESCS = Eugene-Springfield Community Sample (N = 375); University (Development) Sample (N = 778).

Table 13 continued

Means, Standard Deviations, and Internal Reliability for Hierarchical Personality Assessment Questionnaire (HPAQ) in the ESCS and University (Development) Sample

	ESCS			University		
Factor	M	SD	α	M	SD	α
Agreeableness	284.13	29.72	.93	181.87	22.85	.94
Sympathy	31.05	4.66	.75	30.35	5.05	.76
Compassion	32.90	4.41	.82	30.93	4.85	.82
Cooperation	34.34	3.74	.67	30.50	4.41	.69
Peacefulness	31.74	4.29	.73	29.63	4.96	.74
Morality	33.11	4.55	.69	31.00	4.95	.70
Modesty	30.21	5.34	.75	29.75	5.27	.77

Note. ESCS = Eugene-Springfield Community Sample (N = 375); University (Development) Sample (N = 778).

Table 14:

Factor Structure of HPAQ Facet Scale Scores in the University development Sample

	Factors				
	ES	E	A	O	C
Emotional Stability Facets					
Stability	**.81**	.05	.22	.15	.28
Even-tempered	**.78**	-.02	.33	.19	.13
Fearfulness/Low Anxiety	**.78**	.17	.13	.21	.17
Adaptability	**.64**	-.03	.32	.34	.30
Optimism	**.60**	.27	.37	.38	.37
Trust	**.59**	.16	**.41**	.19	.17
Extraversion Facets					
Expressiveness	-.16	**.80**	-.25	.09	-.09
Social Boldness	.36	**.74**	.37	.27	.24
Sociability	.11	**.69**	.02	.16	-.10
Affiliation	.21	**.61**	.37	.07	.19
Assertiveness	.19	**.58**	.16	.16	.31
Enthusiasm	.22	**.57**	.21	.28	.33
Agreeableness Facets					
Compassion	.29	.06	**.75**	.15	.28
Peacefulness	**.55**	-.07	**.72**	.19	.20
Cooperation	.36	-.38	**.70**	.16	.24
Sympathy	.02	-.03	**.68**	.21	.19
morality	.29	-.36	**.67**	.14	.30
Modesty	.23	**-.42**	**.63**	-.06	.17
Openness to Experience Facets					
Creativity	.27	.31	.19	**.71**	.26
Intellectual curiosity	.26	.20	.26	**.70**	.30
Change/Variety Seeking	.33	.30	.36	**.67**	.15
Culture/Artistic Interest	.23	.16	.35	**.61**	.08
intellect	.20	.09	.21	**.58**	.30
Imagination	-.32	.19	-.14	**.57**	-.27
Traditionalism	.11	-.03	.14	**.54**	**.41**
Conscientiousness Facets					
Industriousness	.28	.09	.23	.13	**.82**
Achievement	.21	.09	-.24	.17	**.72**
Orderliness	.19	-.08	.10	.18	**.63**
Self-control	.31	-.29	.17	.08	**.57**

Note. N = 778. Principal Axis Factoring with orthogonal (varimax) rotation. HPAQ = Hierarchical Personality Assessment Questionnaire. ES = Emotional Stability, A = Agreeableness, E = Extraversion, O = Openness to Experience, and C = Conscientiousness.

Table 15:

Factor Structure of HPAQ Facet Scale Scores in the ESCS

	Factor				
	ES	E	A	O	C
Emotional Stability Facets					
Stability	**.84**	-.04	-.15	.01	.13
Fearlessness/Low Anxiety	**.76**	.11	-.08	.17	.01
Optimism	**.69**	.32	.05	.16	.25
Even-tempered	**.67**	-.06	.25	.03	-.02
Adaptability	**.58**	.02	.33	.07	-.07
Trust	**.57**	.24	**.40**	.04	-.06
Extraversion Facets					
Expressiveness	-.13	**.81**	-.10	.16	-.05
Social Boldness	.23	**.73**	-.02	.37	.11
Affiliation	.39	**.70**	.33	.08	.08
Sociability	.06	**.60**	.15	.02	-.02
Assertiveness	.08	**.51**	-.28	.40	.32
Enthusiasm	.31	**.49**	.19	.22	.24
Agreeableness Facets					
Sympathy	-.10	.13	**.75**	.13	.03
Compassion	.07	.26	**.72**	.20	.02
Peacefulness	**.47**	-.02	**.65**	.18	-.06
Cooperation	.30	-.22	**.63**	-.03	.11
Morality	.18	-.11	**.59**	-.01	.21
Modesty	.16	**-.43**	**.57**	-.13	.19
Openness to Experience Facets					
Creativity	.11	.19	-.03	**.77**	.11
Intellectual Curiosity	.05	-.05	.21	**.61**	.09
Intellect	.17	.14	-.01	**.60**	.06
Imagination	-.27	.08	-.07	**.59**	-.29
Change/Variety Seeking	.15	.22	.12	**.57**	-.19
Culture/Artistic Interest	-.02	.10	.36	**.55**	-.16
Traditionalism	-.08	-.02	.11	**-.53**	**.41**
Conscientiousness Facets					
Industriousness	.26	.11	.00	.23	**.77**
Orderliness	-.08	-.02	-.01	-.11	**.62**
Achievement	.12	.13	.07	.36	**.62**
Self-control	.30	-.26	.14	-.03	**.52**

Note. N = 375. Principal Axis Factoring with orthogonal (varimax) rotation. HPAQ = Hierarchical Personality Assessment Questionnaire. ES = Emotional Stability, E = Extraversion, A = Agreeableness O = Openness to Experience, and C = Conscientiousness.

4.3 Scale Validation

4.3.1 Method

4.3.1.1 Sample. The validation sample, a separate independent sample from the development sample, consisted of 807 working and non-working undergraduate and postgraduate students at a University in the English-speaking Caribbean receiving credit for research participation. Some researchers have argued that it is inappropriate to use same sample both to develop an instrument and to assess its psychometric properties (e.g. Campbell, 1976) as factors that may be sample specific, yielding high reliabilities, are likely to result from the use of factor analytic techniques to develop the scales (Krzystofiak, Cardy, & Newman, 1988). In this respect, some researchers have recommended using independent samples for scale development and for assessing their psychometric properties (e.g. Stone, 1978). Also, the use of independent samples enhances the generalisability of new developed instruments. Of the participants, 509 (63.1%) were female and 298 (36.9%) were male. Average age for respondents was 26.56 years of age, with a range of 18 to 61. Most of the participants identified as Black Caribbean (94.9%) while 2% identified as South Asian Caribbean, and 1% or less identified as White Caribbean, White American, East Asian Caribbean or did not report their ethnicity. The sample characteristics for university validation sample are outlined in more detail in Appendix B.

4.3.1.2 Measures and procedure. Initial agreement was sought from students to complete a self-report version of the HPAQ and the NEO Personality Inventory (NEO-PI-R) for an automatic partial course credit towards their final grade. The two personality instruments were administered to participants over a 3-week period. The HPAQ comprising 232 items was first administered to students. Students responded to each item using a 5-point Likert-type response scale ranging from 1 *(strongly disagree)* to 5

(strongly agree). To assess the construct validity of the HPAQ, the NEO Personality Inventory (NEO-PI-R; Costa, et al. 1991; Costa and McCrae, 1992a), a 240-item questionnaire developed to operationalise the FFM of personality was administered two weeks later so as minimised the potential for fatigue and random responding. The NEO-PI-R consists of scales measuring five domains: Neuroticism, Extraversion, Openness to Experience, Agreeableness, and Conscientiousness. Each domain comprises six subscales a total of 30 facets. Items were scaled with a 5-point Likert scale ranging from 1 = *(strongly disagree)* to 5 *(strongly agree)*. Internal consistency (reliability) coefficients for domain scales are reported to range from .86 to .95 and for subscales or "facets" from .62 to .82 (Costa and McCrae, 1992a). Students who agreed to participate in the research project were informed of administration dates and location. (Additionally, the 375 ESCS participants also completed the NEO-PIR, allowing comparison across samples).

Students were briefed by the researcher on the purpose of the study and the procedure for completing the survey. During the briefing, students were informed that participation in the research project was voluntary. To preserve confidentiality and anonymity, students were instructed to write their student ID number and an independently selected corresponding coded number consisting of 7 digits on a participants' form, which was stored separately from the questionnaire data in a locked filing cabinet and only the researcher had access to the participants' form. Students were assured that this information was only required so that the researcher could provide the course administrators with a list of students who participated in study so as to facilitate the awarding of the automatic partial class credit to those individuals. Furthermore, the participants' form was destroyed immediately following the data collection and data entry period and the assignment of the

automatic partial class credit to students who participated in the study. In addition, students were instructed to write their independently selected 7 digit coded number in the top right hand corner of the first page of each questionnaire instrument. This allowed for the matching of individual responses to the two instruments. Of the 1000 distributed questionnaires, 807 participants completed and returned the HPAQ, while 686 completed and return both instruments.

4.3.1.3 Data analysis. An objective of present research was to examine the construct validity of the HPAQ. Validity of an instrument concerns "the extent to which scores generated by an instrument measure the characteristic or variable they are intended to measure for a specific population" (Onwuegbuzie, Daniel, & Collins, 2009, p. 200). Instrument validation can be divided into three forms referred to as criterion validity, content validity, and construct validity. When validating an instrument, researchers usually aim to provide evidence of one or more of these forms (Hinkin, 1998). Up to this point, evidence that the HPAQ possess content validity has been established (see Sections 4.2.2 and 4.2.3.2). Content validity refers to the extent to which items within an instrument are relevant to and representative of the targeted construct (Onwuegbuzie et al., 2009).

Construct validity refers to the extent to which an instrument measures the theoretical construct of interest (Anastasi & Urbina, 1997). In the present research, construct validity of HPAQ was assessed through an examination of the instrument's factor structure or structural validity, convergent validity, and discriminant validity. Despite the fact that EFA analyses have been a commonly used empirical approach to assess structural validity (Onwuegbuzie, et al., 2009), in a multiple-indicator measurement model, items that clearly load on a factor in an EFA due to the lack of external consistency may demonstrate inadequate fit (Gerbing & Anderson,

1988). Therefore, confirmatory factor analysis (CFA) is recommended to confirm the factor structure of the scales revealed from the EFA (Hinkin, 1998). The present research conducted a second-order CFA to assess the structural validity of the HPAQ structure derived from EFA. It has been suggested that CFA may not be appropriate for evaluating personality structure because most personality items and scales are multifactor in nature (McCrae, Zonderman, Costa, Bond, & Paunonen, 1996). CFA is considered a better approach than EFA when there is a sufficient theoretical and empirical basis for a researcher to hypothesise a structure that they believe underlies the data (Fabrigar et al., 1999). This is because specific hypotheses about the data can be tested using CFA (Finch & West, 1997; Fabrigar et al., 1999). Furthermore, because of the a priori nature of CFA, the researcher is not likely to capitalise on chance characteristics in the data (Fabrigar et al., 1999).

In order to assess the overall adequacy of the second-order CFA model, a combination of various model fit indices as well as indicator loadings were examined. It has been recommended that researchers should report multiple fit statistics in structural equation modelling (SEM) studies as numerous fit statistics consider different aspects of fit (Thompson, 2000). For this reason, several fit indices were used: chi-square statistic (x^2) – a non-significant p-value indicates good fit to the data (Kelloway, 1998); the root-mean-square error of approximation (RMSEA) – values less than 0.05 indicate good fit while values as high as 0.08 indicate reasonable fit (Byrne, 2006), and insignificant p-values (greaters than .05) are desirable (Kline, 2011), standardized root square mean residual (SRMR) – small values of 0.05 or less reflect very good fit (Byrne, 2006; Kline, 2011); comparative fit index (CFI) – values of .95 or higher indicate very good fit to data (Hu & Bentler, 1999; Kline, 2011) and values exceeding 0.90 are indicative of acceptable/good model fit (Bentler & Bonett, 1980; Bollen, 1989; Hair, Black, Babin,

& Anderson, 2010; Kline, 2011), and goodness-of-fix index (GFI) – values of 0.95 or higher indicate very good fit and values of .90 and less than .95 indicate acceptable model fit (Kelloway, 1998; Kline, 2011).

For an instrument to have adequate construct validity, it should have high correlations with different measures of the same construct – convergent validity; and low correlations with measures of different constructs – discriminant validity (Aiken & Groth-Marnat, 2006; Anastasi & Urbina, 1997). As individual facet scales are intended to represent one of the five broad domains, all facets in a domain should share many correlates. However, it is also necessary for scales to show differential relations in order to be truly valuable for understanding specific traits (Costa & McCrae, 1992a). Using AMOS 18, CFA was employed to examine the internal convergent of the HPAQ Big Five domain scales and the HPAQ facet scales. The properties of the second-order CFA measurement model conducted to assess the structural validity of the HPAQ structure were used to assess the internal convergent validity of the HPAQ Big Five domain scales and the HPAQ facet scales. To assess internal convergent validity of the HPAQ, factor loadings, composite reliabilities, and average variance extracted (AVE) estimates were examined for each HPAQ Big Five domain and facet scale. Item factor loadings that are statistically significant and exceed the minimum cut-off of 0.5 provide evidence of adequate convergent validity (Hair, Black, Babin, Anderson, & Tatham, 2006). Composite reliability assesses the degree to which a set of latent construct indicators share the measurement of a construct (Fornell & Larcker, 1981). Composite reliability values of 0.60 and higher are considered adequate for convergent validity (Bagozzi & Yi, 1988; Fornell & Larcker, 1981; Hair et al., 1998). Fornell and Larcker (1981) suggest using AVE to assess convergent validity. The AVE is the average variance shared between a construct and its measure

(Fornell & Larcker, 1981). Convergent validity is established when the AVEs of scales exceed the minimum cut-off of 0.5 as recommended by Fornell and Larcker (1981).

The discriminant validity of the HPAQ Big Five domain scales and the HPAQ facet scales was assessed using three procedures based on confirmatory factor analysis. The properties of the second-order CFA measurement model conducted to assess the structural validity of the HPAQ structure were used to assess the internal discriminant validity of the HPAQ Big Five domain scales. Whereas the properties of a first-order CFA measurement model including the 29 facets as latent variables measured by their eight item indicators was used to assess the discriminant validity of the HPAQ facet scales. Firstly, the squared correlations between constructs were compared with the AVE estimates for each construct (Fornell & Larcker, 1981; Hair et al., 2006). In order to establish discriminant validity, the squared correlations between constructs should be less than the AVE of the said construct (Fornell & Larcker, 1981). Secondly, the nested model approach in SEM was also used to assess discriminant validity. This approach involves comparing a constrained pair of constructs (e.g., correlation between the two facets is fixed to 1) with an unconstrained pair of the same constructs (the correlation between two facets is freely estimated) based on a Chi-Square difference test (Anderson & Gerbng, 1988; Bagozzi & Philips, 1982; Bagozzi, Yi, & Phillips, 1991). As the difference in chi-square will have a chi-square distribution with one degree of freedom, a chi-square difference value exceeding 3.84 indicates that the correlation between the pair of constructs is significantly different from 1.00 at the .05 significance level (Shiu, Pervan, Bove, & Beatty, 2011). Where these two models (unconstrained and constrained) differ significantly on Chi-square difference, evidence of discriminant validity on these pairs of latent variables is revealed (Anderson & Gerbing, 1988; Bagozzi & Philips,

1982; Bagozzi et al., 1991). Within the CFA model, the nested approach analysis was performed for one pair of latent variables at a time. Thirdly, the discriminant validity of the HPAQ Big Five domain scales and the HPAQ facet scales was assessed by examining the 95% confidence interval for correlations between pairs of the Big Five personality factors and pairs of the HPAQ facets (Bagozzi et al., 1991). Where the 95% confidence interval does not contain 1.00, it indicates that the correlation between the two constructs is significantly less than 1 at the 5% significance level, and thus the two constructs are distinct.

Anastasi (1988) noted that "it is only through the empirical investigation of the relationship of test scores to other external data that we can discover what a test measures" (p. 162). To further assess the convergent and discriminant validity of the HPAQ, correlations between the HPAQ five broad domains and the five broad factors of the NEO-PIR (Costa & McCrae, 1992a) were computed. Moreover, correlations between the facet scores of the HPAQ and the five broad factors of the NEO-PIR were calculated. According to Cohen (1988), $r \geq 0.5$ (or $r^2 \geq 0.25$) denotes a large effect size, indicating evidence of convergent validity.

4.3.2 Results

4.3.2.1 Outliers and normality. Prior to conducting analyses, data were examined for the presence of univariate and multivariate outliers (McClelland, 2000; Tabachnick & Fidell, 2007), which might attenuate the results. The former was analysed through standardized scores ($|z| \geq 3.30$) and the latter through Mahalanobis Distance ($p < .001$) and Studentised Deleted Residual (greater than ± 4.00). An examination of the data for univariate outliers at the item level of analysis revealed that none of the standardised scores out of 187,224 exceeded 3.29, and thus indicated that no cases could be classified as univariate outliers.

An examination of the data for multivariate outliers at the item level of analysis using Mahalanobis Distance ($p < .001$), which is "evaluated as X^2 with degrees of freedom equal to the number of variables" (Tabachnick & Fidell, 2007, p.99) and Studentised Deleted Residual (greater than ± 4.00) was also conducted. Given that the number of variables are 232, cases with a Mahalanobis Distance greater than X^2 (232) =304.299 are considered multivariate outliers. The analysis for multivariate outliers using identified no cases as multivariate outliers. In addition, the normality of each item was investigated in terms of their skewness (-2.01 to 1.18, |M|=-.49) and kurtosis (-1.25 to 3.10, |M|=-.031). These values were checked to determine if they were within the level recommended for a CFA with maximum-likelihood estimation (skew >2, kurtosis >7; West et al., 1995). The normality assumption for all 232 items was well within the robustness thresholds for normality (West et al., 1995).

In addition, multivariate normality was evaluated using Mardia's (1970) coefficient. A Mardia's coefficient greater than 3.00 indicates nonnormality. To examine if the item level data met the assumption of multivariate normality, the Mardia's coefficient (Mardia, 1970) using PRELIS 2.5, were computed. In addition, the multivariate test for kurtosis, z = -1.814 and for skewness, *z* = -1.910 did not show a departure from multivariate normality as Mardia's values were within the range of – 3.00 to +3.00 (Bentler, 2006).

An examination of the data for univariate and multivariate outliers as well as univariate and multivariate normality at the facet level was also undertaken. An examination of the data for univariate outliers at the facet level revealed that no cases could be classified as univariate outliers as none of the standardised scores out of 23,403 exceeded 3.29. Moreover, the analysis for multivariate outliers identified no cases as multivariate outliers. Additionally,

skewness for facets ranged from (-.65 to .71, |M|=-.11) while Kurtosis for facet scales ranged from (-.54 to 3.26, |M|=.05), and thus were well within the robustness thresholds for normality (West et al., 1995). The multivariate test for kurtosis, z = 1.009, and for skewness, *z* = 1.378 indicated that the facet scales were distributed with multivariate normality as Mardia's values were within the range of – 3.00 to +3.00 (Bentler, 2006).

4.3.2.2 Structural validity. The HPAQ was developed to explicitly represent the Big Five model. More specifically, as mentioned previously, the HPAQ was constructed to assess a hierarchical structure with the Big Five domains represented at the top hierarchy and the 29 facets identified in Study 1 as underlying the trait domain of Big Five represented below. To assess the factor structure or structural validity of the HPAQ, a second –order CFA using AMOS 18 was performed on the university scale validation sample data. In a second-order CFA model, higher order latent variables are modelled as causal variables impacting first-order latent variables (i.e. typical latent variables with measured indicators), and thus second-order latent variables are not directly connected to any measured items (Hair et al., 2010). In the second-order CFA model to examine the structure of the HPAQ instrument, the Big Five personality factors were represented at the top hierarchy as higher-order latent variables modelled as causing 29 facets represented as first-order latent factors measured by eight indicators or observed variables (items) each.

Before conducting the second-order CFA, the minimum sample size required in order to perform a second-order CFA in the current data was determined. Sample size affects the ability of a model to be accurately estimated (Hair et al., 2006). In the SEM or CFA literature several sample size heuristics have been proposed for estimating the minimum sample size intended for SEM or CFA.

These rules of thumbs stipulate either a minimum sample size (e.g. N ≥ 100 to 200), or a desired ratio of number of cases of subjects to free parameters or number of indicators in the model – e.g., at least 5 to 10 cases per free parameter or indicator – (Bentler & Chou, 1987; Bollen, 1989; Boomsma 1982; Ding, Velicer, & Harlow, 1995; Tanaka, 1987). However, the existing literature suggests that such sample size rules of thumbs are oversimplified and have limited utility and generalisability to any given research data set (Brown, 2006; Jackson, 2001; Kim, 2005; MacCallum, Browne, Cai, 2006; Westland, 2010). Moreover, Goodhue, Lewis, and Thompson (2007) revealed that approaches such as the 5:1 or 10:1 fail to have the necessary power to detect small and medium effects in even simple SEM models. Furthermore, the SEM or CFA literature suggests that the determination of minimum sample size in SEM or CFA analysis should be dependent largely on power analysis (Brown, 2006; Jackson, 2001; Kim, 2005; MacCallum et al., 2006; MacCallum, Browne, & Sugawara, 1996; Westland, 2010). Westland (2010) purported that the power analysis approach to the determination of minimum sample size is more reliable and less biased than other 'ad hoc' approaches to the determination of minimum sample size. Greater power reduces both Type I and Type II error (O'Brien & Castelloe, 2007). Brown (2006, p. 413) noted that "in SEM and CFA, power pertains to both the test of the model (e.g., sensitivity of X^2 to detect model specifications) and the model parameter estimates (i.e. probability of detecting a parameter estimate as significantly different from zero)."

Soper (2013) power-based sample size calculator for CFA/SEM research was used to estimate the minimum sample size required for performing CFA in the current research. For this approach, the determination of minimum sample size needed to conduct a CFA is based on the number of observed variables and latent variables in the model, the anticipated effect size based on

Cohen's (1988) convention of small (.1), medium (.3), and large (.5) effect sizes, desired level of power and alpha (set at .05). In this study, Cohen (1988) cut-off for acceptable power of .80 (i.e., an 80% probability of rejecting a false null hypothesis) was employed. In addition, following the convention articulated in Cohen (1988) for behavioural sciences research, a medium effect size (.30) was specified. To estimate the current second-order CFA model, the following information was inputted into Soper (2013) power-based sample size calculator for CFA/SEM research: the alpha level (set at .05), the desired power level (set at .80), the total number of observed variables (232), the total number of latent variables (34), and the anticipated effect size (medium effect of .30). Based on the calculation, the minimum sample size required for achieving adequate statistical power and precision to estimate the current second-order CFA model's parameter estimates as well as reliable indices of overall model fit is 358. Therefore, the sample size achieved in this validation study (N =807) is adequate to conduct current second-order CFA.

The results for second-order CFA examining the hypothesised hierarchical structure of the HPAQ instrument, indicated acceptable fit to data (X^2 = 12844.7, *df* = 19459, *p* < .001: RMSEA = .067 [90% CI = .061 -.069, *p* = .055], SRMR = .05, CFI = .95, GFI = .92). Although the χ^2 statistic for the model was statistically significant indicating poor fit to data, the other model fit indices showed overall acceptable fit. The literature has suggested that the chi-square is sensitive to large sample sizes and researchers should rely on other model fit indices such as the CFI that are more resistant to sample size effects (Kelloway, 1998; Kline, 2011). Overall, these results confirm the factor structure of the HPAQ, and provide robust evidence for the structural validity of the measure.

4.3.2.3 Internal convergent validity and discriminant validity of the HPAQ Big Five factors. The properties of the second-order CFA measurement model were used to assess the internal convergent and discriminant validity of the HPAQ Big Five personality factors. Internal convergent validity of the Big Five personality factors was tested based on an examination of factor loadings, composite reliabilities, and AVE estimates (Table 16). All twenty-nine facets significantly loaded on their corresponding Big Five personality factor ($p < .001$) as the critical ratios associated with each item exceeded the 1.96, and thus the 0.05 level of significance. The critical ratio is the t-value and a t-value greater than 1.96 or smaller than -1.96 is consider statistically significant at the 0.05 level (Byrne, 2001). Hence, all twenty-nine facets were significantly related to their specified facets. Moreover, all of the factor loadings were above the recommended level of .50 (Hair et al., 2006). The composite reliabilities for all of the Big Five personality factors exceeded the recommended .60 cut-off level (Bagozzi & Yi, 1988; Fornell & Larcker, 1981; Hair et al., 1998), ranging from .69 to .91 (Table 16). In addition, the AVE of all the Big Five personality factors exceeded the minimum criterion of .50 except for Openness to Experience (Fornell & Larcker, 1981; Hair et al., 2006). This indicates that for Openness to Experience, the variance accounted for by the measurement error was greater than the variance accounted for by the construct. However, Fornell and Larcker (1981) argued that the AVE is more conservative than composite reliability and the researcher may conclude that the convergent validity of a construct is adequate on the basis of its composite reliability alone.Therefore, it is concluded that the HPAQ Big Five personality factors demonstrated adequate convergent validity.

To test discriminant validity of the HPAQ Big Five personality factors, the AVE for each Big Five personality factor was compared with the squared correlations between facets (Table 17; Fornell & Larcker, 1981). In this study, the squared correlations between Big Five personality factors were obtained from the second-order CFA measurement model. The results showed that the AVE of all the Big Five factors was greater than their squared correlation with other Big Five factors, indicating that the HPAQ Big Five factors are distinct. In addition, the nested model approach in SEM used to assess the discriminant validity (Bagozzi et al., 1991), provided evidence that the HPAQ Big Five factors are unique constructs. In all cases, the unconstrained model (the correlation between two Big Five factors is freely estimated) showed a significantly better fit to the data than the constrained model (correlation between the two Big Five factors is fixed to 1) as chi-square difference values exceeded 3.84, demonstrating evidence of discriminant validity among all pairs of the Big Five factors. Also, when the discriminant validity of HPAQ Big Five factors were assessed by examining the 95% confidence interval for correlations between pairs of facets (Bagozzi et al., 1991), none of the 95% confidence intervals contained the value of 1.00, indicating that the correlations between the Big Five factors are significantly less than 1 at the 5% significance level, thus, the HPAQ Big Five factors are distinct.

Table 16:

Standardised Factor Loadings, Composite Reliabilities, and AVE Estimates for the HPAQ Big Five Factors

Second-order and First-order Latent Variables	Standardised Factor Loadings	Composite Reliability	AVE
Conscientiousness		.86	.61
Industriousness	.84		
Achievement	.79		
Orderliness	.76		
Self-Control	.73		
Agreeableness		.90	.59
Sympathy	.83		
Compassion	.77		
Cooperation	.85		
Peacefulness	.74		
Morality	.79		
Modesty	.62		
Emotional Stability		.86	.51
Fearlessness/Low Anxiety	.73		
Stability	.82		
Optimism	.72		
Even-tempered	.81		
Adaptability	.58		
Trust	.61		
Extraversion		.88	.55
Affiliation	.75		
Sociability	.70		
Social Boldness	.87		
Expressiveness	.77		
Assertiveness	.69		
Enthusiasm	.67		
Openness to Experience		.84	.43
Culture/Artistic Interest	.71		
Imagination	.68		
Creativity	.75		
Intellect	.59		
Change/Variety Seeking	.65		
Traditionalism	.55		
Intellectual Curiosity	.66		

Notes. N = 807

X^2 = 12844.7, *df* = 19459, $p < .001$: RMSEA = .067 (90% CI = .061 -.069, $p = .055$), SRMR = .05, CFI = .95, GFI = .92.

[a] All critical ratios are significant at $p < .001$

[b] Composite reliability = (square of the summation of the standardised factor loadings)/{(square of the summation of the standardised factor loadings) +(summation of error variances)}.

[c] Average variance extracted (AVE) = (summation of the squared standardised factor loadings)/ {summation of the squared standardised factor loadings}+ (summation of error variances)}.

Table 17:

Discriminant Validity of the HPAQ Big Five Factors

Facets	1	2	3	4	5
1. Conscientiousness	.61				
2. Agreeableness	.06	.59			
3. Emotional Stability	.10	.16	.51		
4. Openness to Experience	.01	.03	.01	.43	
5. Extraversion	.05	.01	.14	.18	.55

Notes. N =807; the diagonals are the average variance extracted estimates, while the other matrix entries represent the square correlations among latent variables obtained from the second-order measurement model.

4.3.2.4 Internal convergent validity and discriminant validity of the HPAQ facet scales. The properties of the second-order CFA measurement model were used to assess the convergent validity of the HPAQ facet scales. Internal convergent validity of the twenty-nine facets was tested based on an examination of factor loadings, composite reliabilities, and AVE estimates. The factor loadings for items for each of the twenty-nine facets were statisticaly significant ($p < .001$). Hence, all items were significantly related to their specified facets. Moreover, 190 out of 232 (81.9%) factor loadings were above the recommended level of .50 (Hair et al., 2006). The composite reliabilities for all of the twenty-nine facets exceeded the recommended .60 cut-off level (Bagozzi & Yi, 1988; Fornell & Larcker, 1981; Hair et al., 1998), ranging from .69 to .91 (Table 18). As shown in Table 18, only the AVE for Industriousness, Orderliness, Achievement, Even-tempered, Trust, and Affiliation exceeded the recommended level of .50 (Fornell & Larcker, 1981; Hair et al., 2006). This implies that for 23 out of the 29 facets, the variance accounted for by the measurement error was greater than the variance accounted for by the construct. However, as mentioned above, the researcher may conclude that the convergent validity of a construct is adequate on the basis of its composite reliability alone (Fornell & Larcker, 1981) given the

conversativeness of the AVE criterion. Overall, the analyses provided support of adequate convergent validity for all of the twenty-nine HPAQ facets.

A first-order CFA measurement model including the 29 facets as latent variables measured by their eight item indicators was conducted to assess the discriminant validity of the 29 HPAQ facet scales. Prior to conducting the first-order CFA, Soper (2013) power-based sample size calculator for SEM research was used to estimate the minimum sample size required for performing a first-order CFA in the current data. As mentioned above, inadequate sample size would result in underidentification and insufficient power of the measurement results (Bentler & Chou, 1987). To estimate the current second-order CFA model, the following information was inputted into Soper (2013) power-based sample size calculator for CFA/SEM research: the alpha level (set at .05), the desired power level (set at .80), the total number of observed variables (232), the total number of latent variables (29), and the anticipated effect size (medium effect of .30). Based on the calculation, the minimum sample size required for achieving adequate statistical power and precision to estimate the current second-order CFA model's parameter estimates as well as reliable indices of overall model fit is 700. Therefore, the sample size achieved in this validation study (N =807) is adequate to conduct current first-order CFA. The first-order CFA measurement model, indicated acceptable fit to data (X^2 = 9513.62, *df* = 20474, $p < .001$: RMSEA = .06 [90% CI = .057 - .063, p = .051], SRMR = .05, CFI = .95, GFI = .93).

To test discriminant validity, the AVE for each facet was compared with the squared correlations between facets (Table 19; Fornell & Larcker, 1981). In this study, the squared correlations between facets were obtained from the first-order CFA measurement model. The results showed that achievement and industriousness, peacefulness and cooperation, adaptability and

cooperation, peacefulness and adaptability, peacefulness and morality, cooperation and morality, and morality and adaptability facets were not distinct from each other as their squared correlation was higher than their average variance estimates (AVEs). Moreover, based on the comparison of the AVEs and the squared correlation, even-tempered and peacefulness were not shown be distinct traits as the squared correlation between these two traits was higher than the AVE for peacefulness but lower than the AVE for even-tempered. Similarly, even-tempered and cooperation facets were not shown to be distinct traits as the squared correlation between these two traits was higher than the AVE for correlation but lower than the AVE for even-tempered. The AVE for all other facets was higher than the square correlation between that facet and all other facets, indicating that they have adequate discriminant validity. However, the nested model approach in SEM used to assess the discriminant validity of facets (Bagozzi et al., 1991), provided evidence of adequate discriminant validity for all facets. In all cases, the unconstrained model (the correlation between two facets is freely estimated) showed a significantly better fit to the data than the constrained model (correlation between the two facets is fixed to 1) as chi-square difference values exceeded 3.84, demonstrating evidence of discriminant validity among all pairs of facets. Also, when the discriminant validity of HPAQ facet scales were assessed by examining the 95% confidence interval for correlations between pairs of facets (Bagozzi et al., 1991), none of the 95% confidence intervals contained the value of 1.00, indicating that the correlations between facets are significantly less than 1 at the 5% significance level, thus, the HPAQ facet scales are distinct. It is worthy to note that given the purpose of analysis to demonstrate the conceptual distinctiveness among a set of facets within a multidimensional scale, there is need for adequate evidence of discriminant validity at the population level. It has been argued that

this can be achieved through the use of the SEM-based nested model approach and the 95% confidence interval method as a minimum requirement for assessing discriminant validity (Shiu et al., 2011). Moreover, the AVE approach to assessing discriminant validity fails to take into account the variance in the correlation between two latent constructs as well as the variances in the AVEs of the two latent constructs (Shiu et al., 2011). Taken together, these results provided sufficient evidence of adequate discriminant validity for all of the HPAQ facets scales.

4.3.2.5 External convergent and discriminant validity. Although the intended Big Five model was confirmed by CFA, to test whether the HPAQ actually measures the intended Big Five model, correlations between the HPAQ five broad domains and the five broad factors of the NEO-PIR (Costa & McCrae, 1992a) for both the university validation sample and the ESCS were computed. Only participants from the university validation sample (N =668) and the ESCS (N = 375) who had completed both the HPAQ and NEO-PIR were included in the analyses conducted here. Tables 20 and 21 show that the correlations between the same Big Five domains across the two instruments (in bold italics) for both the university validation sample and the ESCS were all above .5 minimum cut-off recommended by Cohen (1988) for evidence of convergent validity; when corrected for attenuation, based on reliability ranged from .76 to .98 (*M* = .91, *SD* = .09) for the university validation sample and from .86 to .99 (*M* = .94, *SD* = .05) for the ESCS. Thus, providing external evidence of convergent validity for the HPAQ and demonstrating that it is measuring the Big Five. In addition, an examination of correlations between the different Big Five domains across the two instruments for both the university validation sample and the ESCS showed appropriate patterns of correlations that give evidence of the discriminant validity of the HPAQ Big Five domain scales.

Table 18:

Standardised Factor Loadings, Composite Reliabilities, and AVE Estimates for the Twenty-nine HPAQ Facets

Conscientiousness Facets										
	Standardised Factor Loadings								Composite	
Facets	Item1	Item2	Item3	Item4	Item5	Item6	Item7	Item8	Reliability	AVE
Industriousness	.79	.54	.55	.85	.87	.80	.65	.80	.90	.55
Achievement	.74	.74	.77	.80	.65	.75	.50	.84	.90	.53
Orderliness	.87	.55	.83	.56	.80	.76	.76	.51	.89	.51
Self-Control	.50	.50	.55	.67	.71	.80	.78	.81	.87	.47
Agreeableness Facets										
	Standardised Factor Loadings								Composite	
Facets	Item 1	Item2	Item3	Item4	Item5	Item6	Item7	Item8	Reliability	AVE
Sympathy	.62	.65	.57	.52	.56	.51	.55	.51	.79	.32
Compassion	.60	.65	.55	.71	.56	.58	.53	.64	.82	.37
Cooperation	.42	.44	.40	.41	.54	.42	.50	.57	.69	.22
Peacefulness	.50	.45	.50	.55	.50	.60	.51	.65	.76	.30
Morality	.40	.43	.45	.56	.55	.50	.54	.41	.70	.24
Modesty	.35	.41	.50	.46	.57	.60	.62	.59	.74	.27

Notes. N = 807

X^2 = 12844.7, *df* = 19459, $p < .001$: RMSEA = .067 (90% CI = .061 -.069, p = .055), SRMR = .05, CFI = .95, GFI = .92.

[a] All critical ratios are significant at $p < .001$

[b] Composite reliability = (square of the summation of the standardised factor loadings)/{(square of the summation of the standardised factor loadings) +(summation of error variances)}.

[c] Average variance extracted (AVE) = (summation of the squared standardised factor loadings)/ {summation of the squared standardised factor loadings}+ (summation of error variances)}.

[d] For corresponding item description for each facet see Appendix C

Table 18 continued

Standardised Factor Loadings, Composite Reliabilities, and AVE Estimates for the Twenty-nine HPAQ Facets

Emotional Stability Facets										
	Standardised Factor Loadings								Composite	
Facets	Item1	Item2	Item3	Item4	Item5	Item6	Item7	Item8	Reliability	AVE
Fearlessness/Low Anxiety	.71	.62	.60	.71	.65	.81	.64	.75	.88	.48
Stability	.65	.62	.55	.75	.79	.54	.55	.50	.83	.39
Optimism	.63	.52	.63	.77	.76	.68	.66	.61	.86	.44
Even-tempered	.71	.71	.70	.84	.74	.83	.73	.65	.91	.55
Adaptability	.56	.35	.56	.38	.55	.57	.56	.48	.73	.26
Trust	.72	.65	.79	.65	.74	.79	.65	.62	.89	.50
Extraversion Facets										
	Standardised Factor Loadings								Composite	
Facets	Item 1	Item2	Item3	Item4	Item5	Item6	Item7	Item8	Reliability	AVE
Affiliation	.77	.54	.58	.84	.81	.79	.63	.67	.89	.51
Sociability	.69	.61	.51	.69	.56	.78	.64	.57	.84	.41
Social Boldness	.67	.57	.56	.70	.77	.66	.64	.75	.86	.45
Expressiveness	.74	.45	.56	.52	.40	.78	.63	.41	.79	.33
Assertiveness	.73	.79	.55	.71	.70	.63	.69	.62	.87	.46
Enthusiasm	.77	.50	.48	.67	.54	.47	.64	.51	.80	.34

Notes. N = 807

X^2 = 12844.7, *df* = 19459, $p < .001$: RMSEA = .067 (90% CI = .061 -.069, $p = .055$), SRMR = .05, CFI = .95, GFI = .92.

[a] All critical ratios are significant at $p < .001$

[b] Composite reliability = (square of the summation of the standardised factor loadings)/{(square of the summation of the standardised factor loadings) + (summation of error variances)}.

[c] Average variance extracted (AVE) = (summation of the squared standardised factor loadings)/ {summation of the squared standardised factor loadings} + (summation of error variances)}.

[d] For corresponding item description for each facet see Appendix C

Table 18 continued

Standardised Factor Loadings, Composite Reliabilities, and AVE Estimates for the Twenty-nine HPAQ Facets

Openness to Experience Facets										
	Standardised Factor Loadings								Composite	
Facets	Item1	Item2	Item3	Item4	Item5	Item6	Item7	Item8	Reliability	AVE
Culture/Artistic Interest	.70	.44	.43	.48	.65	.62	.65	.66	.80	.35
Imagination	.63	.33	.29	.80	.67	.66	.25	.42	.74	.29
Creativity	.60	.67	.70	.65	.70	.54	.64	.55	.84	.40
Intellect	.78	.65	.41	.40	.56	.66	.54	.48	.79	.33
Change/Variety Seeking	.56	.62	.57	.78	.49	.35	.46	.47	.77	.30
Traditionalism	.45	.30	.89	.51	.80	.41	.48	.51	.79	.33
Intellectual Curiosity	.51	.60	.60	.45	.41	.69	.57	.34	.75	.28

Notes. N = 807

X^2 = 12844.7, *df* = 19459, $p < .001$: RMSEA = .067 (90% CI = .061 -.069, $p = .055$), SRMR = .05, CFI = .95, GFI = .92.

[a] All critical ratios are significant at $p < .001$

[b] Composite reliability = (square of the summation of the standardised factor loadings)/{(square of the summation of the standardised factor loadings) + (summation of error variances)}.

[c] Average variance extracted (AVE) = (summation of the squared standardised factor loadings)/ {summation of the squared standardised factor loadings} + (summation of error variances)}.

[d] For corresponding item description for each facet see Appendix C

Table 19:

Discriminant Validity of the HPAQ Facets

Facets	1	2	3	4	5	6	7	8	9	10	11	12
1. Affiliation	.51											
2. Social Boldness	.41	.45										
3. Sociability	.31	.28	.41									
4. Expressiveness	.30	.29	.31	.33								
5. Assertiveness	.35	.37	.15	.21	.46							
6. Enthusiasm	.21	.32	.15	.11	.31	.34						
7. Culture/Artistic Interest	.10	.13	.00	.00	.05	.09	.35					
8. Creativity	.16	.21	.03	.05	.21	.18	.14	.40				
9. Imagination	-.00	-.00	.02	.02	-.00	-.01	.04	.18	.29			
10. Traditionalism	.05	.04	-.00	.00	.05	.06	.06	.06	.02	.33		
11. Change/Variety Seeking	.18	.20	.12	.04	.25	.17	.16	.31	.04	.05	.30	
12. Intellectual Curiosity	.10	.21	.02	.02	.11	.26	.26	.27	.24	.09	.26	.28
13. Intellect	.09	.18	-.00	.00	.14	.13	.02	.25	.25	.04	.11	.18
14. Orderliness	.02	.03	-.02	-.02	.04	.11	.02	.06	-.07	.06	.03	.05
15. Achievement	.19	.23	-.00	.00	.27	.31	.10	.30	.04	.08	.17	.26
16. Industriousness	.21	.22	-.00	-.00	.23	.31	.07	.34	-.08	.11	.20	.24
17. Self Control	.04	.01	-.04	-.06	.02	.07	.08	.05	-.16	.08	.03	.16

Notes. N =807; the diagonals are the average variance extracted estimates, while the other matrix entries represent the square correlations among latent variables obtained from the first-order measurement model.

Table 19 continued:

Discriminant Validity of Facets

Facets	1	2	3	4	5	6	7	8	9	10	11	12
18. Compassion	.32	.15	.00	.00	.10	.12	.14	.09	-.00	.11	.20	.21
19. Peacefulness	.27	.09	-.00	-.05	.05	.19	.09	.04	-.06	.03	.21	.21
20. Cooperation	.13	.00	-.07	-.19	.00	.06	.08	.02	-.05	.07	.17	.20
21. Morality	.08	.00	-.12	-.16	.00	.05	.06	.02	-.09	.09	.08	.14
22. Sympathy	.15	.05	-.00	-.00	.04	.04	.08	.05	.01	.12	.08	.15
23. Modesty	-.01	-.09	-.22	-.24	-.09	-.00	.00	-.02	-.04	.00	-.00	.02
24. Fearlessness/Low Anxiety	.15	.16	.01	-.00	.05	.19	.04	.09	-.14	.00	.09	.04
25. Stability	.16	.11	.01	-.00	.03	.18	.03	.05	-.12	.00	.07	.05
26. Optimism	.29	.23	.00	.00	.16	.28	.02	.25	-.09	.06	.19	.20
27. Even-tempered	.14	.06	.00	-.16	.01	.12	.06	.02	-.08	.01	.07	.04
28. Trust	.29	.11	.03	.01	.04	.13	.06	.01	-.03	.05	.08	.04
29. Adaptability	.24	.23	.00	-.00	.11	.22	.08	.20	-.04	.07	.24	.22

Notes. N =807; the diagonals are the average variance extracted estimates, while the other matrix entries represent the square correlations among latent variables obtained from the first-order measurement model.

Table 19 continued

Discriminant Validity of Facets

Facets	13	14	15	16	17	18	19	20	21	22	23	24
13. Intellect	.33											
14. Orderliness	.09	.51										
15. Achievement	.30	.30	.53									
16. Industriousness	.31	.37	.61	.55								
17. Self Control	.10	.20	.30	.40	.47							
18. Compassion	.07	.03	.23	.15	.16	.37						
19. Peacefulness	.06	.10	.26	.24	.27	.28	.30					
20. Cooperation	.09	.09	.18	.19	.20	.20	.42	.22				
21. Morality	.08	.18	.16	.17	.21	.31	.36	.27	.24			
22. Sympathy	.03	.04	.16	.11	.05	.30	.26	.18	.23	.32		
23. Modesty	.00	.03	.04	.05	.23	.09	.21	.18	.21	.07	.27	
24. Fearlessness/Low Anxiety	.12	.04	.08	.15	.17	.00	.14	.07	.03	-.06	.00	.48
25. Stability	.07	.09	.12	.20	.30	.04	.27	.18	.10	-.02	.05	.37

Notes. N =807; the diagonals are the average variance extracted estimates, while the other matrix entries represent the square correlations among latent variables obtained from the first-order measurement models.

Table 19 continued:

Discriminant Validity of Facets

Facets	13	14	15	16	17	18	19	20	21	22	23	24
26. Optimism	.21	.17	.39	.40	.32	.11	.26	.21	.21	.02	.03	.32
27. Even-tempered	.05	.05	.08	.14	.24	.10	.40	.36	.16	.00	.07	.46
28. Trust	.02	.00	.07	.08	.06	.11	.28	.15	.11	.05	.00	.16
29. Adaptability	.21	.14	.24	.22	.23	.24	.33	.30	.33	.10	.19	.24

Notes. N =807; the diagonals are the average variance extracted estimates, while the other matrix entries represent the square correlations among latent variables obtained from the first-order measurement model.

Table 19 continued:

Discriminant Validity of Facets

Facets	25	26	27	28	29
25. Stability	.39				
26. Optimism	.36	.44			
27. Even-tempered	.38	.22	.55		
28. Trust	.13	.12	.14	.50	
29. Adaptability	.24	.22	.24	.21	.26

Notes. N =807; the diagonals are the average variance extracted estimates, while the other matrix entries represent the square correlations among latent variables obtained from the first-order measurement model.

Table 20:

Correlations between HPAQ and NEO-PIR in the University Validation Sample

	NEO-PIR					HPAQ				
Domains and Facets	C	A	N	O	E	C	A	ES	O	E
Conscientiousness (NEO-PIR)	1.00									
Agreeableness (NEO-PIR)	**.12**	1.00								
Neuroticism (NEO-PIR)	**-.38**	**-.23**	1.00							
Openness to Experience (NEO-PIR)	**.16**	**.18**	**-.15**	1.00						
Extraversion (NEO-PIR)	**.15**	**.17**	**-.25**	**.34**	1.00					
Conscientiousness (HPAQ)	***.80***	.13	-.37	-.15	.14	1.00				
Agreeableness (HPAQ)	.20	***.67***	-.19	.14	.11	**.14**	1.00			
Emotional Stability (HPAQ)	.30	.38	***-.82***	.05	.20	**.30**	**.29**	1.00		
Openness to Experience (HPAQ)	.06	-.10	-.15	***.78***	.33	**.21**	**.27**	**.18**	1.00	
Extraversion (HPAQ)	.17	.04	-.27	.20	***.83***	**.23**	**.17**	**.35**	**.38**	1.00
Industriousness	.65	.10	-.34	-.01	.26	.86	.15	.34	.17	.32
Achievement	.57	.08	-.28	.07	.23	.83	.12	.29	.30	.32
Orderliness	.49	.14	.09	.20	.06	.77	.06	.26	-.10	.13
Self-Control	.43	.21	-.35	-.18	-.13	.71	.25	.36	-.11	-.02
Sympathy	.05	.59	.06	.20	.17	.15	.71	.05	.20	.17
Compassion	.05	.57	-.12	.20	.21	.17	.75	.22	.23	.33
Cooperation	.25	.61	-.21	.08	-.02	.30	.80	.33	.06	-.03
Peacefulness	.11	.66	-.30	.17	.14	.20	.76	.58	.10	.23
Morality	.20	.52	-.20	.05	-.00	.31	.80	.30	.05	-.02
Modesty	.14	.51	-.07	-.18	-.21	.28	.65	.21	-.09	-.34
Fearlessness/Low Anxiety	.20	.13	-.71	.14	.13	.19	.11	.80	.14	.27
Stability	.29	.13	-.69	-.14	.06	.35	.07	.81	.11	.20

Optimism	.35	.15	-.73	.06	.34	.37	.12	.66	.15	.39
Even-tempered	.16	.20	-.50	.06	.08	.29	.38	.83	.05	.19
Trust	.09	.55	-.48	.13	.21	.16	.33	.60	.02	.27
Adaptability	.08	.28	-.41	.12	.18	.21	.31	.68	.31	.23
Culture/Artistic Interest	-.11	.14	-.07	.70	.20	-.04	.30	.07	.70	.28
Imagination	-.14	-.20	.26	.57	.14	-.29	-.15	-.14	.60	.09
Creativity	.21	-.10	-.24	.52	.33	.31	.07	.21	.72	.42
Intellect	.22	.09	-.22	.49	.15	.38	.13	.27	.65	.21
Change/Variety Seeking	-.09	.05	-.18	.55	.33	-.08	.06	.24	.67	.32
Traditionalism	.29	.04	-.05	-.31	.06	.37	.15	-.05	-.56	.09
Intellectual Curiosity	.19	.05	-.13	.35	.17	.21	.27	.24	.73	.22
Affiliation	.15	.24	-.32	.18	.68	.14	.31	.41	.22	.78
Sociability	-.03	.06	-.08	.14	.65	-.02	.05	.10	.12	.65
Social Boldness	.19	-.05	-.31	.25	.71	.18	.13	.36	.30	.82
Expressiveness	-.11	-.20	-.06	.20	.62	-.15	-.21	-.14	.08	.73
Assertiveness	.24	-.27	-.19	.19	.57	.31	-.05	.17	.18	.70
Enthusiasm	.29	.17	-.32	.20	.53	.35	.28	.49	.31	.67

Notes. N =686. Validity Coefficients across the two instruments are in bold italics. Correlations among the Big Five with each instrument are in bold; NEO-PIR = Revised NEO Personality Inventory; HPAQ = Hierarchical Personality Assessment Questionnaire; C = Conscientiousness A = Agreeableness; N = Neuroticism; ES = Emotional Stability; O = Openness to Experience; E = Extraversion.

Table 21:

Correlations between HPAQ and NEO-PIR in the ESCS

	NEO-PIR					HPAQ				
Domains and Facets	C	A	N	O	E	C	A	ES	O	E
Conscientiousness (NEO-PIR)	1.00									
Agreeableness (NEO-PIR)	**.12**	1.00								
Neuroticism (NEO-PIR)	**-.44**	**-.23**	1.00							
Openness to Experience (NEO-PIR)	**-.15**	**.03**	**-.05**	1.00						
Extraversion (NEO-PIR)	**.16**	**.05**	**-.30**	**.34**	1.00					
Conscientiousness (HPAQ)	***.83***	.11	-.36	-.12	.14	1.00				
Agreeableness (HPAQ)	.16	***.75***	-.19	.14	.11	**.22**	1.00			
Emotional Stability (HPAQ)	.30	.39	***-.82***	.06	.29	**.28**	**.35**	1.00		
Openness to Experience (HPAQ)	.04	-.10	-.12	***.80***	.32	**.07**	**.13**	**.08**	1.00	
Extraversion (HPAQ)	.22	-.05	-.38	.30	***.84***	**.20**	**.02**	**.32**	**.38**	1.00
Industriousness	.74	.03	-.39	-.03	.27	.86	.14	.33	.17	.33
Achievement	.60	.08	-.26	.10	.35	.73	.17	.22	.27	.34
Orderliness	.54	.00	.01	-.23	.01	.71	.05	-.05	-.12	.03
Self-Control	.54	.21	-.41	-.15	-.17	.63	.28	.36	-.09	-.08
Sympathy	.01	.46	.10	.23	.22	.06	.69	.06	.24	.17
Compassion	.07	.47	-.09	.34	.36	.11	.71	.23	.33	.33
Cooperation	.15	.57	-.17	.08	-.07	.21	.74	.33	.02	-.08
Peacefulness	.09	.64	-.41	.20	.18	.12	.71	.58	.18	.18
Morality	.24	.54	-.19	.03	-.01	.24	.76	.24	.07	-.01
Modesty	.12	.50	-.04	-.21	-.31	.20	.65	.12	-.19	-.39
Fearlessness/Low Anxiety	.22	.16	-.75	.12	.24	.19	.14	.83	.12	.29
Stability	.34	.16	-.72	-.12	.13	.30	-.03	.80	.06	.16

Optimism	.40	.17	-.75	.03	.43	.38	.23	.80	.15	.51
Even-tempered	.16	.45	-.53	.04	.10	.16	.38	.75	.01	.12
Trust	.07	.51	-.42	.13	.31	.09	.35	.63	.06	.32
Adaptability	.06	.41	-.41	.10	.23	.11	.37	.65	.07	.18
Culture/Artistic Interest	-.09	.16	-.04	.69	.21	-.01	.29	.06	.64	.20
Imagination	-.27	-.26	.19	.54	.11	-.27	-.11	-.19	.63	.09
Creativity	.20	-.11	-.29	.49	.40	.21	.05	.21	.72	.45
Intellect	.18	-.06	-.30	.45	.22	.18	.07	.22	.62	.31
Change/Variety Seeking	-.07	.03	-.19	.53	.41	-.04	.07	.25	.61	.33
Traditionalism	.31	.02	.02	-.27	.04	.29	.13	-.03	-.56	.00
Intellectual Curiosity	.14	.04	-.11	.37	.17	.17	.15	.11	.67	.22
Affiliation	.20	.25	-.44	.22	.68	.19	.30	.51	.25	.79
Sociability	.00	.01	-.08	.13	.64	.01	.04	.16	.10	.69
Social Boldness	.20	-.09	-.42	.34	.68	.18	.01	.34	.39	.87
Expressiveness	-.04	-.25	-.08	.26	.60	-.09	-.22	-.01	.21	.77
Assertiveness	.32	-.29	-.25	.20	.55	.33	-.17	.17	.34	.68
Enthusiasm	.29	.18	-.41	.15	.52	.31	.28	.44	.25	.57

Note. N = 375. Validity Coefficients across the two instruments are in bold italics. Correlations among the Big Five with each instrument are in bold; NEO-PIR = Revised NEO Personality Inventory; HPAQ = Hierarchical Personality Assessment Questionnaire; C = Conscientiousness A = Agreeableness; N = Neuroticism; ES = Emotional Stability; O = Openness to Experience; E = Extraversion.

4.4 Study 2 discussion

In this investigation, the psychometric properties of the Hierarchical Personality Assessment Questionnaire (HPAQ), a personality inventory developed using International Personality Item Pool (IPIP), which contains over 2,000 public domain items was examined. The HPAQ was developed explicitly to represent the Big Five personality dimensions at the top of the hierarchy and twenty-nine lower-level facets represented below, and thus can be conceived as a hierarchical structure. Overall, the results of analyses suggest that HPAQ provides good representations of the twenty-nine facets underlying the Big Five domains. Moreover, summing the facets in each domain provides good representations of the Big Five.

Within both the university development sample and ESCS, the Big Five factor structure was recoverable in exploratory factor analyses (EFAs; all facets scales had their hieghest loading on the intended Big Five domain) and there was a high degree of replication across samples. However, within both the samples there were facet scales that showed strong secondary loadings with other Big Five domains. Traditionalism had a strong secondary loading on the Conscientiousness domain while peacefulness had a strong secondary loading on the Emotional Stabiity domain, trust had a strong secondary loading on the Agreeableness domain, and modesty had strong secondary loading on the Extraversion domain. It is unlikely that these findings could be a product of the final item selection procedure used in the development of the HPAQ, which intentionally reduced correlations of items across domains by discarding items that did not discriminate well among the Big Five domains. As mentioned earlier in this thesis, these facets may best be considered blends of two Big Five factors (Hofstee et al. 1992). Peacefulness appears to be primarily related to Agreeableness and secondarily related to Emotional Stability whereas traditionalism

appears to be primarily related to Openness to Experience and secondarily related to Conscientiousness, trust appears to be primarily related to Emotional Stability and secondarily related to Agreeableness, and modesty appears to be primarily related Agreeableness and secondarily related to Extraversion[1]. Additional taxonometric research exploring location of these facets within the trait domain of the Big Five is need before any conclusions about the placement of these facets are made.

Notwithstanding, a second-order CFA conducted in a separate university validation sample confirmed the factor structure of the HPAQ, and provided adequate evidence for the structural validity of the instrument. Moreover, the results of confimatory factor analyses (CFAs) conducted in university validation sample provided adequate evidence for the internal convergent and discrimant validity of the Big Five domain scales. Furthermore, evidence that the HPAQ is measuring the standard Big Five was demonstrated by the high validity coefficients between same Big Five domains across both HPAQ and NEO-PIR instruments. Additionally, the Big Five domain scales showed evidence of adequate reliability across samples as demonstrated by the Cronbach's alpha reliabilities for the Big Five domain scales in the ESCS and university development sample and the composite reliabilities (a measure of internal reliability similar to Cronbach's alpha) for the Big Five domain scales in the university validation sample.

The HPAQ facet scales also showed evidence of adequate reliability across samples as demonstrated by the Cronbach alpha reliabilities for the twenty-nine facet scales in the ESCS and university development sample and the composite reliabilities for the twenty-nine facet scales in the university validation sample.

[1] Readers are directed to Chapter 3 on Study 1 for a more comprehensive discussion on the factor structure derived.

Moreover, CFAs conducted in the university validation sample data provided evidence of adequate internal convergent and discriminant validity for the twenty-nine HPAQ facets. Thus, HPAQ is useful for assessing the broad Big Five factors at the higher level and the twenty-nine lower-order facets hypothesised to underlie them. This hierarchical structural representation offers high efficiency (parsimony) at the broader-bandwidth level and higher fidelity (predictive accuracy) at the narrower level (Saucier & Goldberg, 2003).

The HPAQ facet scales should be differentially related to various criteria as they were found to be sufficiently heterogeneous and have specific variance that cannot be explained by their higher order factors. Thus, it is expected that the HPAQ facet scales will demonstrate good levels of criterion validity, especially in cases where the criteria in question are theoretically-relevant. In addition, because the HPAQ facet scales were found to have specific variance, it is likely that they will have incremental validity above and beyond the broad Big Five factors, especially when they are relevant to the criteria under investigation. Many research studies have shown that narrow personality traits are better predictors of behavioural outcomes than broad personality factors (for example, Ashton, 1998; Paunonen, 1998; Paunonen & Ashton, 2001a). Therefore, the HPAQ will prove to be a useful tool for investigating the differential criterion-related validity of narrower personality traits in predicting theoretically-relevant criteria, in particularly, narrower faceted measures.

However, the psychometric properties of the HPAQ were not perfect and might be improved upon by creating additional new items specifically targeting the twenty-nine facets. Nevertheless, the use of the IPIP public domain items, which have a short verbal phrase format, allowed for the development of a public domain instrument with good psychometric properties and with greater

brevity and efficiency than that typically found in most personality inventories today.

In summary, the results of this investigation support the construct validity of the HPAQ and suggest that the twenty-nine HPAQ facet scales may have utility for theoretical and applied contexts. Moreover, the HPAQ is likely to be valid in other English-speaking populations as its scales performed psychometrically well in the two English-speaking populations (An American community sample and an English-speaking Caribbean university sample) with strong cultural and demographical differences. In addition to testing for construct validity of new instruments, it is also important that other aspects of instrument validity be assessed in order to arrive at a better and more comprehensive understanding of the full psychometric properties of a newly developed instrument. In light of this, a next important step in instrument validation lies in the tests of criterion-related validity. Criterion-related validity is critical for determining the extent to which instruments or tests effectively predict an individual's performance on criterion/outcome measures (Aiken & Groth-Marnat, 2006). As such, testing for the criterion-related validity of the HPAQ allows one to better ascertain the predictive value of this personality instrument in applied settings. Specifically, understanding its utility in predicting various job-related criteria such as job performance and on-the-job employee behaviours would be beneficial for managers and related practitioners who seek to identify the best personality predictors of job performance in a personnel selection context. Moreover, an examination of criterion-related validity of the HPAQ at the facet level will permit a better understanding of how well lower-order facets predict different job-related criteria (differential effects), as well as how their predictive effects explain these criteria above and beyond the broad Big Five personality factors (incremental validity). It is also important evaluate the incremental validity of tests, which

is concerned with the degree to which a tests adds to the prediction and understanding of criteria above and beyond that already achieved by another measure of the same construct (Bryant et al., 2007). Smith, Fischer, and Fister (2003) recommended that the incremental validity of an instrument be examined at the facet level rather than at the broad construct level so as to enhance theoretical and predictive power. Such an examination is largely based on prior arguments, previously discussed in Chapter 2 (see Section 2.2) on the Bandwidth-Fidelity dilemma, which highlight the possibility that narrow personality traits are better predictors of behavioural outcomes than are broad personality traits (e.g. Ashton, 1998; Mershon & Gorsuch, 1988; Paunonen, 1998). Therefore, there has been a call for the use of narrow-bandwidth personality measures to enhance criterion-related validity (Paunonen et al. 1999; Schneider et al., 1996). Hence, research focused on building criterion-related validity for the HPAQ scales is warranted. Study 3 in this thesis is a step in this direction. Study 3 investigates the differential criterion-related validity of the twenty-nine HPAQ lower-order facet scales in the prediction of job performance criteria (task performance, counterproductive work behaviour, and organisational citizenship behaviours). Moreover, Study 3 also examines the incremental validity of those lower-order facet scales in predicting job performance criteria above and beyond the broad Big Five personality factors.

Chapter 5: Study 3 – Criterion-Related Validity and Incremental Validity of the HPAQ Facet Scales for Predicting OCB, CWB, and Task Performance

5.1 Introduction

Study 3 investigated the differential criterion-related validity and/or incremental validity of the twenty-nine lower-order facets of the Big Five derived in Study 1 in predicting task performance, CWBO (counterproductive work behaviours towards the organisation), CWBI (counterproductive work behaviours towards the individual), and three organisation citizenship behaviours – OCBO (organisational citizenship behaviours towards the organisation), interpersonal courtesy, and interpersonal helping. In addition, the incremental validity of those twenty-nine lower-order facets above and beyond the broad Big Five personality factors in the prediction of the above mentioned job performance criteria was also examined. The twenty-nine facets should be differentially related to various job performance criteria as well as provide incremental validity above and beyond the broad Big Five factors as they were found to be sufficiently heterogeneous and have specific variance that cannot be explained by their higher-order factors. Therefore, the twenty-nine lower-order facets may enhance our understanding of the associations between specific lower-order facets and various performance criteria.

There has been a call for researchers to use narrow personality measures to increase criterion-related validity above that achieved by broad personality measures as narrow traits are often better predictors of behaviour outcomes than broad personality factors (for example, Ashton, 1998; Paunonen, 1998;

Paunonen & Ashton, 2001a)[2]. However, the validity of narrow traits in predicting job performance has not been adequately addressed (Bergner, Neubauer, & Kreuzthaler, 2010). Moreover, the majority of the studies examining the criterion-related validity of narrow facets in predicting job performance criteria have focus on narrow facets of Conscientiousness. This study is a response to the call for future research investigating the relationships between facets of the other four Big Five personality factors and a wide array of job performance criteria (Dudley, et al., 2006). The following research questions were explored in Study 3:

Research Question 2: Which lower-order personality traits are predictors of task performance, OCB, and CWB?

Research Question 3: Do lower-order facets demonstrate incremental validity above and beyond the Big Five personality dimensions in the prediction of task performance, OCB, and CWB?

5.2 Method

5.2.1 Participants. In Study 3, regression analysis was the main statistical technique used to investigate research questions. Several rules of thumb have been suggested for adequate sample size when conducting regression analyses. The two most common of these rules of thumb being 10 cases of data per predictor in the model, and 15 cases for each predictor in the model (Field, 2005). Green (1991) provided a discussion on procedures to help determine the required sample size for regression. He proposed two simple rules of thumb, one for testing the overall fit of the regression model, and the second for testing individual predictors. For testing the overall fit of the model, he suggested a minimum

[2] Readers are directed to the discussion on the Bandwidth-Fidelity Dilemma presented in Chapter 2.

sample size of 50 +8m, where m is the number of predictors, whereas for testing individual predictors he recommended a minimum sample size of 104+m.

Green (1991) further recommended that researchers use methods that incorporate effect size to determine sample size in regression analyses, and introduced a new-rule of thumb based on Cohen's (1998) power analytic method, where lambda (L) is determined in step 1 and minimum required sample size (N) is computed in step 2. For $m < 11$, $L = 6.4 + 1.65m - .05m^2$, and increases by .6 for each additional predictor past 10. The formula for required minimum sample size is $N \geq L/f^2$, where effect sizes (f^2) of .02, .15, and .35 represent small, medium, and large effect sizes, respectively. Thus, with a medium effect size and 34 predictors, the minimum sample size is estimated to be 215 whereas with large effect size and 39 predictors, the minimum sample size is estimated to be 92. Therefore, given the expectation of medium to large effect size for personality predictors, the study sought to obtain a sample size with a range of 92 to 215. Cohen (1988) argues that a medium effect size is typical for studies in the behavioural sciences. It is important to note that regression models can include too many cases:

> "as the number of cases becomes quite large, almost any multiple correlation will depart significantly from zero, even one that predicts negligible variance in the DV. For both statistically and practical reasons, then, one wants to measure the smallest number of cases that has a decent chance of revealing a relationship of a specified size" (Tabachnick & Fidell, 2007, p.123).

Study 3 comprised 545 employees across 8 organisations from the manufacturing, financial, and services industries in Barbados. Given the above discussion on minimum required sample size, the sample achieved in this study was more than adequate. Of the

participants, 38% were male and 62% were female. Average age for the employees was 36.16 years of age, with a range of 20 to 60 (SD = 9.15). The majority of the sample was non-manual workers 49%, with 34.9% manual workers, 8.4% in a supervisor position, 5.3% in a middle manager position, and 2.4% in a senior manager position. The sample characteristics for this study are outlined in more detail in Appendix B.

5.2.2 Measures

5.2.2.1 Personality scales. Participants completed measures of lower level personality traits and higher level or broad personality factors, which were used as predictors in this study. The narrow trait measures contained in the Hierarchical Personality Assessment Questionnaire (HPAQ) was used to assess facets of each of the Big Five personality factors. The HPAQ consist of 29 facets of 8 items each. Participants responded to each item using a 5-point Likert-type response scale ranging from 1 = *(strongly disagree)* to 5 *(strongly agree)*. McCrae and Costa's (2010) NEO Five-Factor Inventory-3 (NEO-FFI-3-3) was used to measure the broad Big Five personality factors. The NEO-FFI-3-3 measures the Big Five factors of Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to Experience. Each scale has 12 items, which are scaled with a 5-point Likert scale ranging from 1 = *(strongly disagree)* to 5 *(strongly agree)*.

5.2.2.2 Citizenship behaviours and CWB. Coyne, Gentile, Born, Cem & Vakola's (2012) Voluntary Workplace Behaviour Scale (25-item version) was used to measure citizenship behaviours and CWB. This 25-item scale assessed a five-factor model including interpersonal courtesy (e.g. Been sensitive to the feelings of other co-workers), interpersonal helping (e.g. Given helpful advice to a co-worker), organisational citizenship behaviours towards the organisation (OCBO; e.g. Identified a variety of alternative

solutions to organisational issues and problems), counterproductive work behaviours towards the organisation (CWBO; e.g. Used property, material or company supplies from the organisation without permission), and counterproductive work behaviours towards the individual (CWBI; e.g. Been rude and offensive to another employee). Coyne et al. (2012) showed good fit for the five-factor structure when compared to one, two and four factor models and equivalence of the scale across UK, Dutch and Turkish samples. Other raters were asked to rate the extent that their co-worker engaged in citizenship behaviours and counterproductive work behaviours in the previous 12-months on a six-point Likert scale from '0 = never' to '6 = very often'. Of the employees providing other ratings, 240 (44%) were male and 305 (56%) were female. Average age was 35 years of age, with a range of 17 to 58. The majority of the raters were co-workers (80%) whereas 13% of the raters were in a supervisor position, 5.7 % in a middle manager position, and 1.3 % in a senior manager position.

5.2.2.3 Task performance. William and Anderson (1991) In-role Job Performance 7-item supervisor rating scale was used to measure task performance. This scale assessed how well employees perform activities specified in their job description (e.g. Fulfil responsibilities specified in his/her job description; Adequately completes assigned tasks). Supervisors responded to each item on a 7-point scale ranging from 1 (does not apply at all to the person I am rating) to 7 (*Applies very well to the person I am rating)*. High scores indicated high levels of task performance.

5.2.3 Procedure. Four survey instruments – the HPAQ, NEO-FFI-3, a supervisor rating measure of task performance, and a peer or co-workers rating measure of voluntary work behaviours - and return envelopes were distributed to participants in June 2011. The HPAQ and NEO-FFI-3 were administered to employees at work. Employees were briefed by the researcher on the purpose of the

study and the procedure for completing the survey. During the briefing, the researcher stressed that participation in the study was voluntary. Employees were informed that if they chose to participate in the study, a supervisor rating of their task performance from the supervisor who directly supervised them and a peer or co-worker rating of their voluntary work behaviours was required, and that they could choose the peer or co-worker. To preserve confidentiality and anonymity, employees were instructed to write a coded number consisting of 7 digits in the designated areas provided on the four survey instruments. During the worksite session, which lasted for 60 to 90 minutes, employees first completed the HPAQ, and then the NEO-FFI-3 instruments. Additionally, employees were asked to distribute the peer or co-worker ratings instrument to a work colleague of their choice and the supervisor rating to the individual who directly supervised them. Co-workers and supervisors, who completed the rating instruments, returned them within two days of the questionnaire distribution, in the sealed envelope, to a box placed in the Human Resources Department of the organisations. Of the 600 distributed instruments, 545 (90.8%) usable surveys were returned.

5.2.4 Data Analysis. First, bivariate correlations among all variables were corrected or disattenuated for unreliability using the Cronbach's alpha estimates of the corresponding variables as well as Nunnally and Bernstein (1994) correction for attenuation procedure. Separate disattenuated multiple regression analyses were conducted to examine the criterion-related validity of the broad HPAQ Big Five personality factors, the HPAQ facet scales, and the NEO-FFI-3 Big Five factor scales in predicting the six job performance criteria (task performance, CWBO, CWBI, OCBO, interpersonal courtesy, and interpersonal helping). For all disattenuated multiple regression analyses, the corrected correlation matrices between personality variables and job

performance criteria were submitted to AMOS 18. Moreover, the bootstrapping method using the Monte Carlo utility within AMOS 18 based on 5000 resamples was employed to test statistical significance of the multiple correlation (*R*), the squared multiple correlation (R^2), and the standardised beta weights (β). The Bootstrapping approach "is a process by which statistics (e.g., regression weights) are generated over a very large number replications, with samples drawn with replacement from a data set" (Tabachnick & Fidell, 2007, p. 141). The Monte Carlo Utility within AMOS 18 allowed corresponding raw data with the same inter-variable correlations, means, and standard deviations to be generated from which 95% confidence interval estimates based on 5000 bootstrapped resamples could be derived. It is important to note that using the bootstrapping method reduces the likelihood of Type 1 error as the number of inferential tests is minimised (Preacher & Hayes, 2004; Shrout & Bolger, 2002). Furthermore, bootstrapping is also a useful technique for avoiding overfitting data when using statistical regression (Tabachnick & Fidell, 2007). Additionally, given the non-existence of a well-established sampling theory for determining the statistical significance of effects disattenuated for unreliability, this procedure is deemed appropriate (Raju & Brand, 2003). Also, more accurate estimates of parameters can be obtained using bootstrapping. For bootstrap analyses, the *R*, R^2, and beta weights are considered significant when zero is not contained in their respective 95% confidence intervals. As the AMOS 18 computer software package does not compute an adjusted R^2 value (a modification of the coefficient of determination statistic that takes into consideration the number of predictors in the regression model and the sample size), an adjusted R^2 for each regression equation was calculated using the following equation:

$$\bar{R}^2 = 1 - (1 - R^2)\frac{n-1}{n-k-1}, \quad (1)$$

where R^2 is the sample R-square, k is the number of predictors, and n is the total sample size (Cohen, Cohen, West, & Aiken, 2003).

Disattenuated hierarchical regression analyses using bootstrapping method employing the Monte Carlo utility within AMOS 18 based on 5000 resamples were conducted to explore the incremental validity of the lower level personality traits (HPAQ facet scales) above and beyond the broad Big Five personality factors (NEO-FFI-3 Big Five domain scales) in the prediction of task performance, CWBO, CWBI, OCBO, interpersonal courtesy, and interpersonal helping. Testing lower level personality traits from one questionnaire against higher level traits from a different questionnaire was deemed appropriate as such an approach would ensure that lower level and higher level measures with high linear dependencies are not included in the analyses (for instance, HPAQ Big Five domain scales are simple algebraic sums of participant scores on the HPAQ facet scales). A similar approach was also employed in other studies (For example, Paunonen & Ashton, 2001a; Paunonen, 1998). To illustrate incremental validity for each job performance criteria, two disattenuated hierarchal multiple regressions with reverse entry of only the predictive HPAQ facet scales for the criterion and the NEO-FFI-3 Big Five domain scales were performed. The reason for including only significant HPAQ facet scale predictors in the examination of incremental validity was so as to ensure an accurate estimation of the multiple correlation between predictors and criteria. Therefore, “the minimum value of the multiple correlation will be the most predictive facets’ correlation with the criterion” (Smith et al., 2003). In the first hierarchal regression, in model 1, the NEO-FFI-3 Big Five domain scales were entered to predict the criterion. Then, the predictive

HPAQ facet scales were added to the prediction equations in the second model to see whether they significantly increased the coefficient of determination (R^2) so as to evaluate their incremental contributions to criterion-related validity. The results were then compared with those from the reverse situation (second hierarchical regression), in which the predictive HPAQ facet scales were entered into the regression equations in model 1, and the NEO-FFI-3 Big Five domain scales were entered in model 2 to evaluate their incremental contributions to criterion-related validity.

5.3 Results

5.3.1 Outliers and normality. Prior to conducting analyses, test to determine if data met all assumptions required for the use of maximum likelihood estimation in SEM were conducted. An examination of the data for univariate outliers with respect to the personality variables (the 29 HPAQ facet scales, the HPAQ Big Five scales data, and the NEO-PIR Big Five scales) and the six job performance criteria revealed that none of the standardised scores out of 24525 exceeded 3.29, and thus indicated that no cases could be classified as univariate outliers. Moreover, an examination for multivariate outliers among the 29 HPAQ facet scales and the NEO-PIR Big Five scales using Mahalanobis Distance at $p < .001$ and Studentised Deleted Residual (greater than ± 4.00) identified 22 cases as multivariate outliers. Given that the number of variables are 34 (excluding HPAQ Big Five domain scales), cases with a Mahalanobis Distance greater than X^2 (34) =65.25 are considered multivariate outliers. In addition, an examination for multivariate outliers among the HPAQ Big Five scales using Mahalanobis Distance at $p < .001$ and Studentised Deleted Residual (greater than ± 4.00) identified no cases as multivariate outliers. Given that

the number of variables are 5, cases with a Mahalanobis Distance greater than X^2 (5) =20.52 are considered multivariate outliers.

An examination of the data for univariate normality revealed that the data were within the robustness thresholds for univariate normality (West et al., 1995). Skewness for the 29 HPAQ facet scales, the HPAQ Big Five scales, the NEO-PIR Big Five scales, and the six job performance criteria ranged from (-1.20 to 1.07, |M|=-.19) while Kurtosis ranged from (-.78 to 1.96, |M|=-.11). Moreover, initial Mardia's values for multivariate normality among the 29 HPAQ facet scales and the NEO-PIR Big Five scales revealed that the data was non-normally distributed (multivariate test for kurtosis, z = 4.519 and for skewness, z = 4.825). In an attempt to achieve multivariate normality the 22 cases identified by the Mahalanobis Distance at p < .001 and Studentised Deleted Residual (greater than ± 4.00) as multivariate outliers were deleted. When the Mardia's values for multivariate normality were re-assessed with the 22 outliers deleted, multivariate normality was achieved (multivariate test for kurtosis, z = 1.360 and for skewness, z = 1.421). In addition, multivariate test for Kurtosis, z = 1.101, and for skewness, z = 1.197 indicated the HPAQ Big Five scales were distributed with multivariate normality. These results allowed the use of maximum likelihood estimation. Thus all analyses in the current study were performed using (N =523).

5.3.2 Confirmatory Factor Analysis for Scales. To assess the hypothesised factor structure of the HPAQ instrument, a second –order CFA using AMOS 18 was performed. Based on the calculation for minimum sample size using Soper (2013) power-based sample size calculator for CFA/SEM research (see Chapter 4, Section 4.3.2.2), the minimum sample size required for achieving adequate statistical power and precision to estimate the current second-order CFA model's parameter estimates as well as reliable indices of overall model fit is 358. Therefore, the sample size (N = 523) is

adequate to conduct current second-order CFA. The results for the second-order CFA model indicated good fit to data (X^2 = 14430.25, *df* = 19459, *p* < .001: RMSEA = .050 [90% CI = .047 -.051, *p* = .12], SRMR = .04, CFI = .96, GFI = .95). Thus, the model fit indices for the measurement model provided sufficient support for the results to be deemed an acceptable representation of the hypothesised hieriachical structure of the HPAQ with the Big Five personality factors represented at the top hierarchy and 29 facets represented below.

To assess the five-factor structure of the NEO-FFI-3, a first-order CFA was conducted. The results for first-order CFA model indicated acceptable fit to data (X^2 = 6847.12, *df* = 1480, *p* < .001: RMSEA = .058 [90% CI = .056 -.061, *p* = .16], SRMR = .05, CFI = .95, GFI = .94).

A first-order CFA was conducted to assess the five-factor structure of the 25-item VWB scale (Coyne et al, 2012). The CFA goodness of fit test statistics for the five factor model, VWB scale indicated an acceptable fit to data (χ^2 = 389.9, *df* = 270, p < .001; RMSEA = .060 [90% CI = .061-066, *p* = .58], SRMR = .05, CFI = .96, GFI = .93).

A first-order CFA was also conducted to assess the one-dimensional in-role job performance measure by William and Anderson (1991) used to assess task performance. The CFA goodness of fit test statistics for the one factor model, indicated an acceptable fit to data (χ^2 = 303.5, *df* = 14, p < .001; RMSEA = .050 [90% CI = .048-052, *p* = .063], SRMR = .04, CFI = .95, GFI = .94).

5.3.3 Descriptive statistics and reliability coefficient estimates. Descriptive statistics and Cronbach's alpha internal consistency reliabilities for the 29 HPAQ facet scales, HPAQ Big Five domain scales, and the NEO-FFI-3 Big Five domain scales, and the six job performance criteria are presented in Table 22. Cronbach's

alpha for personality variables ranged from .87 (Extraversion) to .94 (Conscientiousness) with a mean alpha coefficient of .91 (SD = .03) for the HPAQ domain scales, .69 (Cooperation) to .85 (Sociability) with a mean alpha coefficient of .75 (SD = .04) for the 29 HPAQ facet scales, and .72 (Neuroticism) to .94 (Conscientiousness) for the NEO-FFI-3 Big Five domain scales with a mean alpha coefficient of .79 (SD = .09).

Table 22:

Descriptive Statistics and Cronbach's Alpha Reliability Coefficients for Study Variables

Variable	M	SD	α	Variable	M	SD	α
TP	38.39	10.88	.94	Intellect	28.35	7.06	.72
CWBO	11.54	11.80	.81	Change/Variety Seeking	30.15	6.21	.71
CWBI	9.41	10.44	.81	Intellectual curiosity	30.27	7.18	.73
OCBO	32.94	13.25	.93	Traditionalism	26.76	4.60	.74
				Fearlessness/ Low			
Courtesy	36.57	9.51	.78	Anxiety	25.45	6.85	.71
Helping	34.10	9.21	.71	Optimism	29.92	7.88	.73
Affiliation	28.15	6.35	.82	Trust	25.95	5.61	.77
Sociability	23.28	6.54	.85	Adaptability	28.42	6.26	.75
Social Boldness	26.82	5.06	.73	Stability	27.83	7.18	.76
Expressiveness	20.74	4.90	.72	Even-tempered	26.62	7.34	.84
Enthusiasm	30.25	6.20	.77	Sympathy	28.31	6.75	.71
Assertiveness	26.84	4.63	.70	Compassion	30.29	5.40	.70
Industriousness	30.02	7.13	.83	Cooperation	29.01	6.28	.69
Achievement	29.88	7.57	.72	Peacefulness	30.18	5.64	.79
Orderliness	29.88	7.48	.77	Morality	29.27	6.69	.70
Self-control	28.33	8.34	.75	Modesty	28.10	5.13	.77
Culture/Artistic Interest	28.81	5.36	.70	NEOFFI-3 Neuroticism	23.41	7.73	.72
Imagination	24.23	6.78	.80	NEOFFI-3 Extraversion	34.01	7.45	.74
Creativity	29.74	5.62	.79	NEOFFI-3 Agreeableness	32.01	7.16	.76

Note. N = 523. TP = Task Performance, CWBO = Counterproductive work behaviors towards the organisation, CWBI = Counterproductive work behaviors towards the individual, OCBO = Organisational citizenship behaviours towards the organisation, Courtesy = Interpersonal Courtesy, and Helping = Interpersonal Helping.

Table 22 continued

Descriptive Statistics and Cronbach's Alpha Reliability Coefficients for Study Variables

Variable	M	SD	α	Variable	M	SD	α
NEOFFI-3 Openness to Experience	32.37	6.37	.78	HPAQ Agreeableness	175.16	26.75	.91
NEOFFI-3 Conscientiousness	38.62	7.25	.94	HPAQ Conscientiousness	118.17	25.49	.94
HPAQ Emotional Stability	164.18	31.14	.91	HPAQ Openness to Experience	253.03	28.67	.92
HPAQ Extraversion	156.76	22.42	.87				

Note. N = 523. NEOFFI-3 = NEO Five-Factor Inventory; HPAQ = Hierarchical Personality Assessment Questionnaire

5.3.4 Bivariate correlations. The attenuated and disattenuated Pearson correlation coefficients between the HPAQ Big Five domain scales, the 29 HPAQ facet scales, and the NEO-FFI-3 Big Five domain scales and six job performance criteria are presented in Table 23, 24 and 25.[3] Discussion of correlation analyses are based on the uncorrected correlations as interpretations are facilitated by statistical significance testing. Given the exploratory nature of the analyses conducted here, as a solution to the problem of capitalisation on chance, this study used the Bonferroni correction approach for adjusting the selected alpha level (p = .05) to control for the overall Type 1 error rate for correlation (Howell, 2012). Testing 234 correlations require an adjusted p value of somewhat lower than .001 (a Bonferroni correction of p = .05/234 = .0002 level). This means that correlations have to be significant at .000. Therefore, the criterion correlations for the NEO-FFI-3 Big Five domain scales, HPAQ domain scales, and HPAQ facet scales were assessed in terms of p < .0002.

5.3.4.1 Task performance. As can be seen in Table 23, based on the adjusted p value of .0002, all of the HPAQ Big Five domain scales except for Extraversion were significantly and positively associated with task performance. Similary, the NEO-FFI-3 Conscientiousness, Agreeableness, and Openness to Experience domain scales were significantly and positively associated with task performance whereas the Neuroticism (inverse of Emotional Stability) domain scale was significantly and negatively associated with task performance and the association between the Extraversion domain scale and task performance was not significant. In terms of the HPAQ facet scales, there were significant and positive correlations between task performance and Extraversion facets –

[3] Inter-correlations for personality variables were also corrected for attenuation and are available from the author on request.

social boldness, assertiveness, and enthusiasm –, Openness to Experience facets –intellect, change/variety seeking, and intellectual curiosity –, Agreeableness facets – compassion, cooperation, peacefulness, and morality –, Emotional Stability facets – stability, adaptability, fearlessness/low anxiety, even-tempered, and optimisim –, and all Conscientiousness facets.

5.3.4.2 Counterproductive work behaviours. As shown in Table 24, based on the adjusted p value of .0002, the HPAQ Conscientiousness, Agreeableness, and Emotional Stability Big Five domain scales were significantly and negatively correlated with CWBO. Similarly, the NEO-FFI-3 Conscientiousness and Agreeableness domain scales were significantly and negatively correlated with CWBO whereas the Neuroticism domain scale was significantly and positively correlated with CWBO. Regarding the HPAQ facet scales, there were significant and negative uncorrected correlations between CWBO and Agreeableness facets – peacefulness and morality –, Emotional Stability facets – stability, even-tempered, adaptability, optimism, trust –, and all Conscientiousness facets.

In terms of CWBI, the HPAQ Conscientiousness, Agreeableness, and Emotional Stability Big Five domain scales were significantly and negatively related to CWBI. Similarly, the NEO-FFI-3 Conscientiousness and Agreeableness domain scales were significantly and negatively related to CWBI whereas the Neuroticism domain scale was significantly and positively related to CWBI. Concerning the HPAQ facet scales, Extraversion facet – affiliation –, Agreeableness facets – morality, peacefulness, cooperation, and sympathy –, and all Emotional Stability, and Conscientiousness facets were significantly and negatively associated with CWBI. Also, the Extraversion facet (Expressiveness) was significantly and positively related to CWBI.

5.3.4.3 Organisational citizenship behaviours. As indicated in Table 25, based on the adjusted p value of .0002, all of the HPAQ Big Five domain scales except for Extraversion were significantly and positively associated with OCBO. Similarly, the NEO-FFI-3 Openness to Experience, Conscientiousness, and Agreeablness domain scales were significantly and positively associated with OCBO whereas the Neuroticism domain scale was significantly and negatively associated with OCBO and the association between the Extraversion domain scale and OCBO was not significant. Regarding the HPAQ facet scales, there were significant and positive uncorrected correlations between OCBO and Openness to Experience facets – imagination, creativity, intellect, change/variety seeking, and intellectual curiosity –, Agreeableness facets – cooperation and peacefulness–, Emotional Stability facets – stability, optimism, adaptability, trust, and fearlessness/low anxiety – Extraversion facet –enthusiasm –, and all Conscientiousness facets.

With regards to interpersonal courtesy, the HPAQ Agreeableness, Extraversion, and Emotional Stability Big Five domain scales were significantly and positively related to interpersonal courtesy. Moreover, the NEO-FFI-3 Agreeableness domain scale was significantly and positively associated with interpersonal courtesy while the Neuroticism domain scale was negatively and sigficantly associated with interpersonal courtesy. Concerning the HPAQ facet scales, Extraversion facets – sociability and affiliation –, Agreeableness facets – sympathy, compassion, cooperation, morality, and peacefulness –, Emotional Stability facets – trust and stability –, and the Conscientiousness facet – self-control –, were significantly and positively correlated with interpersonal courtesy.

As to interpersonal helping, the HPAQ Agreeableness, Extraversion, and Emotional Stability Big Five domain scales were

significantly and positively correlated with interpersonal helping. In addition, the NEO-FFI-3 Agreeableness domain scale was significantly and positively correlated with interpersonal helping whereas the Neuroticism domain scale significantly and negatively correlated with interpersonal helping. Regarding the HPAQ facet scales, the Extraversion facet – sociability –, Agreeableness facets – sympathy, compassion, cooperation, morality, and peacefulness–, and Emotional Stability facets – stability, adaptability, and trust –, were significantly and positively related to interpersonal helping.

Table 23:

Uncorrected and Corrected Correlations among Personality Variables and Task Performance

Variable	R	Variable	R	Variable	R
Affiliation	.15**	Orderliness	.42†	Traditionalism	-.04
	(.17)		(.49)		(-.05)
Sociability	.09	Self-Control	.40†	Fearlessness/Low Anxiety	.20†
	(.10)		(.48)		(.24)
Social Boldness	.27†	Culture/Artistic Interest	.09	Optimism	.40†
	(.33)		(.11)		(.48)
Expressiveness	-.07	Imagination	.10	Trust	.16**
	(-.09)		(.12)		(.19)
Enthusiasm	.29†	Creativity	.15**	Adaptability	.38†
	(.38)		(.24)		(.45)
Assertiveness	.25†	Intellect	.44†	Stability	.41†
	(.31)		(.53)		(.49)
Industriousness	.44†	Change/Variety Seeking	.28†	Even-tempered	.32†
	(.50)		(.34)		(.36)
Achievement	.47†	Intellectual curiosity	.35†	Sympathy	.07
	(.57)		(.42)		(.09)

Note. N = 523. Values in parentheses are corrected correlations.
*p < .05 **p < .01 †p < .0001.

Table 23 continued

Uncorrected and Corrected Correlations among Personality Variables and Task Performance

Variable	R	Variable	R	Variable	R
Compassion	.15** (.18)	NEOFFI-3 Neuroticism	-.32† (-.39)	HPAQ Emotional Stability	.37† (.40)
Cooperation	.22† (.27)	NEOFFI-3 Extraversion	.12* (.14)	HPAQ Agreeableness	.24† (.26)
Peacefulness	.21† (.24)	NEOFFI-3 Openness to Experience	.25† (.29)	HPAQ Extraversion	.18** (.20)
Morality	.17** (.21)	NEOFFI-3 Agreeableness	.20† (.24)	HPAQ Conscientiousness	.40† (.42)
Modesty	.07 (.09)	NEOFFI-3 Conscientiousness	.35† (.37)	HPAQ Openness to Experience	.32† (.34)

Note. N = 523. Values in parentheses are corrected correlations. NEOFFI-3 = NEO Five-Factor Inventory; HPAQ = Hierarchical Personality Assessment Questionnaire

*p < .05 **p < .01 †p < .0001

Table 24:

Uncorrected and Corrected Correlations among Personality Variables and Counterproductive Work Behaviours

Variable	CWBO	CWBI	Variable	CWBO	CWBI
Affiliation	-.12**	-.19†	Culture/Artistic Interest	-.09*	-.16**
	(-.15)	(-.23)		(-.12)	(-.21)
Sociability	-.03	-.14**	Imagination	-.05	-.08
	(-.04)	(-.17)		(-.06)	(-.10)
Social Boldness	-.10*	-.08	Creativity	-.06	-.07
	(-.13)	(-.10)		(-.08)	(-.09)
Expressiveness	.13**	.19†	Intellect	-.14**	-.12*
	(.19)	(.25)		(-.18)	(-.16)
Enthusiasm	-.15**	-.13*	Change/Variety Seeking	-.15**	-.12*
	(-.21)	(.19)		(-.20)	(-.16)
Assertiveness	-.03	-.07	Intellectual curiosity	-.15**	-.12*
	(-.04)	(.09)		(-.20)	(-.16)
Industriousness	-.44†	-.24†	Traditionalism	.02	.06
	(-.54)	(-.29)		(.03)	(.08)
Achievement	-.46†	-.22†	Fearlessness/Low Anxiety	-.11**	-.20†
	(-.60)	(-.29)		(-.15)	(-.26)
Orderliness	-.45†	-.36†	Optimism	-.21†	-.19†
	(-.57)	(-.46)		(-.27)	(-.25)
Self-Control	-.48†	-.41†	Trust	-.33†	-.32†
	(-.62)	(-.52)		(-.42)	(-.41)

Note. N = 523. Values in parentheses are corrected correlations. CWBO = Counterproductive work behaviours towards the organisation, CWBI = Counterproductive work behaviours towards the individual.

*p < .05 **p < .01 †p < .0001

Table 24 continued

Uncorrected and Corrected Correlations among Personality Variables and Counterproductive Work Behaviours

Variable	CWBO	CWBI	Variable	CWBO	CWBI
Adaptability	-.37†	-.30†	NEOFFI-3 Conscientiousness	-.37†	-.30†
	(-.47)	(-.38)		(-.42)	(-.34)
Stability	-.42†	-.44†	NEOFFI-3 Extraversion	-.06	-.12**
	(-.54)	(-.56)		(.08)	(-.15)
Even-tempered	-.32†	-.39†	NEOFFI-3 Openness to Experience	-.10*	-.09*
	(-.39)	(-.48)		(-.13)	(-.11)
Sympathy	-.05	-.36†	NEOFFI-3 Agreeableness	-.30†	-.34†
	(-.07)	(-.47)		(-.38)	(-.43)
Compassion	-.09*	-.38†	HPAQ Emotional Stability	-.32†	-.33†
	(-.12)	(-.50)		(-.37)	(-.38)
Cooperation	-.16**	-.39†	HPAQ Agreeableness	-.34†	-.47†
	(-.21)	(-.53)		(-.40)	(-.56)
Peacefulness	-.38†	-.45†	HPAQ Extraversion	-.11*	-.13*
	(-.48)	(-.56)		(-.13)	(-.15)
Morality	-.47†	-.40†	HPAQ Openness to Experience	-.18**	-.15*
	(-.62)	(-.52)		(-.21)	(-.17)
Modesty	-.09*	-.10*	HPAQ Conscientiousness	-.44†	-.31†
	(.12)	-.14		(-.50)	(-.35)
NEOFFI-3 Neuroticism	.25†	.28†			
	(-.33)	(-.37)			

Note. N = 523. Values in parentheses are corrected correlations. CWBO = Counterproductive work behaviours towards the organisation, CWBI = Counterproductive work behaviours towards the individual. NEOFFI-3 = NEO Five-Factor Inventory; HPAQ = Hierarchical Personality Assessment Questionnaire.
*p < .05 **p < .01 †p < .0001

Table 25:

Uncorrected and Corrected Correlations among Personality Variables and Organisational Citizenship Behaviours

Variable	OCBO	Courtesy	Helping	Variable	OCBO	Courtesy	Helping
Affiliation	.05	.23†	.18**	Culture/Artistic Interest	.07	.07	.07
	(.06)	(.29)	(.24)		(.09)	(.09)	(.10)
Sociability	.08	.25†	.21†	Imagination	.28†	.02	.03
	(.09)	(.31)	(.27)		(.32)	(.03)	(.04)
Social Boldness	.05	.01	.08	Creativity	.49†	.05	.11*
	(.06)	(.01)	(.11)		(.57)	(.06)	(.15)
Expressiveness	-.04	-.04	.00	Intellect	.30†	.08	.12*
	(-.06)	(-.06)	(.00)		(.37)	(.11)	(.17)
Enthusiasm	.24†	.14**	.15**	Change/Variety Seeking	.28†	.07	.07
	(.32)	(.21)	(.23)		(.34)	(.09)	(.10)
Assertiveness	.07	.08	.09	Intellectual curiosity	.50†	.07	.11*
	(.09)	(.11)	(.13)		(.61)	(.09)	(.15)
Industriousness	.40†	.14**	.12*	Traditionalism	-.05	.01	.01
	(.46)	(.17)	(.16)		(-.07)	(.01)	(.01)
Achievement	.53†	.13**	.11*	Fearlessness/Low Anxiety	.22†	.08	.12*
	(.65)	(.17)	(.15)		(.27)	(.11)	(.17)
Orderliness	.45†	.12*	.09	Optimism	.32†	.12*	.15**
	(.53)	(.15)	(.12)		(.39)	(.16)	(.21)
Self-Control	.35†	.30†	.17**	Trust	.18†	.29†	.44†
	(.42)	(.39)	(.23)		(.21)	(.38)	(.59)

Note. N = 523. Values in parentheses are corrected correlations. OCBO = Organisational citizenship behaviours towards the organisation, Courtesy = Interpersonal Courtesy, and Helping = Interpersonal Helping.
*p < .05 **p < .01 †p < .0001.

Table 25 continued

Uncorrected and Corrected Correlations among Personality Variables and Organisational Citizenship Behaviours

Variable	OCBO	Courtesy	Helping	Variable	OCBO	Courtesy	Helping
Adaptability	.37†	.11*	.21†	NEOFFI-3 Extraversion	.13**	.14	.17**
	(.44)	(.14)	(.29)		(.16)	(.18)	(.23)
Stability	.34†	.35†	.20†	NEOFFI-3 Openness to Experience	.29†	.09	.09
	(.40)	(.46)	(.27)		(.35)	(.12)	(.12)
Even-tempered	.18†	.30†	.32†	NEOFFI-3 Agreeableness	.28†	.42†	.38†
	(.20)	(.39)	(.41)		(.33)	(.55)	(.52)
Sympathy	.16**	.36†	.36†	NEOFFI-3 Conscientiousness	.32†	.12*	.14*
	(.20)	(.39)	(.51)		(.34)	(.15)	(.17)
Compassion	.17**	.39†	.47†	HPAQ Emotional Stability	.41†	.32†	.28†
	(.21)	(.53)	(.61)		(.45)	(.38)	(.35)
Cooperation	.46†	.44†	.42†	HPAQ Agreeableness	.36†	.49†	.46†
	(.57)	(.61)	(.60)		(.39)	(.58)	(.57)
Peacefulness	.18†	.44†	.40†	HPAQ Extraversion	.17**	.22†	.20†
	(.21)	(.59)	(.53)		(.19)	(.27)	(.25)
Morality	.16**	.34†	.30†	HPAQ Openness to Experience	.39†	.09	.13*
	(.20)	(.46)	(.43)		(.42)	(.11)	(.16)
Modesty	.03	.07	.06	HPAQ Conscientiousness	.43†	.18**	.14*
	(.04)	(.09)	(.09)		(.46)	(.21)	(.17)
NEOFFI-3 Neuroticism	-.21†	-.17**	-.18†				
	(-.26)	(-.23)	(-.25)				

Note. N = 523. Values in parentheses are corrected correlations. OCBO = Organisational citizenship behaviours towards the organisation, Courtesy = Interpersonal Courtesy, and Helping = Interpersonal Helping. NEOFFI-3 = NEO Five-Factor Inventory ; HPAQ = Hierarchical Personality Assessment Questionnaire.

*p < .05 **p < .01 †p < .0001.

5.3.5 Criterion-related Validity of Personality Variables. In this section separate disattenuated multiple regression analyses were performed to examine criterion-related validity of the NEO-FFI-3 Big Five domain scales, HPAQ Big Five domain scales, and the HPAQ facet scales as it relates to the prediction of six job performance criteria. For all disattenuated multiple regression analyses, the corrected correlation matrices between personality variables and job performance criteria were submitted to AMOS 18. Multicollinearity was examined by bivariate correlations, variance inflation factors (VIFs), and tolerance statistics. Results of collinearity diagnostics revealed that there is no multicollinearities between personality variables in the regression models as bivariate correlations among personality variables were below .8 or .9, VIFs less than 10, and tolerance statistics above .2 (Field, 2009).

5.3.5.1 Task performance. Results for disattenuated multiple regression analyses for the NEO-FFI-3 Big Five factor scales, the HPAQ Big Five factor scales, and the HPAQ facet scales in predicting task performance are presented in Table 26. As shown, the NEO-FFI-3 Big Five factor scales accounted for a statistically significant 19% of the variance in task performance ($R = .44$, $p < .001$). The adjusted R^2 for the regression equation was .18. The NEO-FFI-3 Conscientiousness, Openness to Experience, and Agreeableness factor scales were significant positive predictors of task performance whereas Neuroticism was a negative predictor of task performance (all *ps* < .05). Extraversion did not emerge as a significant predictor of task performance.

The regression equation for the HPAQ Big Five domain scales explained a statistically significant 35% of the variance in task performance ($R = .59$, $p < .001$). The adjusted R^2 for the regression equation was .34. All of the HPAQ Big Five domain scales were significant positive predictors of task performance (all *ps* < .05). Similar to the NEO-FFI-3 Big Five domain scales, the HPAQ

Conscientiousness domain scale was the strongest predictor of task performance.

For the 29 HPAQ facet scales, the regression equation accounted for a statistically significant 55% of the variance in task performance (R = .74, *p* <.001). The adjusted R^2 for the regression equation was .52. In this model, social boldness (β =.16, *p* < .01), enthusiasm (β =.14, *p* < .01), assertiveness (β =.16, *p* < .01), industriousness (β =.18, *p* < .001), achievement (β =.28, *p* < .001), orderliness (β =.22, *p* < .001), self-control (β =.22, *p* < .01), intellect (β =.15, *p* < .01), intellectual curiosity (β =.16, *p* < .01), stability (β =.20, p < .001), adaptability (β =.21, *p* < .001), and optimism (β =.14, *p* < .01) emerged as significant positive predictors of task performance. In addition, the achievement facet was the most salient predictor of task performance.

5.3.5.2 CWBO. Table 27 shows the results of disattenuated multiple regression analyses for the NEO-FFI-3 Big Five dimension scales, the HPAQ Big Five dimension scales, and the HPAQ facet scales in predicting CWBO. As indicated, the NEO-FFI-3 Big Five factor scales accounted for a statistically significant 15% of the variance in CWBO (R = .39, p < .001). The adjusted R^2 for the regression equation was .14.The NEO-FFI-3 Conscientiousness and Agreeableness domain scales were significant negative predictors of CWBO whereas Neuroticism was a positive predictor of CWBO (all *ps* < .05). Of the NEO Big Five factor scales, Conscientiousness was the most salient predictor of CWBO.

Similarly, the HPAQ Conscientiousness, Agreeableness, and Emotional Stability (inverse Neuroticism) domain scales were significant positive predictors of CWBO (all *ps* < .05). The HPAQ Conscientiousness factor scale was also the strongest predictor of CWBO. However, the HPAQ Big Five domain scales were able to accounted for a statistically significant 30% of the variance in CWBO

(R = .55, p < .001). The adjusted R^2 for the regression equation was .29.

The regression equation for 29 HPAQ facet scales explained a statistically significant 41% of the criterion variance in CWBO (R = .64, *p* <.001). The adjusted R^2 for the regression equation was .38. In this model, industriousness (β =-.15, *p* < .01), achievement (β =-.19, *p* < .001), orderliness (β =-.24, *p* < .001), self-control (β =-.30, *p* < .001), stability (β =-.19, p < .001), even-tempered (β =-.17, *p* < .01), adaptability (β =-.12, *p* < .05), peacefulness (β =-.19, *p* < .001), cooperation (β =-.14, *p* < .01) and morality (β =-.25, *p* < .001) emerged as significant negative predictors of CWBO. Additionally, the self-control facet was the strongest predictor of CWBO.

5.3.5.3 CWBI. In Table 28, the results of the disattenuated multiple regression analyses for predicting CWBI with the NEO-FFI-3 Big Five factor scales, the HPAQ Big Five factor scales, and the HPAQ facet scales are illustrated. As can be seen, the NEO-FFI-3 Big Five domain scales accounted for a statistically significant 11% of the variance in CWBI (R = .33, p < .001). The adjusted R^2 for the regression equation was .10. The NEO-FFI-3 Conscientiousness and Agreeableness domain scales were significant negative predictors of CWBI whereas Neuroticism was a positive predictor of CWBI (all *ps* < .05). Of the NEO Big Five factor scales, Agreeableness was the strongest predictor of CWBI.

For the HPAQ Big Five domain scales, the regression equation accounted for 21% of the variance in CWBI (R = .46, p < .001). The adjusted R^2 for the regression equation was .20. The HPAQ Conscientiousness, Agreeableness, and Emotional Stability domain scales were significant negative predictors of CWBI (all *ps* < .05). Similar to the NEO-FFI-3 Big Five factor scales, the HPAQ Agreeableness factor scale was the strongest predictor of CWBI.

As to the 29 HPAQ facet scales, the regression equation for the model accounted for a significant 34% of the criterion variance in CWBI (R = .58, *p* <.001). The adjusted R^2 for the regression equation was .30. In this model, affiliation (β =-.13, *p* < .05), orderliness (β =-.15, *p* < .01), self-control (β =-.25, *p* < .001), stability (β =-.22, p < .001), even-tempered (β =-.25, p < .001), morality (β =-.20, *p* < .05), cooperation (β =-.27, *p* < .001), sympathy (β =-.14, *p* < .05), and peacefulness (β =-.36, p < .001) were significant negative predictors of CWBI whereas expressiveness (β =.13, *p* < .05) was a positive predictor. Additionally, the peacefulness facet was the strongest predictor of CWBI.

5.3.5.4 OCBO. Results for disattenuated multiple regression analyses for the NEO-FFI-3 Big Five factor scales, the HPAQ Big Five factor scales, and the HPAQ facet scales in predicting OCBO are shown in Table 29. As indicated, the regression equation for the NEO-FFI-3 Big Five domain scales explained a statistically significant 15% of the variance in OCBO (R = .39, p < .001). The adjusted R^2 for the regression equation was .14. All of the NEO-FFI-3 Big Five factor scales positively predicted OCBO (all *ps* < .05) with the exception of Neuroticism, which negatively predicted OCBO. The most salient NEO-FFI-3 Big Five factor predictor of OCBO was Conscientiousness.

For the HPAQ Big Five domain scales, the regression equation explained 44% of the variance in OCBO (R = .66, p < .001). All of the HPAQ Big Five domain scales positively predicted OCBO (all *ps* < .05). The adjusted R^2 for the regression equation was .43. As with the NEO-FFI-3 Big Five domain scales, the HPAQ Conscientiousness scale was the strongest predictor of OCBO.

Regarding the 29 HPAQ facet scales, the regression equation explained a statistically significant 54% of the criterion variance in OCBO (R = .73, *p* <.001). The adjusted R^2 for the regression

equation was .51. In this model, enthusiasm (β =.16, *p* < .01), orderliness (β =.21, *p* < .001), self-control (β =.23, *p* < .001), achievement (β =.31, *p* < .001), industriousness (β =.14, *p* < .01), stability (β =.15, p < .01), adaptability (β =.14, *p* < .05), cooperation (β =.23, *p* < .001), imagination (β =.11, *p* < .05), creativity (β =.25, *p* < .01), and intellectual curiosity (β =.25, p < .01) were significant positive predictors of OCBO. Additionally, the achievement facet was the strongest predictor of OCBO.

5.3.5.5 Interpersonal courtesy. Table 30 displays the results of disattenuated multiple regression analyses for the NEO-FFI-3 Big Five dimension scales, the HPAQ Big Five dimension scales, and the HPAQ facet scales in predicting interpersonal courtesy. As shown, the NEO-FFI-3 Big Five factor scales accounted for 11% of the variance in interpersonal courtesy (R = .33, p < .001). The adjusted R^2 for the regression equation was .10. The NEO-FFI-3 Conscientiousness, Agreeableness and Extraversion domain scales positively predicted interpersonal courtesy whereas Neuroticism was a significant negative predictor (all *ps* < .05) and Openness to Experience did not emerge as a significant predictor of interpersonal courtesy. The Agreeableness facet was the strongest NEO Big Five domain scale predictor of interpersonal courtesy.

Concerning the HPAQ Big Five factor scales, the regression equation accounted for 21% of the variance in interpersonal courtesy (R = .64, p < .001). The adjusted R^2 for the regression equation was .20.All of the HPAQ Big Five domain scales positively predicted interpersonal courtesy (all *ps* < .05) with the exception of Openness to Experience, which did not emerge as significant predictor. Similar to the NEO-FFI-3 Big Five domain scales, the HPAQ Agreeableness domain scale was the strongest predictor of interpersonal courtesy.

For the 29 HPAQ facet scales, the regression equation accounted for 38% of the criterion variance in interpersonal

courtesy (R = .62, *p* <.001). The adjusted R^2 for the regression equation was .34. In this model, self-control (β =.13, *p* < .05), affiliation (β =.15, *p* < .01), sociability (β =.14, *p* < .01), stability (β =.15, p < .01), even-tempered (β =.28, *p* < .001), compassion (β =.26, *p* < .001), cooperation (β =.21, *p* < .001), peacefulness (β =.37, *p* < .001), and sympathy (β =.25, p < .001) were significant positive predictors of interpersonal courtesy. Additionally, the peacefulness facet was the strongest predictor of interpersonal courtesy.

5.3.5.6 Interpersonal helping. Results for disattenuated multiple regression analyses for the NEO-FFI-3 Big Five factor scales, the HPAQ Big Five factor scales, and the HPAQ in predicting interpersonal helping are shown in Table 31. As indicated, the regression equation for the NEO-FFI-3 Big Five domain scales explained 17% of the variance in interpersonal helping (R = .41, p < .001). The adjusted R^2 for the regression equation was .16. The NEO-FFI-3 Conscientiousness, Agreeableness and Extraversion domain scales positively predicted interpersonal helping whereas Neuroticism was negative predictor (all *ps* < .05) and Openness to Experience did not emerge as a significant predictor of interpersonal helping. Of the NEO Big Five domain scales, Agreeableness was the strongest predictor of interpersonal helping.

For the HPAQ Big Five domain scales, the regression equation explained 20% of the variance in interpersonal helping (R = .44, p < .001). The adjusted R^2 for the regression equation was .19. Of the HPAQ Big Five domain scales, Emotional Stability, Agreeableness, and Extraversion were significant positive predictors of interpersonal helping (all *ps* < .05) whereas Conscientiousness and Openness to Experience did not emerge as significant predictors. As with the NEO-FFI-3 Big Five domain scales, the HPAQ Agreeableness domain scale was the strongest predictor of interpersonal helping.

As to the 29 HPAQ facet scales, the regression equation explained 38% of the variance in interpersonal helping (R = .62, *p* <.001). The adjusted R^2 for the regression equation was .34. In this model, affiliation (β =.17, *p* < .01), sociability (β =.13, *p* < .05), trust (β =.18, *p* < .001), compassion (β =.35, *p* < .001), cooperation (β =.24, *p* < .001), peacefulness (β =.26, *p* < .001), and sympathy (β =.18, p < .001) were significant positive predictors of interpersonal helping. Additionally, the compassion facet was the strongest predictor of interpersonal helping.

The levels of R^2 values for regression models in the current study appear quite high for personality-based predictors in comparison to other studies reported in the literature. It is important to note that the current study corrected personality variables and criterion variables for attenuation and conducted disattenuated multiple regressions using AMOS 18 to examine the criterion-related validity of personality variables in predicting job performance criteria. Measurement error is likely to inflate disturbance terms in regression models, thus resulting in the attenuation of the R^2 statistic (Bagozzi, 1994). Thus, regression models that account for measurement error in the predictor and criterion are likely to result in higher R^2 values (Bagozzi, 1994). Moreover, in industrial-work-organizational psychology, the taxonomic structure of personality variables has an effect on the magnitude and nature of the personality-criteria relationships (Hough & Furnham, 2003). In the current study, the regression equations including the HPAQ broad Big Five domain scales yielded much higher criterion-related validities and R^2 values than did the regression equations including the NEO-FFI Big Five domain scales. It is possible that the HPAQ instrument might have a predictive advantage resulting in a higher explained variation in criterion variables as it is arguably the most comprehensive measure of the lower-order structure of the Big Five to date in terms of the breadth

of the scales and item content. The HPAQ instrument was developed to measure the 29 lower-order facet taxonomy of the Big Five derived in Study 1 by factor analysing facet scale scores from nine widely used personality inventories in research. As previously discussed in Chapter 3 (see Section 3.4), none of the nine personality inventories (including the NEO-PIR) had scales that fell within all of the twenty-nine lower-order facets, thus indicating that these inventories do not provide systematic cover of the entire trait domain of the Big Five. Murphy and Dzieweczynski (2005) pointed to the poor quality of many existing personality measures as one of the main reasons for the low criterion-related validities for personality variables in predicting job performance reported in the literature.

In addition, matching criterion constructs with relevant predictor constructs will lead to higher criterion-related validities (Bartram, 2005; Hough & Oswald, 2005). Moreover, matching specificity levels of predictor traits with specific behaviours will also lead to higher criterion-related validities (Barrick & Mount, 2005). The research conducted here included more specific criterion constructs such as OCBs (interpersonal helping, interpersonal courtesy, and OCBO) rather than general criterion constructs such overall job performance. It is also possible that in the current study job performance criterion variables were aligned with specific related personality predictors.

Table 26:

Multiple Regression Analyses for Personality Variables and Task Performance

	Predictors: NEO-FFI-3 Domain Scales			Predictors: HPAQ Domain Scales			Predictors: HPAQ Facet Scales		
	B	95% CI		β	95% CI		β	95% CI	
NEOFFI-3 Conscientiousness	.31†	.22	.39						
NEOFFI-3 Extraversion	.09	-.01	.18						
NEOFFI-3 Openness	.13*	.04	.22						
NEOFFI-3 Agreeableness	.13*	.03	.21						
NEOFFI-3 Neuroticism	-.22†	-.30	-.12						
HPAQ Conscientiousness				.33†	.24	.41			
HPAQ Extraversion				.13*	.08	.18			
HPAQ Openness				.15**	.04	.26			
HPAQ Agreeableness				.14**	.07	.20			
HPAQ Emotional Stability				.23†	.13	.32			
Affiliation							.09	-.02	.20
Sociability							-.05	-.13	.04
Social Boldness							.16**	.07	.25
Expressiveness							-.09	-.19	.01
Enthusiasm							.14**	.05	.23
Assertiveness							.16**	.07	.25
Self-Control							.22†	.12	.31
Achievement							.30†	.20	.38
Industriousness							.18**	.07	.28
Orderliness							.22†	.12	.31
Culture/Artistic Interest							-.03	-.11	.06
Imagination							.04	-.06	.13
Creativity							.09	-.02	.20

Intellect							.15**	.04	.26
Change/Variety Seeking							.07	-.04	.17
Intellectual Curiosity							.16**	.05	.27
Traditionalism							-.03	-.11	.04
Even-tempered							.02	-.06	.11
Stability							.20†	.11	.29
Fearlessness/ Low Anxiety							-.04	-.11	.03
Adaptability							.21†	.12	.29
Optimism							.14**	.05	.23
Trust							.01	-.08	.09
Modesty							-.03	-.11	.07
Morality							.04	-.05	.13
Cooperation							.05	-.06	.15
Compassion							.04	-.06	.13
Peacefulness							-.01	-.13	.11
Sympathy							.01	-.07	.08
R	.44†	.39	.50	.59†	.57	.66	.74†	.73	.80
R^2	.19†	.15	.25	.35†	.33	.44	.55†	.53	.64
Adjusted R^2	.18			.34			.52		

Note. N = 523. NEOFFI-3 = NEO Five-Factor Inventory; HPAQ = Hierarchical Personality Assessment Questionnaire
β = standardized regression coefficients.
*p < .05 **p < .01 †p < .001

Table 27:

Multiple Regression Analyses for Personality Variables and CWBO

	Predictors: NEO-FFI-3 Domain Scales			Predictors: HPAQ Domain Scales			Predictors: HPAQ Facet Scales		
	β	95% CI		β	95% CI		β	95% CI	
NEOFFI-3									
Conscientiousness	-.25†	-.34	-.16						
NEOFFI-3 Extraversion	-.07	-.17	.02						
NEOFFI-3 Openness	-.03	-.15	.08						
NEOFFI-3 Agreeableness	-.17**	-.27	-.06						
NEOFFI-3 Neuroticism	.16**	.25	.07						
HPAQ Conscientiousness				-.30†	-.39	-.18			
HPAQ Extraversion				-.07	-.20	.06			
HPAQ Openness				-.04	-.17	.09			
HPAQ Agreeableness				-.26†	-.35	-.17			
HPAQ Emotional Stability				-.22†	-.28	-.14			
Affiliation							-.07	-.18	.05
Sociability							.04	-.13	.05
Social Boldness							-.10	-.21	.02
Expressiveness							-.06	-.15	.02
Enthusiasm							-.04	-.16	.07
Assertiveness							-.06	-.15	.02
Self-Control							-.33†	-.42	-.20
Achievement							-.19†	-.29	-.09
Industriousness							-.15**	-.23	-.04
Orderliness							-.24†	-.33	-.12
Culture/Artistic Interest							-.04	-.13	.05
Imagination							-.02	-.12	.09

Creativity							-.03	-.14	.09
Intellect							-.04	-.15	.08
Change/Variety Seeking							-.02	-.12	.09
Intellectual Curiosity							-.07	-.20	.06
Traditionalism							.06	-.03	.14
Even-tempered							-.17**	-.27	-.06
Stability							-.19†	-.28	-.08
Fearlessness/ Low Anxiety							-.02	-.12	.09
Adaptability							-.12*	-.21	-.01
Optimism							-.03	-.13	.09
Trust							-.08	-.16	.02
Modesty							.07	-.04	.17
Morality							-.28†	-.37	-.19
Cooperation							-.14*	-.23	-.04
Compassion							-.03	-.13	.09
Peacefulness							-.19†	-.27	-.09
Sympathy							-.06	-.15	.03
R	.39†	.33	.46	.55†	.49	.62	.64†	.63	.75
R^2	.15†	.11	.21	.30†	.24	.38	.41†	.40	.56
Adjusted R^2	.14			.29			.38		

Note. N = 523. NEOFFI-3 = NEO Five-Factor Inventory; HPAQ = Hierarchical Personality Assessment Questionnaire
β = standardized regression coefficients.
*p < .05 **p < .01 †p < .001

Table 28:

Multiple Regression Analyses for Personality Variables and CWBI

	Predictors: NEO-FFI-3 Domain Scales			Predictors: HPAQ Domain Scales			Predictors: HPAQ Facet Scales		
	β	95% CI		β	95% CI		β	95% CI	
NEOFFI-3 Conscientiousness	-.21†	-.30	-.10						
NEOFFI-3 Extraversion	-.09	-.19	.05						
NEOFFI-3 Openness	-.08	-.23	.08						
NEOFFI-3 Agreeableness	-.25†	-.34	.15						
NEOFFI-3 Neuroticism	.17**	-.27	-.06						
HPAQ Conscientiousness				-.21†	-.29	-.12			
HPAQ Extraversion				-.09	-.19	-.01			
HPAQ Openness				-.06	-.14	.01			
HPAQ Agreeableness				-.34†	-.42	-.25			
HPAQ Emotional Stability				-.20†	-.27	-.13			
Affiliation							-.13*	-.23	-.02
Sociability							-.11	-.19	.01
Social Boldness							-.03	-.15	.09
Expressiveness							.13*	.02	.23
Enthusiasm							-.03	-.13	.08
Assertiveness							-.05	-.15	.05
Self-Control							-.25†	-.34	-.13
Achievement							-.09	-.19	.01
Industriousness							-.07	-.19	.04
Orderliness							-.15**	-.26	-.04
Culture/Artistic Interest							-.07	-.17	.03
Imagination							-.08	-.18	.03

Creativity							-.04	-.16	.08
Intellect							-.09	-.21	.03
Change/Variety Seeking							-.04	-.14	.06
Intellectual Curiosity							-.06	-.17	.07
Traditionalism							.04	-.04	.13
Even-tempered							-.25†	-.34	.13
Stability							-.22†	-.31	-.10
Fearlessness/Low Anxiety							-.02	-.11	.07
Adaptability							-.11	-.22	.01
Optimism							-.01	-.13	.10
Trust							-.04	-.14	.06
Modesty							.10	-.01	.19
Morality							-.20†	-.30	-.08
Cooperation							-.27†	-.36	-.15
Compassion							.10	-.01	.19
Peacefulness							-.36†	-.42	-.21
Sympathy							-.14**	-.23	-.05
R	.33†	.28	.41	.46†	.47	.60	.58†	.57	.71
R^2	.11†	.08	.17	.21†	.25	.36	.34†	.33	.51
Adjusted R^2	.10			.20			.30		

Note. NEOFFI-3 = NEO Five-Factor Inventory; HPAQ = Hierarchical Personality Assessment Questionnaire.
β = standardized regression coefficients.
*p < .05 **p < .01 †p < .001

Table 29:

Multiple Regression Analyses for Personality Variables and OCBO

	Predictors: NEO-FFI-3 Domain Scales			Predictors: HPAQ Domain Scales			Predictors: HPAQ Facet Scales		
	β	95% CI		β	95% CI		β	95% CI	
NEOFFI-3 Conscientiousness	.21†	.12	.30						
NEOFFI-3 Extraversion	.11*	.02	.20						
NEOFFI-3 Openness	.18†	.08	.26						
NEOFFI-3 Agreeableness	.14**	.15	.24						
NEOFFI-3 Neuroticism	.16†	.05	.26						
HPAQ Conscientiousness				.33†	.23	.43			
HPAQ Extraversion				.13*	.03	.23			
HPAQ Openness				.25†	.13	.36			
HPAQ Agreeableness				.23†	.12	.32			
HPAQ Emotional Stability				.21†	.09	.31			
Affiliation							.02	-.08	.13
Sociability							.04	-.04	.12
Social Boldness							.07	-.03	.17
Expressiveness							-.04	-.13	.05
Enthusiasm							.16**	.07	.24
Assertiveness							.10	.00	.19
Self-Control							.23†	.12	.32
Achievement							.31†	.19	.40
Industriousness							.14**	.05	.23
Orderliness							.21†	.11	.20
Culture/Artistic Interest							.01	-.07	.08
Imagination							.11*	.01	.20

Creativity							.25†	.14	.35
Intellect							.06	-.04	.17
Change/Variety Seeking							.07	-.03	.17
Intellectual Curiosity							.25†	.14	.35
Traditionalism							-.01	-.09	.07
Even-tempered							.06	-.02	.14
Stability							.15**	.05	.24
Fearlessness/ Low Anxiety							.01	-.07	.09
Adaptability							.14**	.02	.25
Optimism							.05	-.04	.14
Trust							.06	-.05	.16
Modesty							-.09	-.18	-.01
Morality							.02	-.08	.11
Cooperation							.23†	.13	.31
Compassion							.02	-.08	.11
Peacefulness							.09	-.03	.21
Sympathy							.03	-.04	.11
R	.39†	.33	.47	.66†	.62	.72	.73†	.71	.80
R^2	.15†	.11	.22	.44†	.38	.52	.54†	.51	.64
Adjusted R^2	.14			.43			.51		

Note. NEOFFI-3 = NEO Five-Factor Inventory; HPAQ = Hierarchical Personality Assessment Questionnaire.
β = standardized regression coefficients.
*p < .05 **p < .01 †p < .001

Table 30:

Multiple Regression Analyses for Personality Variables and Interpersonal Courtesy

	Predictors: NEO-FFI-3 Domain Scales			Predictors: HPAQ Domain Scales			Predictors: HPAQ Facet Scales		
	β	95% CI		β	95% CI		β	95% CI	
NEOFFI-3 Conscientiousness	.11*	.02	.19						
NEOFFI-3 Extraversion	.15*	.05	.24						
NEOFFI-3 Openness	.05	-.04	.14						
NEOFFI-3 Agreeableness	.21†	.11	.30						
NEOFFI-3 Neuroticism	-.19†	-.27	-.09						
HPAQ Conscientiousness				.11*	.01	.20			
HPAQ Extraversion				.15**	.05	.25			
HPAQ Openness				.06	-.03	.16			
HPAQ Agreeableness				.35†	.23	.45			
HPAQ Emotional Stability				.21†	.14	.28			
Affiliation							.15**	.05	.24
Sociability							.14**	.05	.23
Social Boldness							.04	-.06	.14
Expressiveness							-.07	-.17	.03
Enthusiasm							.06	-.03	.16
Assertiveness							.00	-.09	.09
Self-Control							.13*	.14	.24
Achievement							.05	-.06	.15
Industriousness							.06	-.03	.16
Orderliness							.07	-.06	.18
Culture/Artistic Interest							.05	-.04	.14
Imagination							.05	-.04	.14

Creativity							.07	-.05	.20
Intellect							.05	-.07	.17
Change/Variety Seeking							.01	-.10	.13
Intellectual Curiosity							.05	-.07	.18
Traditionalism							.01	-.10	.14
Even-tempered							.28†	.17	.38
Stability							.15**	.05	.24
Fearlessness/Low Anxiety							.02	-.07	.10
Adaptability							.08	-.03	.18
Optimism							.01	-.10	.14
Trust							.03	-.07	.13
Modesty							.02	-.07	.10
Morality							.06	-.06	.17
Cooperation							.21†	.10	.30
Compassion							.26†	.14	.37
Peacefulness							.37†	.23	.48
Sympathy							.25†	.13	.36
R	.33†	.26	.42	.45†	.40	.56	.61†	.60	.73
R^2	.11†	.07	.18	.21†	.16	.31	.38†	.36	.53
Adjusted R^2	.10			.20			.34		

Note. NEOFFI-3 = NEO Five-Factor Inventory; HPAQ = Hierarchical Personality Assessment Questionnaire.
β = standardized regression coefficients.
*p < .05 **p < .01 †p < .001

Table 31:

Multiple Regression Analyses for Personality Variables and Interpersonal Helping

	Predictors: NEO-FFI-3 Domain Scales			Predictors: HPAQ Domain Scales			Predictors: HPAQ Facet Scales		
	β	95% CI		β	95% CI		β	95% CI	
NEOFFI-3 Conscientiousness	.11*	.02	.19						
NEOFFI-3 Extraversion	.13*	.04	.22						
NEOFFI-3 Openness	.07	-.02	.16						
NEOFFI-3 Agreeableness	.25†	.12	.36						
NEOFFI-3 Neuroticism	-.14*	-.28	-.01						
HPAQ Conscientiousness				.10	-.02	.22			
HPAQ Extraversion				.15**	.03	.26			
HPAQ Openness				.03	-.08	.16			
HPAQ Agreeableness				.33†	.23	.43			
HPAQ Emotional Stability				.16**	.08	.25			
Affiliation							.17**	.06	.27
Sociability							.13*	.03	.22
Social Boldness							.10	-.02	.22
Expressiveness							.04	-.06	.14
Enthusiasm							.10	-.02	.22
Assertiveness							.04	-.05	.13
Self-Control							.09	-.02	.19
Achievement							.05	-.05	.16
Industriousness							.06	-.04	.16
Orderliness							.05	-.05	.16
Culture/Artistic Interest							.08	-.01	.17
Imagination							.01	-.07	.10

Creativity							.01	-.07	.10
Intellect							.03	-.08	.16
Change/Variety Seeking							.07	-.05	.18
Intellectual Curiosity							.06	-.06	.19
Traditionalism							-.00	-.09	.08
Even-tempered							.07	-.02	.16
Stability							.10	.01	.19
Fearlessness/Low Anxiety							.01	-.07	.10
Adaptability							.04	-.06	.14
Optimism							.01	-.11	.13
Trust							.18†	.07	.28
Modesty							.03	-.07	.13
Morality							.04	-.06	.14
Cooperation							.24†	.13	.33
Compassion							.35†	.23	.45
Peacefulness							.26†	.12	.38
Sympathy							.18†	.07	.28
R	.41†	.33	.50	.44†	.37	.57	.62†	.60	.73
R^2	.17†	.11	.25	.20†	.14	.32	.38†	.36	.53
Adjusted R^2	.16			.19			.34		

Note. NEOFFI-3 = NEO Five-Factor Inventory; HPAQ = Hierarchical Personality Assessment Questionnaire
β = standardized regression coefficients.
*p < .05 **p < .01 †p < .001

5.3.6 Incremental Validity of Personality Variables. In this section, the incremental validities provided by the HPAQ facet scales and the NEO-FFI-3 Big Five domain scales over each other in the prediction of task performance, CWBO, CWBI, OCBO, interpersonal courtesy, and interpersonal helping were examined. For each criterion, two sets of disattenuated hierarchal multiple regressions using AMOS with reverse entry of only the predictive HPAQ facet scales for the criterion and the NEO-FFI-3 Big Five domain scales were performed. Specifically, in the first disattenuated hierarchal regression, the NEO-FFI-3 Big Five domain scales were entered in model 1 to predict the criterion and then the predictive HPAQ facets were added in model 2 to evaluate their incremental contributions to criterion-related validity. Whereas, in second hierarchical regression, the predictive HPAQ facet scales were entered into the regression equations in model 1 and then the NEO-FFI-3 Big Five domain scales were entered in model 2 to evaluate their incremental contributions to criterion-related validity. As noted earlier, including only significant HPAQ facet scale predictors allows for an accurate estimation of the multiple correlations between predictors and criteria.

5.3.6.1 Task performance. As seen in Table 32, in the first disattenuated hierarchical regression, the 12 HPAQ facet scales identified as significant predictors of task performance previously (social boldness, enthusiasm, assertiveness, industriousness, achievement, orderliness, self-control, intellect, intellectual curiosity, stability, adaptability, and optimism), when added to the prediction equations in second model, accounted for an additional, significant 26% of the variance in task performance (ΔR^2 = .26, F Change = 19.894, p < .001). The 12 disattenuated HPAQ facets provided a significant incremental validity of .23 (from .44 to .67) over the validity already provided for by the corrected NEO-FFI-3 Big Five factor scales.

In the second disattenuated hierarchical regression with the order of entry reversed, the corrected NEO-FFI-3 Big Five factor scales entered in the second model accounted for an additional 5% of the variance in task performance (ΔR^2 = .05, F Change = 9.182, p < .001), which was statistically significant. The corrected NEO-FFI-3 Big Five factor scales provide a significant incremental validity of .04 (from .63 to .67) over the validity already provided for by the 12 HPAQ facet scale predictors. In summary, the 12 HPAQ facet scales and the NEO-FFI-3 Big Five factor scales provided incremental validity over each other in predicting task performance. However, the magnitude of the incremental predictive efficacy was much greater for the 12 HPAQ facet scales.

5.3.6.2 CWBO. As shown in Table 32, in the first disattenuated hierarchical regression, adding the 10 disattenuated HPAQ facet scales identified as significant predictors of CWBO previously (industriousness, achievement, orderliness, self-control, stability, even-tempered, adaptability, peacefulness, cooperation, and morality) in the second model, explained an additional significant 16% of the variance in CWBO (ΔR^2 = .16, F Change = 11.757, p < .001). The 10 disattenuated HPAQ facets provided a significant incremental criterion validity of .17 (from .39 to .56) over the validity already provided for by the corrected NEO-FFI-3 Big Five factor scales.

In the second disattenuated hierarchical regression, adding the corrected NEO-FFI-3 Big Five factor scales in the second model explained an additional significant 8% of the variance in CWBO (ΔR^2 = .08, F Change = 11.757, p < .001). The corrected NEO-FFI-3 Big Five factor scales provide a significant incremental criterion validity of .08 (from .48 to .56) over the validity already provided for by the 11 HPAQ facet scales. To sum up, the 10 HPAQ facet scales and the NEO-FFI-3 Big Five factor scales provided incremental criterion validity over each other in predicting CWBO. However, the 10 HPAQ

facet scales accounted for a substantially greater increment in criterion variance.

5.3.6.3 CWBI. As indicated in Table 32, in the first disattenuated hierarchical regression, the 10 disattenuated HPAQ facet scales identified as significant predictors of CWBI previously (affiliation, orderliness, self-control, stability, even-tempered, morality, cooperation, sympathy, peacefulness, and expressiveness), when added to the prediction equations in second model, accounted for an additional significant 21% of the variance in CWBI (ΔR^2 = .21, F Change = 15.657, p < .001). The 11 disattenuated HPAQ facets added a significant 23% (from .33 to .56) in incremental variance over the corrected NEO-FFI-3 Big Five domain scales.

In the second disattenuated hierarchical regression, the corrected NEO-FFI-3 Big Five factor scales entered in the second model of the hierarchical regression, accounted for an additional significant 3% of the variance in CWBI (ΔR^2 = .03, F Change = 4.474, p = .001). The corrected NEO-FFI-3 Big Five factor added a non-significant 2% (from .54 to .56) in incremental variance over the 10 HPAQ facet scales. These findings indicate that the 10 HPAQ facet scales and the NEO-FFI-3 Big Five factor scales added incremental criterion variance over each other in predicting CWBI. Even so, the 10 HPAQ facet scales contribution to incremental criterion variance was more substantial.

5.3.6.4 OCBO. Table 32 shows that, in the first disattenuated hierarchical regression, adding the 11 HPAQ facet scales identified as significant predictors of OCBO previously (enthusiasm, orderliness, self-control, achievement, industriousness, stability, adaptability, cooperation, imagination, creativity, and intellectual curiosity) to the prediction equations in second model explained a significant additional 36% variance in OCBO (ΔR^2 = .36, F Change = 33.796, p < .001). The 11 attenuated HPAQ facets provided a

significant incremental validity of .32 (from .39 to .71) over the validity already achieved by the corrected NEO-FFI-3 Big Five domain scales.

In a second disattenuated hierarchical regression, the corrected NEO-FFI-3 Big Five domain scales, entered in the second model of the hierarchical regression, explained a further 6% of the variance in OCBO (ΔR^2 = .06, F Change = 12.392, p < .001). The corrected NEO-FFI-3 Big Five factor scales provide a significant incremental validity of .04 (from .67 to .71) over the validity already achieved by the 12 HPAQ facet scales. In short, the 11 HPAQ facet scales and the NEO-FFI-3 Big Five domain scales provided incremental validity over each other in predicting OCBO. Nevertheless, the 11 HPAQ facet scales contribution to incremental criterion variance was substantially greater.

5.3.6.5 Interpersonal Courtesy. As seen in Table 32, in the first disattenuated hierarchical regression, the nine HPAQ facet scales identified as significant predictors of interpersonal courtesy previously (self-control, affiliation, sociability, stability, even-tempered, compassion, cooperation, peacefulness, and sympathy), when added to the prediction equations in second model, accounted for an additional significant 24% of the variance in interpersonal courtesy (ΔR^2 = .24, F Change = 20.841, p < .001). The nine disattenuated HPAQ facets added a significant incremental validity of .26 (from .33 to .59) over the validity already achieved by the corrected NEO-FFI-3 Big Five domain scales.

In the second disattenuated hierarchical regression, the corrected NEO-FFI-3 Big Five factor scales, entered in the second model of the hierarchical regression, accounted for an additional significant 3% of the variance in interpersonal courtesy (ΔR^2 = .03, F Change = 4.689, p = .001). The corrected NEO-FFI-3 Big Five domain scales added a significant incremental validity of .02 (from .57 to .59) over the validity already achieved by the nine HPAQ

facet scales. In summary, the nine disattenuated HPAQ facets and the NEO-FFI-3 Big Five domain scales provided incremental criterion validity over each other in predicting interpersonal courtesy. However, the nine HPAQ facet scales accounted for a substantially greater increment in criterion variance.

5.3.6.6 Interpersonal Helping. Table 32 shows that, in the first disattenuated hierarchical regression, entering the seven HPAQ facet scale predictors identified as significant predictors of interpersonal helping previously in the second model, explained an additional, significant 20% of the variance in interpersonal helping (ΔR^2 = .20, F Change = 23.129, p < .001). The seven disattenuated HPAQ facets added a significant 20% (from .41 to .61) in incremental variance over the corrected NEO-FFI-3 Big Five domain scales.

In the second disattenuated hierarchical regression, the corrected NEO-FFI-3 Big Five domain scales, entered in the second model of the hierarchical regression, explained an additional, significant 4% of the variance in interpersonal helping (ΔR^2 = .04, F Change = 6.476, p < .001). The corrected NEO-FFI-3 Big Five factor scales added a significant 4% (from .57 to .61) in incremental variance over the seven HPAQ facet scales. As with the other criteria, the seven HPAQ facet scales and the NEO-FFI-3 Big Five domain scales provided incremental criterion variance over each other in predicting interpersonal helping. Just the same, the seven HPAQ facet scales contribution to incremental criterion variance was more substantial.

Table 32:

Summary of Disattenuated Hierarchical Regression Analyses for Testing Incremental Validity

Criterion and Predictors	Multiple R	R^2	ΔR^2
TASK PERFORMANCE			
Model 1. NEO-FFI-3 Big Five Factors	.44***	.19***	
Model 2. 12 HPAQ Facet Scales	.67***	.45***	.26***
TASK PERFORMANCE			
Model 1. 12 HPAQ Facet Scales	.63***	.40***	
Model 2. NEO-FFI-3 Big Five Factors	.67***	.45***	.05***
CWBO			
Model 1. NEO-FFI-3 Big Five Factors	.39***	.15***	
Model 2. 11 HPAQ Facet Scales	.56***	.31***	.16***
CWBO			
Model 1. 10 HPAQ Facet Scales	.48***	.23***	
Model 2. NEO-FFI-3 Big Five Factors	.56***	.31***	.08***
CWBI			
Model 1. NEO-FFI-3 Big Five Factors	.33***	.11**	
Model 2. 10 HPAQ Facets Scales	.56***	.32***	.21***
CWBI			
Model 1. 10 HPAQ Facet Scales	.54***	.29***	
Model 2. NEO-FFI-3 Big Five Factors	.56***	.32***	.03**
OCBO			
Model 1. NEO-FFI-3 Big Five Factors	.39***	.15***	
Model 2. 11 HPAQ Facet Scales	.71***	.51***	.36***
OCBO			
Model 1. 11 HPAQ Facet Scales	.67***	.45***	
Model 2. NEO-FFI-3 Big Five Factors	.71***	.51***	.06***
Interpersonal Courtesy			
Model 1. NEO-FFI-3 Big Five Factors	.33***	.11***	
Model 2. 9 HPAQ Facet Scales	.59***	.35***	.24***
Interpersonal Courtesy			
Model 1. 9 HPAQ Facet Scales	.57***	.32***	
Model 2. NEO-FFI-3 Big Five Factors	.59***	.35***	.03**
Interpersonal Helping			
Model 1. NEO-FFI-3 Big Five Factors	.41***	.17***	
Model 2. 7 HPAQ Facet Scales	.61***	.37***	.20***
Interpersonal Helping			
Model 1. 7 HPAQ Facet Scales	.57***	.33***	
Model 2. NEO-FFI-3 Big Five Factors	.61***	.37***	.04***

Note. N= 523. NEOFFI-3 = NEO Five-Factor Inventory; HPAQ = Hierarchical Personality Assessment Questionnaire

*p < .05 **p < .01 ***p < .001

5.4 Study 3 Discussion

The current study examined the criterion-related validity of the 29 HPAQ facet scales across six job performance criteria (task performance, OCBO, CWBO, CWBI, interpersonal courtesy, and interpersonal helping). In addition, this study also tested the incremental validity of the 29 HPAQ facet scales in predicting job performance criteria above and beyond the Broad Big Five factors. In general, the study found that (a) the 29 HPAQ facet scales demonstrated significant differential relationships with six job performance criteria in both magnitude and direction, and (b) both facet scales and the Big Five factors demonstrated incremental validity, indicating that facet scales and the broad Big Five factors have valid specific variance associated with the criteria.

Firstly, the differential relationships found for the 29 HPAQ facet scales in predicting job performance criteria suggest that the lower order facets are sufficiently heterogeneous and thus possess specific variance that cannot be explained by higher order factors. Moreover, such results indicate that using measures of the Big Five personality factors that emphasise certain aspects of those factors may lead to the Big Five personality factors demonstrating higher or lower criterion-related validities. Hough and Furnham (2003) noted that the taxonomic structure of personality variables has an effect on the magnitude and nature of the personality-criterion relationship. Generally, with each respective Big Five domain, whereas a number of facets were significant predictors, others in the same domain were revealed to be non-significant. For example, regarding the Conscientiousness domain, the achievement and industriousness facets were not significantly related to CWBI, whereas orderliness, dutifulness, and self-control emerged as significant predictors of the same criterion. Such findings reflect the possibility of dilution or predictive losses among higher order factors in explaining the various criteria (Hough & Oswald, 2000; O'Neill &

Hastings, 2011). In addition, the current study provided evidence to suggest that broad personality traits may obscure meaningful relations between narrow traits and criterion constructs. For example, although the broad Extraversion domain was a non-significant predictor of CWBI, the Extraversion facet of Affiliation negatively predicted CWBI, whereas the Extraversion facet of Expressiveness positively predicted CWBI.

Secondly, the findings show that both broad Big five factors and narrow facets explained significant proportion of nonredundant information in the job performance criteria. Thus, the current study does affirm the usefulness of both the broad Big Five traits and narrow personality traits for predicting job performance criteria. These findings of the current study suggest that factor level variance (i.e. variance shared among the constituent facets of a particular factor) and variance specific to facets are important for predicting the various job performance criteria. It seems, therefore, that to fully maximise the level of behavioural prediction, it may be best to use personality measures that capture broad and narrow traits. Additionally, the results of the current study are consistent with vertical or hierarchical and horizontal structural representations of personality (see Costa & McCrae, 1992a; Goldberg, 1993b), whereby factors and facets contain reliable specific variance. Moreover, the evidence of non-random specific variance at the facet-level corroborates the arguments and empirical evidence that facet-level scores are unique and not entirely measures of the Big Five factors (for example, McCrae & Costa, 1995). Furthermore, the fact that narrow facets have non-random specific variance that is related to valid variance in job performance criteria is consistent with an emergent model of personality perspective at the facet-factor interface. Ozer and Reise (1994) have argued that most personality traits should be regarded as emergent traits rather than latent traits. In emergent models of personality, facets would be

viewed as causal indicators, causing the factors. Emergent models emphasise the importance of not disregarding the presence of facets as the focus is on predicting a criterion using facets. In contrast, in latent models of personality, facets would be viewed as effect indicators that are caused by factors. Latent models put emphasis on using the latent variable to predict a criterion; facets are expected to reliably measure only the latent variable and thus are only effect indicators of the latent variable. Therefore, had the findings of the current study been consistent with the latent model viewpoint, narrow facets would not have significantly added incremental criterion validity in predicting job performance criteria, indicating that they only have factor-level variance related to the Big Five factors as well as measurement error. Suffice it to mention here that the current study is only consistent with an emergent model of personality viewpoint and is not a definitive test as to whether the Big Five are emergent or latent traits. MacCallum & Browne (1993) noted that a factor could have both causal and effect indicators. It is also quite possible that the results of the current study could be consistent with a model of personality wherein a factor has both causal and effect indicators.

The results of the current study point to the importance of facet-level personality measures when developing and using personality measures given the support for specific variance at the facet level that can lead to increases in criterion-related validity of personality scales. Some HPAQ facet scales, despite their brevity and very specific content, were as strong or stronger predictors of job performance criteria as were any of the broad Big Five factors. This means that lower level personality traits are not only important for achieving increments in behaviour prediction, but are also important for our enhanced understanding of the theoretical relations between personality variables and criteria as well as the broad Big Five personality factors and criteria (Hough & Furnham,

2003; Hough & Ones, 2001). This is because narrow measures are more interpretable than broad factors as they measure narrower content than do the broad factors (O'Neil & Allen, 2011), thus representing narrower domains of behaviour. Therefore, an observed facet-criterion relation is more readily understood and defensible (Paunonen et al., 1999). Narrow bandwidth, lower level personality measures have the advantage of allowing researchers to capitalise on their non-random trait-specific and criterion-predictive variance as fidelity (quality of information) is lost when facet scales are aggregated into factors due to differential effects of different facets on the criteria. Thus, researchers and theorists who focus their studies and discussion on the Big Five factors alone are likely to be overlooking important facets of personality as well as underestimating the increased explanatory power that can be gained from using narrow traits.

Furthermore, because of their greater explanatory value, the use of narrow personality measures in organisational behaviour research can potentially lead to significant advances in the development of theories of work behaviour. Such theory development in the area of personality has been somewhat limited, notwithstanding that personality has been an active area of research in psychology for a number of years. In particular, there is a dearth of theory linking personality to job performance (Murphy & Dzieweczynski, 2005). For example, in the current study, at the global Big Five level, Conscientiousness, Agreeableness, and Emotional Stability were the personality constructs that best explain CWBO and CWBI. In such a case where only factor-level information is available, a researcher or practitioner may inappropriately conclude that the personality factor-CWB relations is due to all facets within a particular domain equally contributing to the prediction of CWB when in actuality the personality factor-CWB relations may primarily be due to one or more facets that are highly

predictive of the criterion. For instance, in the current study, Conscientiousness facets – achievement and industriousness – and the Emotional Stability facet – adaptability – were important for explaining individual differences in CWBO but not CWBI. Similarly, the Agreeableness facet – sympathy – was important for explaining individual differences in CWBI but not in CWBO. Such findings potentially provide significant theoretical contributions to the fields of personality and CWB. Moreover, such information at the facet-level would be particularly useful for the development of a theoretical framework linking personality to CWB. Further research should extend the results of the current study and consider the criterion-related and incremental validity of more specific, narrow personality traits in relation to other theoretically-relevant work-related and occupational criteria. For example, future criterion-related validation studies could examine criteria such as leadership ability, management performance, motivation, job attitudes (for example, job satisfaction and organisational commitment), employee engagement, work stress, and absenteeism. Researchers have called for the continued use of multifaceted personality measures that would allowed for the empirical examination, and use, of facet-level variation in criterion validities as an ongoing research priority (for example, Hough & Oswald, 2008; O'Neill & Allen, 2011).

5.4.1 Strengths and limitations. A notable advantage of the current study is the use of other reports of task performance, OCBs, and CWBs. In so doing, certain biases that might distort correlations of the task performance, OCBs, and CWB measures with participant self-ratings of personality variables are likely minimized. However, in terms of peer-ratings of OCBs and CWBs, it is possible that employees might have chosen co-workers who would report on their behaviors more favorably. Furthermore, peers or co-workers, in most cases, are only cognizant of those behaviors

that they can actually see or the results of behaviours (Fox, Spector, Goh, & Bruursema, 2007).

The current study has corrected broad and narrow personality variables and criterion variables for measurement error. This is a noteworthy strength because correcting for measurement error ensured that personality variables with higher reliabilities do not have an unintended advantage (Hastings & O'Neill, 2009). Furthermore, the failure to correct measurement error can lead to much weaker than normal intercorrelations between predictor and criterion variables. Moreover, in such cases, intercorrelations with other personality variables can also be expected to be weaker than normal, suggesting that personality measures contain high degree of unique variance, which is really a function of measurement error (Ones & Viswesvaran, 1996).

A concern for studies that seek to compare the validity of a large number of narrow facets with a criterion in order to observe which facets have significant validity is the problem of capitalisation on chance (Ones and Viswesvaran, 1996). That is, just by chance, some facets are significant valid predictors of a criterion while other facets are not. Moreover, capitalisation on chance is also problematic for studies that seek to compare the validity of facets to broad factors due to the fact that facets are greater in number to broad factors, which increases the chances of finding significant higher correlations for facets by chance alone (Mershon & Gorsuch, 1988; Paunonen & Ashton, 2001a). In addition, the statistical regression procedure is known to be inherently susceptible to capitalisation on chance fluctuations in given sample and overfit data (Tabachnick & Fidell, 2007). This study took special care to avoid the problem of capitalisation on chance when selecting facets based on empirical post-hoc relations with a criterion and when comparing the validity of facets to that of factors by employing the Bootstrapping method to cross-validate analyses. While the current

study used a statistical approach to eliminate (or reduce) the problem of capitalisation on chance, other studies have employed a rational strategy which involved having expert judges choose narrow facets that would predict criteria being measured from a pool of facets (for example, Hastings & O'Neill, 2009; Paunonen & Ashton, 2001a). However, while such a rational approach will potentially maximise prediction accuracy and at the same time eliminate the problem of capitalisation on chance, it is susceptible to subjective biases of experts. For instance, expert judges may identify a particular narrow trait as theoretically relevant but it may not emerge to be statistically related to the criterion under study. For example, in a study conducted by O'Neill and Hastings (2011), expert judges rated Egotism as relevant to the prediction of workplace deviance, but empirical analyses did not show this trait to be related significantly to any of the deviance variables. Furthermore, to further reinforce the empirical approach for selecting significant predictors, follow-up disattenuated hierarchical multiple regressions using the Bootstrapping method were repeated with the other (nonsignificant) facets. These non-significant set of facet predictors did not significantly increased criterion predictions above that of the Big Five in any of the evaluation cases, in contrast to what emerged for the original models with only significant facets. Therefore, indicating that the regression analyses based on Bootstrapping method for cross-validation were unlikely to capitalise on chance. Nevertheless, the replicability of these results still needs to be investigated. Further research can determine if the current results can be replicated across cultures and with different job types or similar jobs across different organisations and industries.

In conclusion, the current study found that both the broad Big Five personality factors and the narrow facets that make up the Big Five personality factors are important for predicting job performance criteria. Moreover, this study demonstrated that the

use of narrow personality traits can account for important variance in the prediction of job performance criteria, which could improve our understanding of the theoretical relations between personality variables and job performance criteria. Therefore, the current study adds to a small but growing body of research suggesting that narrow personality measures are important for explaining theoretically-relevant work-related criteria (e.g. Ashton, 1998). Thus, findings of this study suggest that use of broad Big Five personality measures alone in organisational research will underestimate the criterion validity of personality. This could hinder the advancement of theory that enhances our understanding of personality relates to various job performance criteria and the overall predictive power of personality.

Chapter 6: Conclusions

The main purpose of this thesis was to examine the shared overall lower-order structure of the Big Five personality domains based on nine widely used personality inventories, all developed under different theoretical and empirical consideration (Study 1). Moreover, the present research is the first effort to the author's knowledge to explore the lower-order structure of each of the Big Five personality domains, using scales drawn from several validated personality inventories. Furthermore, this research included the most personality inventories ever to investigate the lower-order structure of the Big Five, and thus, is one of the most comprehensive studies of the Big Five domain.

Factor analyses of the 162 scale scores drawn from the nine personality inventories resulted in twenty-nine lower-order facets underlying the Big Five. In addition, the Hierarchical Personality Assessment Questionnaire (HPAQ) was developed and validated to explicitly measure the twenty-nine facets of the Big Five (Study 2). Also, this thesis sought to investigate the differential criterion-related validity of the twenty-nine facets in predicting job performance criteria (task performance, CWBs, and OCBs) as well as the incremental validity of those facets above and beyond the Big Five (Study 3). Thus, the present research sought to identify an adequate and replicable taxonomy of lower-order facets of the Big Five personality domains, and test the lower-order structure for construct and criterion-related validity.

Unlike the Big Five themselves, there is no theoretical or empirical consensus in the personality research domain regarding an optimal lower-order facet structure of the Big Five (Costa & McCrae, 1998; DeYoung et al., 2007; Saucier & Ostendorf, 1999). In Chapter One, the need for an adequate taxonomy of lower-order facets of the Big Five was discussed (see Section 1.2) and study 1 empirically derived an initial taxonomy for lower-order facets of the

Big Five personality domains. More specifically, some of the specific features for a sufficiently comprehensive and replicable lower-order factor structure of the Big Five were identified. None of the nine personality inventories used in the present research had scales that fell within all of the twenty-nine facets, thus indicating that these personality inventories do not provide systematic coverage of the entire trait domain of the Big Five. Therefore, the lower-order factor structure discovered in this thesis is more comprehensive than that found in the nine personality inventories. Consequently, it is reasonable to conclude that any personality inventory that omits content of the lower-order factor structure derived in the present research is unlikely to be truly comprehensive. Furthermore, the lower-order factor structure for each of the Big Five derived in Study 1 has some similarities with pervious conceptual and lexical research (Hough & Ones, 2001; Peabody & De Raad, 2002; Perugini and Gallucci, 1997; Roberts et al., 2004; Roberts et al., 2005; Saucier & Ostendrof, 1999). Future studies seeking to develop a lower-order taxonomy may find the taxonomy discovered in Study 1 to be a useful starting point of what such a structure might be. Thus, Study 2 moved in this specific direction through a process of empirical scale construction, developed and validated a new Big Five instrument, the Hierarchical Personality Assessment Questionnaire (HPAQ), to measure the twenty-nine facets derived in Study 1.

The HPAQ explicitly measures the Big Five domains at the higher level and the twenty-nine facets at the lower level. It is the only personality instrument that assesses all twenty-nine facets derived in Study 1, and thus is a major contribution of this thesis. Overall, Study 2 revealed that the HPAQ is a useful (i.e. both valid and reliable) tool for assessing the broad Big Five domains at the higher level and the twenty-nine lower-order facets at the lower level. The HPAQ scales demonstrated adequate internal reliability in the Eugene-Springfield Community Sample and English-speaking

Caribbean university development and validation samples. In terms of construct validity, analyses conducted in the university validation sample data (Study 2) provided evidence of structural or factorial validity for the HPAQ instrument, and adequate internal convergent and discriminant validity for the HPAQ Big Five domain scales and the twenty-nine HPAQ facet scales. This was integral to examining the criterion-related validity of the twenty-nine facets in predicting criteria as well as allowing the robustness of lower-order structure of the Big Five derived in the research conducted here to be assessed in other samples.

Both Studies 1 and 2 have moved us closer towards the development of an acceptable lower-order taxonomy of facets of the Big Five personality domains, which, as advocated by Hough and colleagues, may help to enhance our understanding of the associations between personality variables and various criteria of interest to industrial-work-organisational psychologist as advocated by Hough and others (Hough & Furnham, 2003; Hough & Ones, 2001; Hough & Oswald, 2000). Furthermore, these two studies provide new knowledge regarding the lower-order structure of the Big Five that could have important implications for understanding the relationships between the Big Five and a wide variety of criteria.

Personality research has been dominated by a focus on higher order traits such as the broad Big Five personality factors for a number of years; however, lower-order facet structure of the Big Five derived in the present research is important for future work-related research. This is because narrower traits are often better predictors of behavioural outcomes than broad personality traits (e.g. Ashton 1998; Paunonen & Ashton, 2001a), and researchers have found that the use of narrow personality measures increased criterion-related validity above that achieved by the broad Big Five personality factors (e.g. Ashton 1998; Paunonen & Ashton, 2001a). Furthermore, a sufficient working taxonomy of lower-order facets

might reveal important differences in the way that specific facets may possibly relate differently to criteria (e.g. Hough & Furnham, 2003). Therefore, future research focusing on building criterion-related validities of the twenty-nine facets derived in Study 1 in relation to theoretically-relevant criteria to applied settings is warranted. Study 3 represented a critical step in this direction.

In particular, Study 3 investigated the criterion-related validity of the 29 facets (based on HPAQ assessed in Study 2) in relation to predicting job performance criteria (task performance, OCBs, and CWB). It also examined the incremental validity of narrow facets in predicting job performance criteria above and beyond the broad Big Five factors. In so doing, research conducted here responded to the call for studies investigating the relationships between facets of the Extraversion, Agreeableness, Emotional Stability and Openness to Experience domains and wide array of job performance criteria as the majority of studies to date investigating narrow personality traits –job performance criteria links focused on narrow facets of Conscientiousness (Dudley et al., 2006). Bergner, Neubauer, and Kreuzthaler (2010) purported that the validity of narrow traits in predicting job performance has not been adequately addressed.

In general, Study 3 found that the twenty-nine facets demonstrated differential relationships with the six job performance criteria in both magnitude and direction. Thus, it affirmed that the lower-order facets derived in Study 1 are sufficiently heterogeneous and do indeed possess non-random specific variance that cannot be explained by their higher order factors, and thus, corroborates the arguments and empirical evidence that facet scores are unique and not entirely measures of the Big Five personality factors (for example, McCrae & Costa, 1995). In most cases, for each outcome variable, only a few facets of each of the Big Five personality domains were shown to be significant predictors. This suggests the

likelihood of predictive losses among higher order factors or traits in explaining various criteria. The results of Study 3 also revealed that the Big Five personality factors are likely to obscure meaningful relationships between their lower-order facets and criteria. For example, although the broad Extraversion domain was a non-significant predictor of CWBI, the Extraversion facet of Affiliation negatively predicted CWBI, whereas the Extraversion facet of Expressiveness positively predicted CWBI. When aggregating facets into factors such information is lost. Additionally, Study 3 found that both HPAQ facet scales and the broad NEO Big Five domain scales demonstrated incremental validity, indicating that narrow facet scales and the broad Big Five factors have valid specific variance associated with the various job performance criteria. Thus, factor level variance (i.e. variance shared among the constituent facets of a particular factor) and variance specific to facets are important for predicting the various job performance criteria. Hence, the current study does affirm the usefulness of both the broad Big Five traits and narrow personality traits for predicting job performance criteria. It seems, therefore, that to fully maximise the level of behavioural prediction, it may be best to use personality measures that capture broad and narrow traits.

In summary, this thesis provides new knowledge about the lower-order structure of the Big Five personality factors. Moreover, this research constitutes the beginning of a comprehensive taxonomy of lower-order facets of the Big Five that is critical for advancing personality research and theory development. Furthermore, it provides information about and insights into the shared lower-order factor structure of nine widely used personality inventories that should inspire future researchers, theorists, and practitioners in search of overcoming existing challenges and pursuing expectant opportunities in this area. In addition, the lower-order taxonomy of facets of the Big Five derived in the

present research can provide a common yardstick against which to compare different personality inventories and their correlates at the facet –level.

A major contribution of this research is a new Big Five instrument, the HPAQ, which was developed and validated to measure twenty-nine lower-order facets of the Big Five derived in the present research. Because of its hierarchical structure, the HPAQ will be able to facilitate future research that seeks explore levels of analysis in personality research. Although more construct validity and criterion-related validity evidence is need for the HPAQ, results of the present research have demonstrated that the HPAQ facet scales have utility for theoretical and applied contexts. More specifically, the research conducted here has provided evidence that the HPAQ has utility for use in organisational contexts.

The present research through demonstrating criterion-related and incremental validity for the HPAQ facet scales have added to the limited but ever increasing research efforts suggesting that lower-level personality traits are important for explaining theoretically-relevant work-related criteria (for example, Ashton, 1998). The findings of this research affirmed that the twenty-nine facets that make up the Big Five personality factors have non-random trait-specific variance that is important for predicting and understanding behaviour. Furthermore, narrow facets substantially increase criterion-related validities above that achieved by the Big Five personality factors. Thus, the findings of this thesis suggest that organisational behaviour researchers and theorists can achieve significant increments in work behaviour prediction as well as potentially gain significant theoretical advancements regarding the relationships between personality variables and work-related behaviours by using measures of narrow personality traits.

6.1 Practical Implications

From a practical point of view, the findings of the research conducted here suggest that employers may achieve higher utility from developing personnel selection systems that include only those specific facet-level personality traits and broad Big Five personality factors that yield good criterion-related validities in relation to the work-related criteria of interest. Organisations will receive greater financial returns from a selection test with greater predictive validity than a less valid test (Arvey & Faley, 1992). The results of Study 3 demonstrated that some HPAQ facet scales, despite their brevity and very specific content, were as strong or stronger predictors of job performance criteria as were any of the broad Big Five factors.Thus, the present research indicate that employers can achieve high fidelity (prediction accuracy) when using narrow facet-level measures of personality to predict job performance criteria. Thus, in a selection context, it appears that organisations can maximise financial returns by focusing on criterion-relevant facet – level personality traits when the goal is to optimally predict job performance criteria. It is hoped that the HPAQ, the new Big Five personality instrument developed in this thesis, would prove useful in personnel selection contexts. The present research has provided some evidence to suggest that the use of the HPAQ in organisations will likely improve personnel decision making. As more knowledge concerning the differential criterion-related validity of the 29 HPAQ facet scales in relation to predicting important work-related outcomes is forthcoming, practitioners may develop personnel selection systems that include those HPAQ facet scales that are relevant for the type of job for which they are selecting.

Additionally, practitioners may also minimise scale length by only including facets that add incremental validity in a particular personnel selection context. This is of benefit to practitioners especially in selection situations where the testing time is limited.

Therefore, practitioners, using the HPAQ facet scales, may want to develop profile configurations at the facet-level or weighted combinations of facet scales that can be used to select or screen individuals in a particular personnel selection context. The HPAQ is well suited for such applications as it is arguably the most comprehensive measure of the lower-order structure of the Big Five to date. As indicated previously, it is the only personality instrument that measures all twenty-nine facets derived in the present research. However, each such application of the HPAQ facet scales would be akin to the creation of a new test, which must be validated. Moreover, this will be costly and require extensive investment of practitioner time.

Indeed, the results of the present research (Study 3) do suggest that the relative value of narrow traits or broad Big Five personality factors for personnel selection will require the judicious consideration of the likely theoretical or conceptual relations between the particular personality variable or variables (regardless of broad or narrow) and the particular job performance criteria (see O'Neill, Goffin, & Tett, 2009; Rothstein & Goffin, 2006). Furthermore, a sound theoretical or conceptual case for expecting a particular personality variable to be linked to a particular performance criterion variable would be more important than how broad or narrow the personality variable or criterion is (Rothstein & Goffin, 2006). In addition, it may be necessary for personnel selection practitioners to perform personality based job analysis within a specific occupational category to properly select relevant personality variables, and thus a personality measure to use for that particular selection context. However, there are occasions when the use of broad Big Five personality measures such as the NEO-FFI-3 will be more preferable to multifaceted personality measures for predicting behaviour: (a) in situations where the amount of time available for personality assessment is limited, (b) when there is no

rationale for identifying the few narrow facets that best predict the criterion, or (c) when there are multiple criteria to be predicted that have many different personality predictors (Paunonen & Ashton, 2001a).

Furthermore, given the greater explanatory power of narrow facets relative to the broad Big Five, their inclusion in an organisation's selection plan is more defensible for legal purposes (Hastings & O'Neill, 2009). Additionally, because of the increased explanatory power and quality information that can be gained from using narrow traits, practitioners may also find narrow traits especially useful for designing training and employee development and coaching programmes. The fact that narrow traits have clearer behavioural connotations render them especially suitable for developmental purposes where the goal is the identification of person variables or individual characteristics in employees, which predispose them to engage in positive or negative work-related behaviour, which may need training and development interventions. For example, specific training and development and coaching programmes can be best designed to match specific, narrow traits in employees that are relevant for positive workplace behaviours such as task performance and extra-role behaviours and also reduce the likelihood of deviant and unwarranted work-related behaviour.

6.2 Limitations and Directions for Future Research

The present research, as with all research, has several limitations. First, as pointed out in Chapter 3 (see Section 3.4), despite including the most personality inventories ever in one study to examine the optimal number of lower-order facets that make up each of the Big Five personality factors, the research conducted here did not assess all personality inventories in existence. Therefore, the starting set of lower-level scales contained in the

nine personality inventories cannot claim to be fully exhaustive. Consequently, the research cannot claim to examine the lower-order structure of personality because there is likely to be an underrepresentation or non representation of constructs. Further taxonometric research including other personality scales, such as scales more suitable for clinical setting (e.g., Minnesota Multiphasic Personality Inventory—2, MMPI-2; Butcher et al., 1989), those newly developed (e.g., Global Personality Inventory, GPI; Schmit et al., 2000), or those in existence, not included in the present research (e.g., CPI; Gough, 1987) could further enhance our understanding of the lower-order structure of the Big Five domains. Second, other constructs that are independent of the twenty-nine facets are likely to be underrepresented here because of our focus on using the Big Five Model as an organising taxonomy. Nevertheless, the Big Five model is an appropriate organising taxonomy for lower-level personality traits because it captures the commonalities among most of the existing systems of personality traits, thereby, providing an integrative descriptive model for research (John & Srivastava, 1999).

Third, factor structure results in Study 1 and for the HPAQ (Study 2) were based solely on self-reports, and thus is another potential limitation of the present research. Participant's ability to distort scores in a social desirability direction, in some cases, may have an influence on the factor structure and convergent and discriminant validity results. Socially desirable responding (SDR) has been hypothesised by some researchers to have a contaminating effect on personality assessment measures, in relation to construct validity of these measures (see Ganster, Hennessey, Luthans, 1983; Ones, Viswesvaran, & Reiss, 1996). However, in the present research, with regard to factor structure, social desirability was unlikely to be an issue as similar factor structures emerged across samples and in two cultures (ESCS and

English-speaking Caribbean samples). Moreover, studies that examined the influence of SDR on construct validity of Five Factor Model via investigations of factor structure (factorial validity) have found that the factor structure of the Five Factor Model was unaltered in samples where SDR was detected (e.g. Marshall, Fruyt, Rolland, & Bagby, 2005; Smith & Ellington, 2002). In addition, the meta-analysis of Ones and Viswesvaran (1998) presented findings to suggest that SDR does not obliterate the convergent and discriminant validity of the Big Five dimensions of personality. Nonetheless, future studies should attempt to recover the factor structure of the HPAQ in other samples using observer personality ratings or test data as a means to further demonstrate its factorial validity. Additionally, consensual validation studies that examine agreement (convergence coefficients) for the HPAQ factor structure across different observer ratings, and observer ratings and self-report can provide strong evidence of factorial validity. Notwithstanding that similar factor structures of the HPAQ emerged in different samples and across two cultures in the present research, future research attempting to identified the factor structure of the HPAQ in different samples, and across different cultures and language would provide further evidence for robustness of the factor structure of the HPAQ.

Fourth, although analyses in Study 2 provided evidence of adequate internal convergent and discriminant validity for the individual HPAQ facet scales, it still remains to be shown that the HPAQ facet scales are actually measuring the intended constructs. Therefore, external evidence of validity of convergent and discriminant validity is needed. Future studies should examine the convergent validity of the individual HPAQ facet scales with other alternative measures of similar constructs obtained by same or different methods. Additionally, studies should examine the discriminant validity of the individual HPAQ facet scales with

measures of different constructs obtained by same or different methods. Moreover, future studies examining the discriminant validity of the individual HPAQ facet scales could do so by contrasting the correlates of the different facets within the same domain.

Fifth, the procedure or approach used in this research to examine the criterion-related validity of HPAQ was concurrent validity rather than predictive validity. Concurrent validity of a test is determined when scores on a criterion measure are obtained at approximately the same time as test scores (Aiken & Groth-Marnat, 2006). Therefore, the concurrent validity study employs a cross-sectional research design, which cannot provide a causal test of relationships. Whereas, predictive validity of a test is determined when scores on a criterion measure are obtained some time after the test scores are obtained (Aiken & Groth-Marnat, 2006). Concurrent validation is the most appropriate type of criterion-related validity when the test is used for diagnosis of an individual's current status on the relevant criterion, rather than prediction of future performance (Anastasi & Urbina, 1997). On the other hand, knowledge of the predictive validity of tests is particularly relevant to tests used in the selection and classification of personnel such as hiring job applicants (Anastasi & Urbina, 1997). However, Anastasi and Urbina (1997) noted that extending validation procedures over the time necessary for predictive validation or obtaining an appropriate pre-selection sample for testing purposes it is often not practical. Thus, in a number of cases, concurrent validation is used only as an alternative to predictive validation (Anastasi & Urbina, 1997). Nonetheless, predictive validation studies obtaining scores on job-related criterion measures such as job performance and on-the-job employee behaviours months or even years after the HPAQ is administered are needed to further determine the utility of the

HPAQ for use in organisational contexts as well as contribute to existing theory and knowledge.

Further, evidence provided in the current research that the HPAQ scales possess differential criterion-related validity in predicting six job performance criteria should be considered somewhat preliminary and tentative. In test development, it is prudent practice to confirm test validity in new and independent samples (Gregory, 2011). Future research should demonstrate differential criterion-related validity of the HPAQ scales through cross-validation studies in new samples predicting the same job performance criteria used in this research. In addition, future research should explore the criterion-related and incremental validity of the HPAQ facet scales in relation to other theoretically-relevant work-related criteria such as leadership ability, work stress, absenteeism, management performance, and employee engagement. This would also ascertain the full utility of the HPAQ instrument for use in organisational settings.

Although the present research explored and revealed, to a large extent, the utility and value of this new Big Five instrument for use in organisational contexts, more still needs to be done to better establish and understand its full practical value in other applied contexts. Future criterion-related validity research, both concurrent and predictive validation studies, should explore the utility of the HPAQ scales for use in educational and clinical/counselling contexts.

In addition, the development of frameworks linking specific facets to specific job performance criteria, could increase validities and enhance understanding (Barrick et al., 2001). However, such frameworks have been slow to advance due to the lack of a taxonomy of lower-order facets and criterion measures. The present research have derived an adequate taxonomy of lower-order facets of the Big Five, and developed and validated a new Big Five

instrument, the HPAQ, to measure this taxonomy of lower-order facets with the hope of stimulating future research exploring job performance and on-the-job employee behaviour models based on the facet-level of personality. Nevertheless, there is still the need for researchers and/or practitioners to develop an adequate taxonomy of criterion measures. However, there are several taxonomies of criterion measures that could provide a useful starting point (see Barrick et al., 2001).

In short, this thesis calls researchers to continue to engage in taxonometric research to finalise a lower-order taxonomy of the Big Five, which is critical for the future undertaking of work-related and other applied research. The current research represents a first, but critical, step in this direction. Additionally, the thesis sets a strong foundation on which future research could further examine the construct validity of the HPAQ in different samples, across other cultures and languages, and observer rating sources as well as amass criterion-related validity evidence to determine its full utility for use in organisational/occupational, educational, and clinical/counselling contexts.

6.3 Final Conclusion

To conclude, this thesis provides initial lower-order taxonomy of the Big Five personality domains that can advance personality theory and research, and personnel selection practice. Specifically, the present research moves us closer towards an acceptable taxonomy of lower-order facets of the Big Five, which may be important to the understanding of the relationships between personality variables and various criteria in industrial-work-organisational psychology. The present research through a process of empirical scale construction created the new Big Five personality IPIP public domain instrument with good psychometric properties. This new Big Five instrument is the only existing instrument that

measures the lower-order structure of the Big Five derived in the present research. Moreover, this new instrument could be made available to researchers, namely those seeking to explore various levels of analysis in applied personality research.

The results of analyses conducted in the present research based on HPAQ facet scales provided some evidence that the lower-order facets contain reliable specific variance and that global factors may obscure important meaningful relations between narrow traits and criterion constructs. Some of the HPAQ facet scales were as strong or stronger predictors of job performance criteria as were any of the broad Big Five personality factors. The research conducted here has potential implications for those personality theorists and researchers who are studying the Bandwidth-fidelity debate and the hierarchy of personality. The HPAQ facet scales were able to significantly enhance criterion-related validities above that already achieved by the global Big Five personality factors in predicting job performance criteria and vice versa. Thus, these findings suggest that both narrow-bandwidth personality measures and broad Big Five personality measures may have utility for personal selection contexts. In addition, the present research provided some evidence that the new Big Five personality instrument could prove useful in the practical arena of personnel decision making, especially for those responsible for selecting and assessing prospective and current job incumbents.

References

Aiken, L., & Groth-Marnat, G. (2006). *Psychological testing and assessment* (12th ed.).New York: Allyn & Bacon.

Allport, G.W., & Odbert, H. S. (1936).Trait-names: A psycholexical study.*Psychological Monographs, 47* (Whole No. 211).

Anastasi, A. (1988). *Psychological testing* (6th ed.). NY: Macmillan.

Anastasi, A., & Urbina, S. (1997). *Psychological testing* (7th ed.). Upper Saddle River, NJ: Prentice-Hall, Inc.

Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin, 103*, 411-423. DOI:10.1037/0033-2909.103.3.411

Ansell, E. B., & Pincus, A. L. (2004). Interpersonal perceptions of the five-factor model of personality: An examination using the structural summary method for circumplex data. Multivariate Behavioral Research, *39*, 167-201. DOI:10.1207/s15327906mbr3902_3

Arrindell, W. A., & Van der Ende, J. (1985). An empirical test of the utility of the observations-to-variables ratio in factor and components analysis. *Applied Psychological Measurement, 9,* 165-178. DOI:10.1177/014662168500900205

Arvey, R. D., & Faley, R. H. (1992). *Fairness in selecting employees*. Reading, MA: Addison Wesley.

Asendorpf, J. B., & Wilpers, S. (1998). Personality effects on social relationships. *Journal of Personality and Social Psychology, 74,* 1531-1544. DOI:10.1037/0022-3514.74.6.1531.

Ashton, M. C. (1998). Personality and job performance: The importance of narrow traits. *Journal of Organizational Behavior, 19,* 289-303. DOI:10.1002/(SICI)1099-1379(199805)19:3<289::AID-JOB841>3.0.CO;2-C

Ashton, S. G., & Goldberg, L. R. (1973). In response to Jackson's challenge: The comparative validity of personality scales constructed by the external (empirical) strategy and scales developed intuitively by experts, novices, and laymen. *Journal of Research in Personality, 7*, 1-20. DOI:10.1016/0092-6566(73)90028-7

Ashton, M. C., Jackson, D. N., Helmes, E., & Paunonen, S. V. (1998). Joint factor analysis of the personality research form and the Jackson personality inventory: Comparisons with the big five. *Journal of Research in Personality, 32*, 243–250.DOI:10.1006/jrpe.1998.2214

Ashton, M. C., Jackson, D. N., Paunonen, S. V., Helmes, E., & Rothstein, M. G. (1995). The criterion validity of broad factor scales versus specific trait scales. *Journal of Research in Personality, 29*,432–442. DOI: 10.1006/jrpe.1995.1025

Ashton, M. C., & Lee, K. (2001). A theoretical basis for the major dimensions of personality. *European Journal of Personality, 15,* 327-353. DOI: 10.1002/per.417

Ashton, M. C., & Lee, K. (2005). Honesty-humility, the big five, and the five-factor model. *Journal of Personality, 73,* 1321-1353. DOI: 10.1111/j.1467-6494.2005.00351.x

Ashton, M. C., Lee, K., & Goldberg, L. R. (2004). A hierarchical analysis of 1,710 English personality-descriptive adjectives. *Journal of Personality and Social Psychology, 87*, 707–721. DOI:10.1037/0022-3514.87.5.707

Ashton, M. C., Lee, K., & Paunonen, S. V. (2002). What is the central feature of extraversion? Social attention versus reward sensitivity. *Journal of Personality and Social Psychology,* 83, 245-52. DOI:10.1037/0022-3514.83.1.245

Ashton, M. C., Lee, K., Perugini, M., Szarota, P., de Vries, R. E., Di Blas, L.,...De Raad, B. (2004). A six-factor structure of personality-descriptive adjectives: Solutions from psycholexical studies in seven languages. *Journal of Personality and Social Psychology, 86*, 356–366. DOI:10.1037/0022-3514.86.2.356

Ashton, M. C., Lee, K., & Son, C. (2000). Honesty as the sixth factor of personality:Correlations with machiavellianism, primary psychopathy, and social adroitness. *European Journal of Personality, 14*, 359–368. DOI:10.1002/1099-0984(200007/08)14:4<359::AID-PER382>3.0.CO;2-Y

Avis, J. M., Kudisch, J. D., & Fortunato, V. J. (2002). Examining the incremental validity and adverse impact of cognitive ability and conscientiousness on job performance. *Journal of Business and Psychology, 17*, 87-105. DOI:10.1023/A:1016200317002

Bagozzi, R.P. (1996). Structural equation models in marketing research: Basic Principles. In R. P. Bagozzi (Ed.)*, Principles of marketing research*. Cambridge, MA : Blackwell Publishers.

Bagozzi, R. P., & Heatherton, T. F. (1994). A general approach to representing multifaceted personality constructs: Application to state self-esteem. *Structural Equation Modeling, 1,* 35–67. DOI:10.1080/10705519409539961

Bagozzi, R. P., & Phillips, L. W. (1982). Representing and testing organizational theories: A holistic construal. *Administrative Science Quarterly, 27*(3), 459-489. Retrieved from http://web.ebscohost.com

Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing Science, 16*, 74-94. DOI:10.1177/009207038801600107

Bagozzi, R. P., Yi, Y., & Phillips, L. W. (1991). Assessing construct validity in organizational research. *Administrative Science Quarterly, 36*(3), 421-458. Retrieved from http://web.ebscohost.com

Bandalos, D. L. & Finney, S. J. (2001). Item parcelling issues in structural equation modeling. In G. A. Marcoulides, & R. E Schumacker (Eds.), *Advance structural equation modeling: New developments and techniques* (pp. 269-296). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Barrett, P. T., & Kline, P. (1981). The observation to variable ratio in factor analysis. *Personality Study and Group Behavior, 1*(1), 23-33. Retrieved from http://psycnet.apa.org.ezproxy.nottingham.ac.uk

Barrick, M. R., & Mount, M. K. (1991). The big five personality dimensions and job performance: A meta-analysis. *Personnel Psychology, 44*(1), 1-26. DOI:10.1111/j.1744-6570.1991.tb00688.x

Barrick, M. R., & Mount, M. K. (1994). Do specific components of conscientiousness predict better than overall construct? In R. C. Page (Chair), *Personality and job performance: Big five versus specific traits?* Symposium, annual meeting of the Society for Industrial/Organization Psychology, Nashville, TN.

Barrick, M. R., & Mount, M.K. (2005). Yes, personality matters: Moving on to more important matters. *Human Performance, 18*, 359-372 DOI:10.1207/s15327043hup1804_3

Barrick, M. R., Mount, M. K., & Judge, T. A. (2001). Personality and performance at the beginning of the new millennium: What do we know and where do we go next? *International Journal of Selection and Assessment,* 9, 9-30. DOI:10.1111/1468-2389.00160

Bartram, D. (2005). The great eight competencies: A criterion-centric approach to validation. *Journal of Applied Psychology*, *90*, 1185. DOI: 10.1037/0021-9010.90.6.1185

Bateman, T. S., & Organ, D. W. (1983). Job satisfaction and the good soldier: The relationship between affect and employee "citizenship." *Academy of Management Journal, 26*, 587-595. DOI:10.2307/255908.

Beauregard, A. T. (2012). Perfectionism, self-efficacy and OCB: The moderating role of gender. *Personnel Review, 41*, 590-608. DOI: 10.1108/00483481211249120.

Benet, V., & Waller, N. G. (1995). The 'big seven' model of personality description: Evidence for its cross-cultural generality in a Spanish sample. *Journal of Personality and Social Psychology, 69*, 701–718. DOI:10.1037/0022-3514.69.4.701

Benet-Martínez, V. (1997). Theoretical perspectives on the five-factor model of personality: Agreement about five dimensions, disagreement about the concept of trait. *Journal of Personality Assessment, 69*, 658-664. DOI:10.1207/s15327752jpa6903_19

Benet-Martínez, V., & John, O. P. (2000). Toward the development of quasi-indigenous personality constructs: Measuring *los cinco grandes* in Spain with indigenous Castilian markers. *American Behavioural Scientist, 44*, 141–157. DOI:10.1177/0002764200044001011

Bennett, R. J., & Robinson, S. L. (2000). Development of a measure of workplace deviance. *Journal of Applied Psychology, 85,* 349–360. DOI:10.1037/0021-9010.85.3.349

Bentler, P. M. (2006). *EQS 6 structural equations program manual*. Encino, CA: Multivariate Software.

Bentler, P.M., & Bonett, D.G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin 88*, 588-606. DOI:10.1037/0033-2909.88.3.588

Bentler, P. M., & Chou, C. P. (1987). Practical issues in structural equation modeling. *Sociological Methods and Research*, *16*, 78–117. DOI:10.1177/0049124187016001004

Bergner, S., Neubauer, A. C., & Kreuzthaler, A. (2010). Broad and narrow personality traits for predicting managerial success. *European Journal of Work and Organizational Psychology*, *19*, 177-199. DOI: 10.1080/13594320902819728

Berry, C. M., Ones, D. S., & Sackett, P. R. (2007). Interpersonal deviance, organizational deviance, and their common correlates: A review and meta-analysis. *Journal of Applied Psychology*, *92*, 410-424. DOI:10.1037/0021-9010.92.2.410

Bies, R. J., & Tripp, T. M. (2005). The study of revenge in the workplace: Conceptual, ideological, and empirical issues. In S. Fox & P. E. Spector (Eds.) *Counterproductive work behaviour. Investigations of actors and targets* (pp. 65-81). Washington: APA.

Biesanz, J. C. & West, S. G. (2004). Towards understanding assessments of the big five: Multitrait-multimethod analyses of convergent and discriminant validity across measurement occasion and type of observer. *Journal of Personality, 72,* 845-876. DOI:10.1111/j.0022-3506.2004.00282.x

Block, J. (1995). A contrarian view of the five-factor approach to personality description. *Psychological Bulletin, 117*, 187-215. DOI:10.1037/0033-2909.117.2.187

Bogg, T., & Roberts, B. W. (2004). Conscientiousness and health-related behaviors: A meta-analysis of the leading behavioral contributors to mortality. *Psychological Bulletin, 130,* 887–919. DOI:10.1037/0033-2909.130.6.887

Bogg, T., Voss, M. W., Wood, D., & Roberts, B. W. (2008). A hierarchical investigation of personality and behavior: Examining neo-socioanalytic models of health-related outcomes. *Journal of Research in Personality, 42*, 183–207. DOI:10.1016/j.jrp.2007.05.003

Bollen, K. A. (1989). *Structural equations with latent variables.* New York: Wiley.

Bono, J. E., & Judge, T. A. (2004). Personality and transformational and transactional leadership: A meta-analysis. *Journal of Applied Psychology, 89*, 901-910. DOI:10.1037/0021-9010.89.5.901

Boomsma, A. (1982). The robustness of LISREL against small sample sizes in factor analysis models. In K. G. Joreskog & H. Wold (Eds), *Systems under indirect observation: Causality, structure, prediction*, *1*, (pp. 148-173). Amsterdam: North Holland.

Borgatta, E. F. (1964). The structure of personality characteristics. Behavioral Science, 9, 8-17. DOI:10.1002/bs.3830090103

Borman, W. C, Hanson, M., & Hedge, J. (1997). Personnel selection. *Annual Review of Psychology, 48,* 299-337. DOI:10.1146/annurev.psych.48.1.

Borman, W. C. & Motowidlo S. J. (1993). Expanding the criterion domain to include elements of contextual performance. In N. Schmitt & W. C. Borman (Eds.), *Personnel selection in organizations* (pp. 71-98). San Francisco: Jossey-Bass.

Borman, W. C. & Motowidlo, S. J. (1997). Task performance and contextual performance: The meaning for personnel selection research. *Human Performance*, *10,* 99-109. DOI:10.1207/s15327043hup1002_3

Borman, W. C., Penner, L. A., Allen, T. D. & Motowidlo, S. J. (2001). Personality predictors of citizenship performance. *International Journal of Selection and Assessment, 9*, 52–69. DOI:10.1111/1468-2389.00163

Bouchard, G. (2003). Cognitive appraisals, neuroticism, and openness as correlates of coping strategies: An integrative model of adaptation to marital difficulties. *Canadian Journal of Behavioural Science, 35*, 1–12. DOI:10.1037/h0087181

Boudreau, J. W., Boswell, W. R., Judge, T. A., & Bretz, R. D. (2001). Personality and cognitive ability as predictors of job search among employed managers. *Personnel Psychology, 54*, 25–50. DOI:10.1111/j.1744-6570.2001.tb00084.x

Brief, A. P. & Motowidlo, S. J. (1986). Prosocial organizational behaviours. *Academy of Management Review*, *11*, 710-725. DOI:10.5465/AMR.1986.4283909.

Briggs, S. R. (1989). The optimal level of measurement for personality constructs. In D. M. Buss and N. Cantor (Eds.), *Personality psychology: Recent trends and emerging directions* (pp. 246-260). New York: Springer-Verlag.

Briggs, S. R. (1992). Assessing the five-factor model of personality description. *Journal of Personality, 60,* 253-293. DOI:10.1111/j.1467-6494.1992.tb00974.x

Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A Bollen & J. S. Long (Eds.), *Testing structural equation models (pp. 136-162).* Newbury Park, CA: Sage.

Burger, J. M. (2008). *Personality (7th ed.)*. Belmont, CA: Thomson/Wadsworth.

Buss, D. M. (1991). Evolutionary personality psychology. *Annual Review of Psychology, 42,* 459-491. DOI:10.1146/annurev.ps.42.020191.002331

Buss, D. M. (1996). Social adaptation and five major factors of personality. In J. S. Wiggins (Ed.), *The five-factor model of personality: Theoretical perspectives* (pp. 180-207). New York: Guilford.

Butcher, J. N., Dahlstrom, W. G., Graham, J. R., Tellegen, A., & Kaemmer, B. (1989). *MMPI-2: Manual for administration and scoring.* Minneapolis: University of Minnesota Press.

Brown, T. (2006). *Confirmatory factor analysis for applied research*. New York: The Guilford Press.

Bryant, F. B., King, S. P., & Smart, C. M. (2007). Multivariate statistical strategies for construct validation in positive psychology. In A. D. Ong & M. H. M. VanDulmen (Eds.), *Oxford handbook of methods in positive psychology* (pp. 61-82). US: Oxford University Press.

Byrne, B. M. (2001). *Structural equation modeling with AMOS: Basic concepts, applications, and programming*. Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Byrne, B. M. (2006). *Structural equation modeling with EQS. Basic concepts, applications and programming* (2nd ed.). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Campbell, J. P. (1976). Pyschometric theory. In M. D. Dunnette (Ed.), *Handbook of industrial and organizational psychology* (pp. 185-222). Chicago: Rand McNally.

Campbell, J. P. (1990). Modeling the performance prediction problem in industrial and Organizational psychology. In M. D. Dunnette & L. M. Hough (Eds.), *Handbook of industrial and organizational psychology* (Vol. 1, pp. 687-732). Palo Alto, CA: Consulting Psychologists Press.

Campbell, J. P., McHenry, J. J., & Wise, L. L. (1990). Modeling job performance in a population of jobs. Special issue: Project A: the US army selection and classification project. *Personnel Psychology, 43*, 313–333. DOI:10.1111/j.1744-6570.1990.tb01561.x

Caprara, G. V., & Perugini, M. (1994). Personality described by adjectives: The generalizability of the big five to the Italian lexical context. *European Journal of Personality, 8,* 357–369. DOI:10.1002/per.241008502

Carrillo, M., Rojo, N., Sánchez-Bernardos, M. L., & Avia, M. D. (2001). Openness to experience and depression. *European Journal of Psychological Assessment, 17,* 130-136. DOI:10.1027//1015-5759.17.2.130.

Carroll, J. B. (2002). The five-factor personality model: How complete and satisfactory is it? In H. Braun, D. N. Jackson & D. E. Wiley (Eds.), *The role of constructs in psychological and educational measurement (*pp. 97-126). Mahwah, NJ: Erlbaum.

Carver, C. S. (1989). How should multifaceted personality constructs be tested? Issues illustrated by self-monitoring, attributional style, and hardiness. *Journal of Personality and Social Psychology, 56*, 577-585. DOI:10.1037/0022-3514.56.4.577

Cascio, W. E. (1991). *Costing human resources: The financial impact of behavior in organizations* (3rd ed.). Boston: Kent.

Caspi, A., Roberts, B. W., & Shiner, R. (2005). Personality development: Stability and change. *Annual Review of Psychology, 56,* 453–484. DOI:10.1146/annurev.psych.55.090902.141913

Cattell, R. B. (1945). The description of personality: Principles and findings in factor analysis. *American Journal of Psychology, 58*(1), 69-90. Retrieved from http://www.jstor.org

Cattell, R. B. (1947). Confirmation and clarification of primary personality factors. Psychometrika, 12, 197-220. DOI:10.1007/BF02289253

Cattell, R. B. (1948). Primary personality factors in the realm of objective tests. Journal of Personality, 16, 459-487. DOI:10.1111/j.1467-6494.1948.tb02301.x

Cattell, R. B. (1973). *Personality and mood by questionnaire.* San Francisco: Jossey-Bass.

Cattell, R. B. (1978). *The scientific use of factor analysis.* New York: Plenum.

Cattell, R. B., Eber, H. W., & Delhees, K. H. (1968). A large sample cross validation of the personality trait structure of the 16PF with some clinical implications. *Multivariate Behavioral Research*, *Spec Iss*, 107-131. Retrieved from http://web.ebscohost.com

Cattell, R. B., Eber, H. W., & Tatsuoka, M. M. (1970). *Handbook for the Sixteen Personality Factor Questionnaire.* Champaign, IL: Institute for Personality Ability Testing.

Cattell, R. B. & Stice, G. F. (1957). *The Sixteen Personality Factor Questionnaire* (3rd ed). Champaign, IL: Institute for Personality and Ability Testing.

Chamorro-Premuzic, T., & Furnham, A. (2008). Personality, intelligence and approaches to learning as predictors of academic performance. *Personality and Individual Differences, 44*, 1596-1603. DOI:10.1016/j.paid.2008.01.003

Chernyshenko, O. S., Stark, S., & Chan, K. (2001*).* Investigating the hierarchical factor structure of the fifth edition of the 16PF: An application of the Schmid-Leiman orthogonalization procedure. *Educational and Psychological Measurement, 61*, 290-302. DOI:10.1177/00131640121971248

Cheung, F. M., Cheung, S. F., Leung, K., Ward, C., & Leong, F (2003). The English version of the Chinese personality assessment inventory. *Journal of Cross-Cultural Psychology, 34*, 433-452. DOI:10.1177/0022022103034004004

Cheung, F. M., Leung, K., Zhang, J. X., Sun, H. F., Gan, Y. Q., Song, W. Z., & Xie, D. (2001). Indigenous Chinese personality constructs: Is the five factor model complete? *Journal of Cross-Cultural Psychology, 32*, 407–433. DOI:10.1177/0022022101032004003

Chiaburu, D. S., Oh, I. S., Berry, C. M., Li, N., & Gardner, R. G. (2011). The five-factor model of personality traits and organizational citizenship behaviors: A meta-analysis. *Journal of Applied Psychology*, *96*, 1140-1166. DOI: 10.1037/a0024004

Chih-Ting, S. & Chih-Hsun Chuang (2013). Individual differences, psychological contract breach, and organizational citizenship behavior: A moderated mediation study. *Asia Pacific Journal of Management, 30*, 191-210. DOI: 10.1007/s10490-012-9294-8

Church, T. A., & Burke, P. J. (1994). Exploratory and confirmatory tests of the big five and Tellegen's three- and four-dimensional models. *Journal of Personality and Social Psychology*, *66*, 93–114. DOI:10.1037/0022-3514.66.1.93

Cloninger, C. R. (1999). *The Temperament and Character Inventory—Revised. St Louis,* MO: Center for Psychobiology of Personality, Washington University.

Cloninger, C. R., Przybeck, T. R., Svrakic, D. M, & Wetzel, R. D. (1994). *The temperament and character inventory (TCI): A guide to its development and use.* St Louis, MO: Center for Psychobiology of Personality, Washington University.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates, Publishers.

Cohen, J., Cohen, P., West, S.G., and Aiken, L.S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed.). Lawrence Earlbaum Associates, Mahwah, NJ.

Coleman, V. I., & Borman, W. C. (2000). Investigating the underlying structure of the citizenship performance domain. Human Resource Management Review, 10, 25-44. DOI:10.1016/S1053-4822(99)00037-6

Comrey, A. L., & Backer, T. E. (1970). Construct validation of the Comrey personality scale. *Multivariate Behavioural Research, 5*, 469-477. DOI:10.1207/s15327906mbr0504_5

Comrey, A. L., & Lee, H. B. (1992). *A first course in factor analysis.* Hillsdale, NJ: Erlbaum.

Conn, S., & Reike, M. L. (Eds.). (1994). *The 16PF fifth edition technical manual*. Champaign, IL: Institute for Personality and Ability Testing.

Conn S.R., & Reike, M.L. (1994). *The 16PF fifth edition technical manual*. Champaign, IL: Institute for Personality and Ability Testing.

Connelly, B. S., & Ones, D. S. (2010). An other perspective on personality: Meta-analytic integration of observers' accuracy and predictive validity. *Psychological Bulletin*, *136*, 1092-1122. DOI: 10.1037/a0021212

Connor-Smith, J. K., & Flachsbart, C. (2007). Relations between personality and coping: A meta-analysis. *Journal of Personality and Social Psychology, 93*, 1080-1107. DOI:10.1037/0022-3514.93.6.1080

Conway, J. M. (1996). Additional construct validity evidence for the task-contextual performance distinction. *Human Performance, 9,* 309-330. DOI:10.1207/s15327043hup0904_1

Cooper, D.R., & Emory, C.W. (1995). *Business research methods*. Chicago, IL: Irwin.

Cortina, J. M., Goldstein, N. B., Payne, S., Davison, H. K., & Gilliland, S. W. (2000). The incremental validity of interview scores over and above cognitive ability and conscientiousness scores. *Personnel Psychology, 53*, 325-351. Retrieved from http://web.ebscohost.com

Costa, P.T., Jr., Herbst, J. H., McCrae, R.R., & Siegler, I. C. (2000). Personality at midlife: Stability, intrinsic maturation, and response to life events. *Assessment, 7*, 365-378. DOI:10.1177/107319110000700405

Costa, P. T., Jr., & McCrae, R. R. (1988a). Personality in adulthood: A six-year longitudinal study of self-reports and spouse ratings on the NEO personality inventory. *Journal of Personality and Social Psychology, 54*, 853-863. DOI:10.1037/0022-3514.54.5.853

Costa, P.T., Jr., & McCrae, R. R. (1988b). From Catalogue to classification: Murray's needs and the five-factor model. *Journal of Personality and Social Psychology, 55*, 258-265. DOI:10.1037/0022-3514.55.2.258

Costa, P. T., Jr., & McCrae, R. R. (1992a). *Revised NEO personality inventory and five-factor inventory professional manual.* Odessa, FL: Psychological Assessment Resources.

Costa, P. T., Jr., & McCrae, R. R. (1992b). Four ways five factors are basic. *Personality and Individual Differences, 13*, 653–665. DOI:10.1016/0191-8869(92)90236-I

Costa, P. T., Jr., & McCrae, R. R. (1994). Set like plaster: Evidence for the stability of adult personality. In T. F. Heatherton & J. L Weinberger (Eds.), *Can personality change?* (pp. 21-40). Washington, DC: American Psychological Association

Costa, P. T., Jr., & McCrae, R. R. (1995a). Solid ground in the wetlands of personality: A reply to block. *Psychological Bulletin, 117*, 216-220. DOI:10.1037/0033-2909.117.2.216

Costa, P. T., Jr., & McCrae, R. R., & (1995b). Domains and facets: Hierarchical personality assessment using the revised neo personality inventory. *Journal of Personality Assessment, 64*, 21-50. DOI:10.1207/s15327752jpa6401_2

Costa, P. T., Jr., & McCrae, R. R. (1998). Six approaches to the explication of facet-level traits: Examples from conscientiousness. *Journal of Personality, 12,* 117-134. DOI:10.1002/(SICI)1099-0984(199803/04)12:2<117::AID-PER295>3.0.CO;2-C

Costa, P. T., Jr., & McCrae, R. R. (2006). Age changes in personality and their origins: Comment on Roberts, Walton, and Viechtbauer (2006). *Psychological Bulletin, 132,* 26-28. DOI:10.1037/0033-2909.132.1.26

Costa, P. T., Jr., McCrae, R. R., & Dye, D. A. (1991). Facet scales for agreeableness and conscientiousness: A revision of the NEO personality inventory. *Personality and Individual Differences, 12,* 887-898. DOI:10.1016/0191-8869(91)90177-D

Costello, A. B. & Osborne, J. W., (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Practical Assessment, Research & Evaluation*, 10, 1-9. Retrieved from http://pareonline.net

Courneya, K. S., & Hellsten, L. M. (1998). Personality correlates of exercise behavior, motives, barriers, and preferences: An application of the five-factor model. *Personality and Individual Differences*, *24*, 625-633. DOI:10.1016/S0191-8869(97)00231-6

Coyne, I., Gentile, D., Born, M., Cem, N. & Vakola, M. (2012). The relationship between productive and counterproductive work behaviour across four European Countries. *European Journal of Work and Organizational Psychology, 21*, 1-13. DOI:10.1080/1359432X.2012.673280

Cronbach, L. J. (1960). *Essentials of psychological testing*. New York: Harper & Row.

Cronbach, L. J., & Gleser, G. C. (1957). *Psychological tests and personnel decisions*. Urbana: Univer. Illinois Press, 1957.

Curran, P. J., West, S. G, & Finch, J. F. (1996). The robustness of test statistics to nonnormality and specification error in confirmatory factor analysis. *Psychological Methods, 1*, 16-29. DOI: 10.1037/1082-989X.1.1.16

Dalal, R. S. (2005). A meta-analysis of the relationship between organizational citizenship behaviour and counterproductive work behaviour. *Journal of Applied Psychology, 90*, 1241-1255. DOI: 10.1037/0021-9010.90.6.1241

David, J., Green, P., Martin, R., & Suls, J. (1997). Differential roles of neuroticism, extraversion and event desirability on mood in daily life: An integrative model of top-down and bottom-up influences. *Journal of Personality and Social Psychology, 73*, 149-159. DOI:10.1037/0022-3514.73.1.149

DeNeve, K. M., & Cooper, H. (1998). The happy personality: A meta-analysis of 137 personality traits and subjective well-being. *Psychological Bulletin, 124*, 197–229. DOI:10.1037/0033-2909.124.2.197

Depue, R.A. & Collins, P.F. (1999). Neurobiology of the structure of personality: Dopamine, facilitation of incentive motivation, and extraversion. *Behavioral & Brain Sciences, 22*(3), 491-569. Retrieved from http://journals.cambridge.org

De Raad, B. (1998). Five big, big five issues: Rationale, content, structure, status, and cross-cultural assessment. European Psychologist, 3, 113-124. DOI: 10.1037/1016-9040.3.2.113

De Raad, B. & Barelds, D. (2008). A new taxonomy of Dutch personality traits based on a comprehensive and unrestricted list of descriptors. *Journal of Personality and Social Psychology, 94*, 347-364. DOI: 10.1037/0022-3514.94.2.347

De Raad, B., Hendriks, A. A. J., & Hofstee, W. K. B. (1992). Towards a refined structure of personality traits. *European Journal of Personality, 6*, 301–319. DOI:10.1002/per.2410060405

De Raad, B., & Perugini, M. (2002). *Big five assessment*. Germany: Hogrefe & Huber Publishers.

de Winter, J. C. F., Dodou, D., & Wieringa, P. A. (2009). Exploratory factor analysis with small sample sizes. *Multivariate Behavioral Research*, *44*, 147-181. DOI: 10.1080/00273170902794206

DeYoung, C. G. (2006). Higher-order factors of the big five in a multi-informant sample. *Journal of Personality and Social Psychology, 91,* 1138-1151. DOI: 10.1037/0022-3514.91.6.1138

DeYoung, C. G., Peterson, J. B., & Higgins, D. M. (2002). Higher-order factors of the big five predict conformity: Are there neuroses of health? *Personality and Individual Differences, 33,* 533-552. DOI: 10.1016/S0191-8869(01)00171-4

DeYoung, C. G., Peterson, J. B., & Higgins, D. M. (2005). Sources of openness/intellect: Cognitive and neuropsychological correlates of the fifth factor of personality. *Journal of Personality, 73*, 825–858. DOI: 10.1111/j.1467-6494.2005.00330.x

DeYoung, C. G., Quilty, L. C., & Peterson, J. B. (2007). Between facets and domains: 10 aspects of the big five. *Journal of Personality and Social Psychology, 93*, 880-896. DOI: 10.1037/0022.3514.93.5.880

Digman, J. M. (1990). Personality structure: Emergence of the five-factor model. *Annual Review of Psychology, 41*, 417–440. DOI:10.1146/annurev.ps.41.020190.002221

Digman, J. M. (1997). Higher-order factors of the big five. *Journal of Personality and Social Psychology, 73,* 1246-1256. DOI:10.1037/0022-3514.73.6.1246

Digman, J. M., & Inouye, J. (1986). Further specification of the five robust factors of personality. *Journal of Personality and Social Psychology, 50*, 116-123. DOI:10.1037/0022-3514.50.1.116

Digman, J. M., & Takemoto-Chock, N. K. (1981). Factors in the natural language of personality: Reanalysis and comparison of six major studies. *Multivariate Behavioral Research, 16*, 149-170. DOI:10.1207/s15327906mbr1602_2

Ding, L., Velicer, W. F., & Harlow, L. L. (1995). Effects of estimation methods, number of indicators per factor, and improper solutions on structural equation modeling fit indices. *Structural Equation Modeling: A Multidisciplinary Journal*, *2*, 119-143. DOI: 10.1080/10705519509540000

Donnellan, M. B., Conger, R. D., & Bryant, C. M. (2004). The big five and enduring marriages. *Journal of Research in Personality, 38,* 481-504. DOI: 10.1016/j.jrp.2004.01.001

Dudley, N. M., Orvis, K. A., Lebiecki, J. E. & Cortina, J. M. (2006). A meta-analytic investigation of conscientiousness in the prediction of job performance: Examining the intercorrelations and the incremental validity of narrow traits. *Journal of Applied Psychology, 91,* 40-57. DOI: 10.1037/0021-9010.91.1.40

Elliot, A. J. & Thrash, T. M. (2002). Approach-avoidance motivation in personality: Approach and avoidance temperaments and goals. *Journal of Personality & Social Psychology, 82,* 804-818. DOI: 10.1037/0022-3514.82.5.804

Enns, M. W. & Cox, B. J. (1997). Personality dimensions and depression: Review and commentary. *Canadian Journal of Psychiatry, 42*(3), 274-284. Retrieved from http://ww1.cpa-apc.org

Eysenck, H. J. (1947). *Dimensions of personality*. London: Routledge & Kegan Paul.

Eysenck, H. J. (1990). Biological dimensions of personality. In L. A. Pervin (Ed.), *Handbook of personality: Theory and research* (pp. 244-276). New York: Guilford.

Eysenck, H. J. (1991). Dimensions of personality: 16, 5, or 3?—Criteria for a taxonomic paradigm. *Personality and Individual Differences, 12*, 773-790. DOI: 10.1016/0191-8869(91)90144-Z

Eysenck, H. J. (1992). Four ways five factors are not basic. *Personality and Individual Differences, 13*, 667-673. DOI: 10.1016/0191-8869(92)90237-J

Eysenck, H. J. (1997). Personality and experimental psychology: The unification of psychology and the possibility of a paradigm. *Journal of Personality and Social Psychology, 73*, 1224-1237. DOI:10.1037/0022-3514.73.6.1224

Fabrigar, L. R., Wegener, D.T., MacCallum, R.C., & Strahan, E. J. (1999). Evaluating the use of exploratory factor analysis in psychological research. *Psychological Methods, 4*, 272-299. DOI: 10.1037/1082-989X.4.3.272

Feist, G. J. (1998). A meta-analysis of personality in scientific and artistic creativity. *Personality and Social Psychology Review, 4,* 290-309. DOI: 10.1207/s15327957pspr0204_5

Ferguson, E., & Cox, T. (1993). Exploratory factor analysis: A users' guide. *International Journal of Selection and Assessment*, *1*, 84-94. DOI: 10.1111/j.1468-2389.1993.tb00092.x

Field, A. (2005). *Discovering statistics using SPSS* (2nd ed.). London: SAGE Publications.

Field, A. (2009). *Discovering statistics using SPSS* (3rd ed.). London: SAGE Publications.

Finch, J. F., & West, S. G. (1997). The investigation of personality structure: Statistical models. *Journal of Research in Personality, 31*, 439-485. DOI: 10.1006/jrpe.1997.2194

Fisher, T. D., & McNulty, J. K. (2008). Neuroticism and marital satisfaction: The mediating role played by the sexual relationship. *Journal of Family Psychology, 22*, 112-122. DOI: 10.1037/0893-3200.22.1.112

Fiske, D. W. (1949). Consistency of the factorial structures of personality ratings from different sources. *Journal of Abnormal and Social Psychology, 44*, 344–429. DOI: 10.1037/h0057198

Fleeson, W., Malanos, A., & Achille, N. (2002)**.** An intra-individual, process approach to the relationship between extraversion and positive affect: Is acting extraverted as "good" as being extraverted? *Journal of Personality and Social Psychology, 83, 1409-1422.* DOI: 10.1037/0022-3514.83.6.1409

Flynn, F.J. (2005) Having an open mind: The impact of openness to experience on interracial attitudes and impression formation. *Journal of Personality and Social Psychology*. 88, 816-826. DOI: 10.1037/0022-3514.88.5.816

Flynn, L.R., Pearcy, D. (2001). Four subtle sins in scale development: Some suggestions for strengthening the current paradigm. *International Journal of Market Research, 43*(4), 409-423. Retrieved from http://web.ebscohost.com

Flynn, B.B., Schroeder, R.G., &Sakakibara, S. (1994). A framework for quality management research and an associated measurement instrument. *Journal of Operations Management, 11*, 339-66. DOI:10.1016/S0272-6963(97)90004-8

Fornell, C., & Larcker, D.F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research, 18*(1), 39-50. Retrieved from http://www.jstor.org

Fox, S., Spector, P. E., Goh, A., Bruursema, K. (2007). Does your co-worker know what you're doing? Convergence of self-and peer-reports of counterproductive work behavior. *International Journal of Stress Management, 14*, 41-60. DOI:10.1037/1072-5245.14.1.41

Ganster, D., Hennessey, H., & Luthans, F. (1983). Social desirability response effects: Three alternative models. *Academy of Management Journal, 26*, 321-331.DOI: 10.2307/255979

George, J. M. & Brief, A. P. (1992). Feeling good – doing good: A conceptual analysis of the mood at work-organizational spontaneity relationship. *Psychological Bulletin, 112*, 310-329. DOI: 10.1037/0033-2909.112.2.310

Gerbing, D. W., & Anderson, J. C. (1988). An updated paradigm for scale development incorporating unidimensionality and its assessment. *Journal of Marketing research*, 186-192. Retrieved from http://www.jstor.org/stable/3172650

Giacalone, R. A., & Greenberg, J. (1997). *Antisocial behaviour in organizations*. Thousand Oaks, CA: Sage Publications.

Goodhue, D., Lewis, W., & Thompson, R. (2007). Research note—Statistical power in analyzing interaction effects: Questioning the advantage of PLS with product indicators. *Information Systems Research*, *18*, 211-227. DOI: 10.1287/isre.1070.0123

Goffin, R. D., Rothstein, M. G., & Johnston, N. (1996). Personality testing and the assessment center: Incremental validity for managerial selection. *Journal of Applied Psychology, 81*, 746-756. DOI: 10.1037/0021-9010.81.6.746

Goldberg, L. R. (1972). Parameters of personality inventory construction and utilization: A comparison of prediction strategies and tactics. *Multivariate Behavioral Research Monograph,* No. 72-2,59.

Goldberg, L. R. (1981). Language and individual differences: The search for universals in personality lexicons. In L. Wheeler (Ed.), *Review of personality and social psychology,* (Vol. 2, pp. 141-165). Beverly Hills, CA: Sage.

Goldberg, L. R. (1982). From Ace to Zombie: Some explorations in the language of personality. In C. D. Spielberger & J. N. Butcher (Eds.), *Advances in personality assessment* (Vol. 1, pp. 203-234). Hillsdale, NJ: Erlbaum.

Goldberg, L. R. (1990). An alternative "description of personality": The big-five factor structure. *Journal of Personality and Social Psychology, 59*, 1216-1229. DOI:10.1037/0022-3514.59.6.1216

Goldberg, L. R. (1992). The development of markers for the big-five factor structure. *Psychological Assessment, 4*, 26-42. DOI:10.1037/1040-3590.4.1.26

Goldberg, L. R. (1993a). The structure of phenotypic personality traits. *American Psychologist, 48*, 26-34. DOI:10.1037/0003-066X.48.1.26

Goldberg, L. R. (1993b). The structure of personality traits: Vertical and horizontal aspects. In D. C. Funder, R. D. Parke, C. Tomlinson-Keasey, & K. Widaman (Eds.), *Studying lives through time: Personality and development* (Pp. 169-188). Washington, DC: American Psychological Association.

Goldberg, L. R. (1994). Resolving a scientific embarrassment: A comment on the articles in this special issue. *European Journal of Personality, 8*, 351–356. DOI:10.1002/per.2410080411

Goldberg, L. R. (1999). A broad-bandwidth, public-domain, personality inventory measuring the lower-level facets of several five-factor models. In I. Mervielde, I. Deary, F. De Fruyt, & F. Ostendorf (Eds.), *Personality psychology in Europe, (Vol. 7* pp. 7-28). The Netherlands: Tilburg Free Press.

Goldberg, L. R. & Rosolack, T. (1994). The big five factor structure as an integrated framework. In C. Halverson, G. Kohnstamm, & R. Marten (Eds.), *The developing structure of temperament and personality from infancy to adulthood* (pp. 7–35). Hillsdale, NJ: Lawrence Erlbaum Associates.

Goldberg, L. R. & Saucier, G. (1995). So what do you propose we use instead? A reply to Block. *Psychological Bulletin, 117*, 221-225.DOI: 10.1037/0033-2909.117.2.221

Goldberg, L. R., & Somer O. (2000). The hierarchical structure of common Turkish person-descriptive adjectives. *European Journal of Personality, 14,* 497-531. DOI: 10.1002/1099-0984(200011/12)14:6<497::AID-PER379>3.0.CO;2-R

Goldberg, L. R. & Strycker, L. A. (2002). Personality traits and eating habits: The assessment of food preferences in a large community sample. *Personality & Individual Differences, 32,* 49-65. DOI: 10.1016/S0191-8869(01)00005-8

Goldberg, L. R. & Velicer, W. F. (2006). Principles of exploratory factor analysis. In S. Strack (Ed.), *Differentiating normal and abnormal personality*: (2nd ed., pp. 209-237). New York, NY: Springer.

Gorsuch, R. L. (1983). *Factor analysis* (2nd ed.). Hillsdale, NJ: Erlbaum.

Gorsuch, R. L. (1997). Exploratory factor analysis: Its role in item analysis. *Journal of Personality Assessment, 68*, 532-560. DOI:10.1207/s15327752jpa6803_5

Gough, H. G. (1987). *CPI administrator's guide*. Palo Alto, CA: Consulting Psychologists Press, Inc.

Gough, H. G. (1996). *California psychological inventory*. Palo Alto, CA: Consulting Psychologists Press, Inc.

Grant, S. & Langan-Fox, J. (2007). Personality and the occupational stressor-strain relationship: The role of the big five. *Journal of Occupational Health Psychology, 12,* 20-33. DOI:10.1037/1076-8998.12.1.20

Graziano, W. G. & Eisenberg, N. H. (1997). Agreeableness: A dimension of personality. In R. Hogan, J. Johnston, & S. Briggs (Eds.), *Handbook of personality psychology* (pp. 795–824). San Diego, CA: Academic Press.

Graziano, W. G., Habashi, M. M., Sheese, B. E., & Tobin, R. M. (2007). Agreeableness, empathy, and helping: A person X situation perspective. *Journal of Personality and Social Psychology, 93*, 583-599. DOI: 10.1037/0022-3514.93.4.583

Green, S. B. (1991). How many subjects does it take to do a regression analysis? *Multivariate Behavioral Research*, *26*, 499-510. Retrieved DOI:10.1207/s15327906mbr2603_7

Gregory, R.J. (2011). *Psychological testing: History, principles, and applications (6th ed.)*. Boston, MA: Allyn & Bacon.

Griffin, B. & Hesketh, B. (2004). Why openness to experience is not a good predictor of job performance. International Journal of Selection and Assessment, 12, 243-251. DOI: 10.1111/j.0965-075X.2004.278_1.x

Gruys, M. L. & Sackett, P. R. (2003). Investigating the dimensionality of counterproductive work behavior. *International Journal of Selection and Assessment, 11,* 30–41. DOI: 10.1111/1468-2389.00224

Guadagnoli, E. & Velicer, W. F. (1988). Stability of component patterns: A simulation study. *Psychological Bulletin, 103,* 265-275. DOI: 10.1037/0033-2909.103.2.265

Guilford, J. P. (1954). *Psychometric methods* (2nd ed.). New York: McGraw-Hill.

Guion, R. M. & Gottier, R. F. (1965). Validity of personality measures in personnel selection. *Personnel Psychology, 18*, 135–164. DOI: 10.1111/j.1744-6570.1965.tb00273.x

Gunthert, K. C., Cohen, L. H., & Armeli, S. (1999). The role of neuroticism in daily stress and coping. *Journal of Personality and Social Psychology, 77,* 1087-1100. DOI:10.1037/0022-3514.77.5.1087

Guttman, L. *(1954). Some necessary conditions for common-factor analysis. Psychometrika, 19, 149-161.* DOI:10.1007/BF02289162

Hair, J., Black, B., Babin, B., & Anderson, R. (2010). *Multivariate data analysis* (7th ed.). Upper Saddle River, NJ: Prentice-Hall.

Hair, J., Black, B., Babin, B., Anderson, R., & Tatham, R. (2006). *Multivariate data analysis* (6th ed.). Upper Saddle River, NJ: Prentice-Hall.

Hair, J., Anderson, R., Tatham, R., & Black, W. (1998). *Multivariate data analysis (*5th ed.). Upper Saddle River, NJ: Prentice-Hall.

Hakstian, A. R., Rogers, N. T., & Cattell, R. B. (1982). The behavior of number-of-factor rules with simulated data. *Multivariate Behavioral Research, 17,* 193-219. DOI:10.1207/s15327906mbr1702_3

Hase, H. D., & Goldberg, L. R. (1967). Comparative validity of different strategies of constructing personality inventory scales. *Psychological Bulletin, 67*, 231-248. (Reprinted in L. D. Goodstein & R. I. Lanyon (Eds.), *Readings in personality assessment*. New York, NY: Wiley, 1971. Pp. 281-304.

Hastings, S. E., & O'Neill, T. A. (2009). Predicting workplace deviance using broad and narrow personality traits. *Personality and Individual Differences, 47*, 289–293. DOI:10.1016/j.paid.2009.03.015

Hastings, S. E., & Thomas, A. O. (2009). Predicting workplace deviance using broad versus narrow personality variables. *Personality and Individual differences, 47*, 289-293. DOI:10.1016/j.paid.2009.03.015

Hau, K., & Marsh, H. W. (2004). The use of item parcels in structural equation modelling: Non-normal data and small sample sizes. *British Journal of Mathematical Statistical Psychology*, 57, 327-351. DOI:10.1111/j.2044-8317.2004.tb00142.x

Hayes, N., & Joseph, S. (2003). Big 5 correlates of three measures of subjective well-being. *Personality and Individual Differences, 34*, 723–727. DOI:10.1016/S0191-8869(02)00057-0

Heller, D., Watson, D., & Ilies, R. (2004). The role of person vs. situation in life satisfaction: A critical examination. *Psychological Bulletin, 130,* 574-600. DOI:10.1037/0033-2909.130.4.574

Hinkin, T. R. (1998). A brief tutorial on the development of measures for use in survey questionnaires. *Organizational Research Methods, 1*, 104-121. DOI:10.1177/109442819800100106

Hofstee, W. K., De Raad, B., & Goldberg, L. R., (1992). Integration of the big five and circumplex approaches to trait structure. *Journal of Personality and Social Psychology, 63*, 146-163. DOI:10.1037/0022-3514.63.1.146

Hogan, R. (1983). A socioanalytic theory of personality. In M. Page (Ed.) *Nebraska symposium on motivation, 1982: Personality--Current theory and research*. Lincoln, NE: University of Nebraska Press.

Hogan, R. (1996). A socioanalytic perspective on the five-factor model. In J. S. Wiggins (Ed.), *The five-factor model of personality: Theoretical perspectives* (pp. 180-207). New York: Guilford Press.

Hogan, R., & Hogan, J. (1992). *Hogan personality inventory manual.* Tulsa, OK: Hogan Assessment Systems.

Hogan, R., & Hogan, J. (2007). *Hogan personality inventory manual:Third edition.* Tulsa, OK: Hogan Assessment Systems.

Hollenbeck, J. R., Moon, H., Ellis, A. P. J., West, B. J., Ilgen, D. R., Sheppard, L., ... Wagner, J. A., III, (2002). Structural contingency theory and individual differences: Examination of external and internal person-team fit. *Journal of Applied Psychology, 87*, 599-606. DOI:10.1037/0021-9010.87.3.599

Hollinger, R. C., & Clark, J. P. (1982). Formal and informal social controls of employee deviance. *Sociological Quarterly*, 23, 333-343. DOI:10.1111/j.1533-8525.1982.tb01016.x

Horn, J. L. (1965). A rationale and test for the number of factors in factor analysis. *Psychometrika, 30, 179-185.* DOI:10.1007/BF02289447

Hough, L. M. (1992). The “big five” personality variables—construct confusion: Description versus prediction. Human Performance, 5, 139-155. DOI:10.1080/08959285.1992.9667929.

Hough, L. M. (1998). Personality at work: Issues and evidence. In M. Hakel (Ed.), *Beyond multiple choice: Evaluating alternatives to traditional testing for selection* (pp. 131–166). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Hough, L. M., & Furnham, A. (2003). Use of personality variables in work settings. In W. C. Borman, D. R. Ilgen, R. J. Klimoski (Eds.), *Handbook of psychology: Industrial and Organizational psychology* (Vol. 12, pp. 131–169). Hoboken, NY: Wiley.

Hough, L. M., & Ones, D. S. (2001). The structure, measurement, validity, and use of personality variables in industrial work, and organizational psychology. In N. Anderson, D. S. Ones, H. K. Sinangil, & C. Viswesvaran (Eds.), *Handbook of industrial, work and organizational* psychology (Vol. 1, pp. 233-277). NewburyPark, CA: Sage.

Hough, L., & Oswald, F. (2000). Personnel selection: Looking toward the future- remembering the past. *Annual Review of Psychology, 51*, 631-664. DOI:10.1146/annurev.psych.51.1.631

Hough, L. M., & Oswald, F. L. (2005). They're right, well... mostly right: Research evidence and an agenda to rescue personality testing from 1960s insights. *Human Performance*, *18*, 373-387. DOI: 10.1207/s15327043hup1804_4

Hough, L. M., & Oswald, F. L. (2008). Personality testing and industrial–organizational psychology: Reflections, progress, and prospects. *Industrial and Organizational Psychology*, *1*, 272-290. DOI: 10.1111/j.1754-9434.2008.00048.x

Howell, D. (2012). *Statistical methods for psychology* (8th ed.). Belmont, CA: Wadsworth, Cengage Learning

Hoyle, R. H., Fejfar, M. C., & Miller, J. D. (2000). Personality and sexual risk taking: Aquantitative review. *Journal of Personality, 68* (6), 1203-1231. DOI:10.1111/1467-6494.00132

Hu, L-T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6, 1-55. DOI:10.1080/10705519909540118

Hull, J. G., Tedlie, J. C., & Lehn, D. A. (1995). Modeling the relation of personality variables to symptom complaints: The unique role of negative affectivity. In R. H. Hoyle (Ed.), *Structural equation modeling: Concepts, issues, and applications* (pp. 217-235). Newbury Park, CA: Sage.

Humphreys, L. G., & Montanelli, R. G. (1975). An investigation of the parallel analysis criterion for determining the number of common factors. *Multivariate Behavioral Research, 10,* 193-205. DOI:10.1207/s15327906mbr1002_5

Hurtz, G. M., & Donovan, J. J. (2000). Personality and job performance: The big five revisited. *Journal of Applied Psychology, 85*, 869–879.DOI:10.1037/0021-9010.85.6.869

Jackson, D. N. (1984). *Jackson research form manual.* Port Huron, MI: Research Psychologists Press.

Jackson, D. N. (1994). *Jackson personality inventory—revised manual.* Port Huron. Ml: Sigma Assessment Systems, Inc.

Jackson, D. L. (2001). Sample size and number of parameter estimates in maximum likelihood confirmatory factor analysis: A Monte Carlo investigation. *Structural Equation Modeling*, *8*, 205-223**.** DOI: 10.1207/S15328007SEM0802_3

Jackson, D. N., Paunonen, S. V., & Tremblay, P. F. (2000). *Six factor personality questionnaire manual*. Port Huron, MI: Sigma Assessment Systems.

Jensen-Campbell, L. A., & Graziano, W. G. (2001). Agreeableness as a moderator of interpersonal conflict. *Journal of Personality, 69*, 323-362. DOI:10.1111/1467-6494.00148

John, O. P. (1990). The “big five” factor taxonomy: Dimensions of personality in the natural language and in questionnaires. In L. A. Pervin (Ed), *Handbook of personality: Theory and research* (pp.66-100). New York: Guilford Press.

John, O. P., Caspi, A., Robbins, R. W., Moffitt, T. E., & Stouthamer-Loeber, M. (1994). The "little five": Exploring the nomological network of the five-factor model of personality in adolescent boys. *Child Development, 65*, 160-178. DOI:10.1111/j.1467-8624.1994.tb00742.x

John, O. P., & Robbins, R. W. (1994). Traits and types, dynamics and development: No doors should be closed in the study of personality. *Psychological Inquiry, 5*, 137-142. DOI:10.1207/s15327965pli0502_10

John, O. P., & Srivastava, S. (1999). The big five trait taxonomy: History, measurement, and theoretical perspectives. In L. A. Pervin & O. P.

John (Eds.), *Handbook of personality: Theory and research* (2nd ed., pp. 102-138). New York, NY: Guilford Press.

Johnson, W., & Krueger, R. F. (2004). Genetic and environmental structure of adjectives describing the domains of the big five model of personality: A nationwide US twin study. Journal of Research in Personality, 38, 448–472. DOI:10.1016/j.jrp.2003.11.001

Jöreskog, K. G., & Sörbom, D. (2003). *LISREL 8.54. Scientific Software International*, Inc.

Judge, T. A., & Bono, J. E. (2000). Five-factor model of personality and Transformational leadership. *Journal of Applied Psychology*, 85, 751-765. DOI:10.1037/0021-9010.85.5.751

Judge, T. A., & Bono, J. E. (2001) Relationship of core self-evaluation traits—self-esteem, generalized self-efficacy, locus of control, and emotional stability— with job satisfaction and job performance: A meta-analysis. *Journal of Applied Psychology*, 86, 80 –92. DOI:10.1037/0021-9010.86.1.80

Judge, T. A., Bono, J. E., Ilies, R., & Gerhardt, M. (2002). Personality and leadership: A qualitative and quantitative review. *Journal of Applied Psychology, 87***,** 765-780. DOI:10.1037/0021-9010.87.4.765

Judge, T. A., Erez, A., Bono, J. E., & Thorensen, C. J. (2002). Are measures of self esteem, neuroticism, locus of control, and generalized self-efficacy indicators of a common core construct? *Journal of Personality and Social Psychology, 83*, 693–710. DOI:10.1037/0022-3514.83.3.693

Judge, T. A., Heller, D., & Mount, M. K. (2002). Five-factor model of personality and job satisfaction: A meta-analysis. *Journal of Applied Psychology, 87*, 530-541. DOI:10.1037/0021-9010.87.3.530

Judge, T. A., Higgins, C. A., Thoresen, C. J., & Barrick, M. R. (1999). The big five personality traits, general mental ability, and career success across the life span. *Personnel Psychology, 52*, 621–652. DOI:10.1111/j.1744-6570.1999.tb00174.x

Jung, C. G. (1923). *Psychological types*. London: Rutledge & Kegan Paul.Kaiser, H. F. (1974). An index of factorial simplicity. *Psychometrika, 39*, 31–36. DOI:10.1007/BF02291575

Kaiser, H.F. (1960). The application of electronic computers to factor analysis. *Educational and Psychological Measurement, 20*, 141–151. DOI: 10.1177/001316446002000116

Kallasmaa, T., Allik, J., Realo, A., & McCrae, R. R. (2000). The Estonian version of the NEO-PI-R: An examination of universal and culture-specific aspects of the five factor model. *European Journal of Personality, 14*, 265-278. DOI:10.1002/1099-0984(200005/06)14:3<265::AID-PER376>3.0.CO;2-B

Kelloway, K. (1998). *Using LISREL for structural equation modeling.* Thousand Oaks, California: Sage Publications, Inc.

Kim, K. H. (2005). The relation among fit indexes, power, and sample size in structural equation modeling. *Structural Equation Modeling*, *12*, 368-390. DOI: 10.1207/s15328007sem1203_2

Klein, B. (1978). The measurement of long- and short-term price uncertainty: A moving regression time Series Analysis," *Economic Inquiry* 16, 438-52. DOI:10.1111/j.1465-7295.1978.tb00514.x

Kline, R. B. (2011). *Principles and practice of structural equation modeling* (3rd ed.). New York: The Guilford Press.

Kline, P. (1998). *The new psychometrics: Science, psychology, and measurement*. London: Psychology Press.

Kling, C., Ryff, C. D., Love, G., & Essex, M. (2003). Exploring the influence of personality on depressive symptoms and self-esteem across a significant life transition. *Journal of Personality and Social Psychology, 85*, 922-932. DOI:10.1037/0022-3514.85.5.922

Krzystofiak, F., Cardy, R., & Newman, J. (1988). Implicit personality and performance appraisal: The influence of trait inferences on evaluations of behavior. *Journal of Applied Psychology, 73*, 515-521. DOI:10.1037/0021-9010.73.3.515

Landis, R. S., Beal, D. J., & Tesluk, P. E. (2000). A comparison of approaches to forming composite measures in structural equation models. *Organizational Research Methods, 3*, 186–207. DOI: 10.1177/109442810032003

Landy, F. J., Shankster, L. J., & Kohler, S. S. (1994). Personnel selection and placement. *Annual Review of Psychology, 45*, 261-296. DOI:10.1146/annurev.ps.45.020194.001401

Lanning, K. (1994). Dimensionality of observer ratings on the California adult-set. *Journal of Personality and Social Psychology, 67*, 151-160. DOI:10.1037/00223514.67.1.151

Lawshe, C. H. (1975). A quantitative approach to content validity. *Personnel Psychology*, *28*, 563-575. DOI:10.1111/j.1744-6570.1975.tb01393.x

Leary, T. (1957). *Interpersonal diagnosis of personality.* New York: Ronald Press.

Lee, K., & Ashton, M. C. (2004). Psychometric properties of the HEXACO Personality inventory. Multivariate Behavioral Research, 39, 329–358. DOI:10.1207/s15327906mbr3902_8

Lee, K., Ogunfowora, B., & Ashton, M. C. (2005). Personality traits beyond the big five: Are they within the HEXACO space? *Journal of Personality, 73*, 1437-1463. DOI:10.1111/j.1467-6494.2005.00354.x

Le, H., Oh, I. S., Robbins, S. B., Ilies, R., Holland, E., & Westrick, P. (2011). Too much of a good thing: Curvilinear relationships between personality traits and job performance. *Journal of Applied Psychology*, *96*, 113-133. DOI: 10.1037/a0021016

Leech, N., Barrett, K., & Morgan, G., A. (2005). *SPSS for intermediate statistics: Use and interpretation* (2nd ed.). London: Lawrence Erlbaum Associates.

Lent, R. H., Aurbach, H. A., & Levin, L. S. (1971). Predictors, criteria and significant results. *Personnel Psychology, 24*, 519-533. DOI:10.1111/j.1744-6570.1971.tb00374.x

LePine, J. A., Erez, A. & Johnson, D. E. (2002). The nature of dimensionality of organizational citizenship behavior: A critical review and meta-analysis. *Journal of Applied Psychology*, 87, 52-65. DOI:10.1037/0021-9010.87.1.52

Lindeman, R. H., Merenda, P. F., & Gold, R. Z. (1980). *Introduction to bivariate and multidimensional analysis.* Glenview, IL: Scott, Foresman.

Little, T. D., Cunningham, W. A., Shahar, G., & Widaman, K. F. (2002). To parcel or not to parcel: Exploring the question, weighing the merits.*Structural Equation Modeling, 9,* 151–173. DOI: 10.1207/S15328007SEM0902_1

Loehlin, J. C. (1992). *Genes and environment in personality development.* Newbury Park, CA: Sage Publishers.

Loehlin, J. C., McCrae, R. R., Costa, P. T., Jr., & John, O. P. (1998). Heritabilities of common and measure-specific components of the big five personality factors. *Journal of Research in Personality, 32,* 431-453. DOI:10.1006/jrpe.1998.2225

Longman, R. S., Cota, A. A., Holden, R. R. & Fekken, G. C. (1989). A regression equation for the parallel analysis criterion in principal components analysis: Mean and 95th percentile eigenvalues. *Multivariate Behavioral Research, 24,* 59-69. DOI:10.1207/s15327906mbr2401_4

Loo, R. (1983). Caveat on sample sizes in factor analysis. *Perceptual and Motor Skills, 56,* 371-374. DOI:10.2466/pms.1983.56.2.371

Lucas, R. E., Diener, E., Grob, A., Suh, E. M., & Shao, L. (2000). Cross-cultural evidence for the fundamental features of extraversion. *Journal of Personality and Social Psychology, 79*, 452-468. DOI:10.1037//0022-3514.79.3.452

MacCallum, R.C., & Browne, M.W. (1993). The use of causal indicators in covariance structure models: Some practical issues. *Psychological Bulletin, 114*, 533-541. DOI:10.1037/0033-2909.114.3.533

MacCallum, R. C., Browne, M. W., & Cai, L. (2006). Testing differences between nested covariance structure models: Power analysis and null hypotheses. *Psychological methods*, *11*, 19-35. DOI: 10.1037/1082-989X.11.1.19

MacCallum, R. C., Browne, M. W., & Sugawara, H. M. (1996). Power analysis and determination of sample size for covariance structure modeling. *Psychological methods*, *1*, 130-149. DOI: 10.1037/1082-989X.1.2.130

MacCallum, R. C., Widaman, K. F., Zhang, S. B., & Hong, S. H. (1999). Sample size in factor analysis. *Psychological Methods, 4*, 84-99. DOI:10.1037/1082-989X.4.1.84

MacDonald, K. B. (1998). Evolution, culture, and the five-factor model. *Journal of Cross-Cultural Psychology 29*, 119-149. DOI:10.1177/0022022198291007

MacDonald, K. (2005). Personality, Evolution, and Development. In R. Burgess and K. MacDonald (Eds.), *Evolutionary Perspectives on Human Development*, 2nd edition, pp. 207–242. Thousand Oaks, CA: Sage.

Magnus, K., Diener, E., Fujita, F., & Pavot, W. (1993). Extraversion and neuroticism as predictors of objective life events: A longitudinal analysis. *Journal of Personality and Social Psychology, 65*, 1046-1053. DOI:10.1037/0022-3514.65.5.1046

Marcus, B., & Schuler, H. (2004). Antecedents of counterproductive behavior at work: A general perspective. *Journal of Applied Psychology, 89,* 647-660. DOI:10.1037/0021-9010.89.4.647

Marcus, B., Schuler, H., Quell, P., & Humpfner, G. (2002). Measuring counterproductivity: Development and initial validation of a German self-report questionnaire. *International Journal of Selection and Assessment*, 10, 18-35. DOI: 10.1111/1468-2389.00191

Mardia, K. V. (1970). Measures of multivariate skewness and kurtosis with application. *Biometrika, 36*, 519-530. DOI:10.1093/biomet/57.3.519

Marinova, S., & Moon, H. (2003, April). *The circumplex model of organizational citizenship behaviours: Establishing dimensionality and space via organizational reward and roles*. Paper presented at the Society for Industrial and Organizational Psychology, Orlando, Florida.

Marshall, M., Fruyt, F., Rolland, J., & Bagby, R. (2005). Socially desirable responding and factorial stability of the NEO-PI-R. *Psychological Assessment, 17*, 379-384. DOI:10.1037/1040-3590.17.3.379

Martinko, M. J., Gundlach, M. J., & Douglas, S. C. (2002). Toward an integrative theory of counterproductive workplace behavior: A causal reasoning perspective. *International Journal of Selection and Assessment, 10,* 36–50. DOI:10.1111/1468-2389.00192

Matthews, G., Emo, A. K., Funke, G., Zeidner, M., Roberts, R. D., Costa P. T. & Schulze, R. (2006). Emotional intelligence, personality, and task-induced stress. J*ournal of Experimental Psychology: Applied, 12*, 96-107. DOI:10.1037/1076-898X.12.2.96

McClelland, G. H. (2000). Nasty data: Unruly, ill-mannered observations can ruin your analysis. In H. T. Reis & C. M. Judd (Eds.), *Handbook of research methods in social and personality psychology* (pp. 393–411). New York, NY: Cambridge University Press.

McCrae, R. R. (1992). Editor's introduction to Tupes and Christal. Journal of Personality, 60, 217-219. DOI:10.1111/j.1467-6494.1992.tb00971.x

McCrae, R. R. (2001). Five years of progress: A reply to block. *Journal of Research in Personality*, 35, 108-113. DOI:10.1006/jrpe.2000.2294

McCrae, R. R. (2002). NEO-PI-R data from 36 cultures: Further intercultural comparisons. In R. R. McCrae & J. Allik. (Eds.), *The Five-Factor Model of personality across cultures* (pp.105-125). New York: Kluwer Academic/Plenum Publishers.

McCrae R. R., & Costa P. T. (1983). Joint factors in self-reports and ratings: Neuroticism, extraversion and openness to experience. *Personality and Individual Differences,* 4, 245-255. DOI:10.1016/0191-8869(83)90146-0

McCrae, R .R., & Costa, P. T. Jr. (1985). Comparison of EPI and psychoticism scales with measures of the five-factor model of personality. *Personality and Individual Differences, 6*, 587-597. DOI: 10.1016/0191-8869(85)90008-X

McCrae, R. R., & Costa, P. T., Jr. (1987). Validation of the five-factor model of personality across instruments and observers. *Journal of Personality and Social Psychology, 52*, 81-90. DOI:10.1037/0022-3514.52.1.81

McCrae, R. R., & Costa, P. T., Jr. (1989a). The structure of interpersonal traits: Wiggins' circumplex and the five factor model. *Journal of Personality and Social Psychology, 56*, 586-595. DOI:10.1037/0022-3514.56.4.586

McCrae, R. R., & Costa, P.T., Jr. (1989b). Reinterpreting the Myers-Briggs type indicator from the perspective of the five factor model of personality. *Journal of Personality, 57*, 17-40. DOI: 10.1111/j.1467-6494.1989.tb00759.x

McCrae, R. R., & Costa, P. T., Jr. (1996). Toward a new generation of personality theories: Theoretical contexts for the five-factor model. In J. S. Wiggins (Ed.), *The five-factor model of personality: Theoretical perspectives* (pp. 51-87). New York: Guilford.

McCrae, R. R., & Costa, P. T., Jr. (1997). Personality trait structure as a human universal. *American Psychologist, 52,* 509-516. DOI: 10.1037/0003-066X.52.5.509

McCrae, R. R., & Costa, P. T., Jr. (1999). A five-factor theory of personality. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research* (2nd ed., pp. 139–153). New York: Guilford.

McCrae, R. R., & Costa, P. T., Jr. (2010). *Neo personality inventory-3, neo five-factor inventory-3, and neo personality inventory-revised professional manual*. Odessa, FL: Psychological Assessment Resources.

McCrae, R. R., Costa, P. T. Jr., del Pilar, G. H., Rolland, J., & Parker, W. D. (1998). Cross-cultural assessment of the five-factor model: The revised NEO personality inventory. *Journal of Cross-Cultural Psychology, 29*, 171-188. DOI:10.1177/0022022198291009

McCrae, R. R., Costa, P. T., Jr., Lima, M. P., Simões, A., Ostendorf, F., Angleitner, A., et al. (1999). Age differences in personality across the adult life span: Parallels in five cultures. *Developmental Psychology, 35*, 466-477. DOI: 10.1037/0012-1649.35.2.466

McCrae, R. R., Costa, P. T., Jr., Martin, T. A., Oryol, V. E., Rukavishnikov, A. A., Senin, I. G., ... Urbanek, T. (2004). Consensual validation of personality traits across cultures. Journal of Research in Personality, 38, 179–201. DOI:10.1016/S0092-6566(03)00056-4

McCrae, R. R., Costa, P. T., Jr., Ostendorf, F., Angleitner, A., Hrebickova, M., Avia, M. D., et al. (2000). Nature over nurture: Temperament, personality, and life span development. *Journal of Personality and Social Psychology, 78,* 173–186. DOI:10.1037/0022-3514.78.1.173

McCrae, R. R., & John, O. P. (1992). An introduction to the five-factor model and its applications. *Journal of Personality, 60*, 175-215. DOI:10.1111/j.1467-6494.1992.tb00970.x

McCrae, R. R, Terraccino, A., et al. (2005a). Universal features of personality traits from observer's perspective: Data from 50 cultures. *Journal of personality and Social Psychology, 88*, 547-561. DOI:10.1037/0022-3514.88.3.547

McCrae, R. R, Terraccino, A., et al. (2005b). Personality profiles of cultures: Aggregate personality traits. *Journal of personality and Social Psychology, 89*, 407- 425. DOI:10.1037/0022-3514.89.3.407

McCrae, R. R., Zonderman, A. B., Costa, P. T., Jr., Bond, M. H., & Paunonen, S. V. (1996). Evaluating replicability of factors in the revised NEO personality inventory: Confirmatory factor analysis versus procrustes rotation. *Journal of Personality and Social Psychology, 70*, 552–566. DOI:10.1037/0022-3514.70.3.552

McHenry, J. J., Hough, L. M., Toquam, J. L., Hanson, M. A., & Ashworth, S. (1990). Project A validity results: The relationship between predictor and criterion domains. *Personnel Psychology, 43*, 335–354. DOI:10.1111/j.1744-6570.1990.tb01562.x

McManus, M. A., & Kelly, M. L. (1999) Personality measures and biodata: Evidence regarding their incremental predictive value in the life insurance industry. *Personnel Psychology, 52,* 137-148. DOI:10.1111/j.1744-6570.1999.tb01817.x

Mershon, B., & Gorsuch, R. L. (1988). Number of factors in the personality sphere: Does increase in factors increase predictability of real-life criteria? *Journal of Personality and Social Psychology, 55*, 675–680. DOI:10.1037/0022-3514.55.4.675

Miller, R. L., Griffin, M. A., & Hart, P.M. (1999). Personality and organizational health: The role of conscientiousness. *Work & Stress, 13*, 7-19. DOI: 10.1080/026783799296156

Motowidlo, S. J., Borman, W.C., & Schmit, M. J., (1997). A theory of individual differences in task and contextual performance. *Human Performance, 10, 71-83.* DOI:10.1207/s15327043hup1002_1

Motowidlo, S. J., & Van Scotter, J. R. (1994). Evidence that task performance should be distinguished from contextual performance. *Journal of Applied Psychology, 79,* 475-480. DOI: 10.1037/0021-9010.79.4.475

Mount, M. K., & Barrick, M. R., (1995). The big five personality dimensions: Implications for research and practice in human resources management. *Research in Personnel and Human Resources Management, 13, 153-200.*

Mount, M. K., & Barrick, M. R. (1998). Five reasons why the "five factor" article has been frequently cited. *Personnel Psychology, 51*, 849-857. DOI:10.1111/j.1744-6570.1998.tb00743.x

Mount, M. K., Witt, L. A., & Barrick, M. R. (2000). Incremental validity of empirically keyed biodata scales over GMA and the five factor personality constructs. *Personnel Psychology, 53*, 1-24. Retrieved from http://web.ebscohost.com DOI:10.1111/j.1744-6570.2000.tb00203.x

Murphy, K. R. (1993). *Honesty in the workplace*. Belmont, CA: Brooks/Cole Publishing Company.

Murphy, K. R., & Dzieweczynski, J. L. (2005). Why don't measures of broad dimensions of personality perform better as predictors of job performance? *Human Performance, 18*, 343-357. DOI:10.1207/s15327043hup1804_2

Murphy, K. R., & Shiarella, A. H. (1997). Implications of the multidimensional nature of job performance for the validity of selection tests: Multivariate frameworks for studying test validity. *Personnel Psychology, 50*, 823-854. DOI: 10.1111/j.1744-6570.1997.tb01484.x

Murray, H. A. (1938). *Explorations in personality*. New York: Oxford University Press.

Neuman, G. A., & Kickul, J. R. (1998). Organizational citizenship behaviors; Achievement orientation and personality. *Journal of Business and Psychology, 13*, 263-279. DOI: 10.1023/A:1022963108025

Norman, W. (1963). Toward an adequate taxonomy of personality attributes: Replicated factor structure in peer nomination personality ratings. *Journal of Abnormal and Social Psychology, 66*, 574–583. DOI: 10.1037/h0040291

Norman, W. (1967). *2800 personality trail descriptors: Normative operating characteristics for a university population.* Ann Arbor: University of Michigan, Department of Psychology.

Nunnally, J. C. (1967). *Psychometric theory*. New York: McGraw-Hill.

Nunnally, J. C. (1978). *Psychometric theory (2nd ed.)*. New York: McGraw-Hill.

Nunnally, J. C. & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). New York: McGraw-Hill.

O'Brien, R. G., & Castelloe, J. (2007). Sample-size analysis for traditional hypothesis testing: concepts and issues. In A. D Dmitrienko, C. Chuang-Stein, & R. D. Agostino (Eds), *Pharmaceutical statistics using SAS: A practical guide* (pp. 237-271). Cary, NC: SAS.

O'Connor, B. P. (2000). SPSS and SAS programs for determining the number of components using parallel analysis and Velicer's MAP test. *Behavior Research Methods, Instruments, & Computers, 32,* 396–402. DOI: 10.3758/BF03200807

Oh, I. S., Wang, G., & Mount, M. K. (2011). Validity of observer ratings of the five-factor model of personality traits: A meta-analysis. *Journal of Applied Psychology*, *96*(4), 762-773. DOI: 10.1037/a0021832

Ones, D. S., & Anderson, N. (2002). Gender and ethnic group differences on personality scales in selection: Some British data. *Journal of Occupational and Organizational Psychology, 75*, 255-276. DOI: 10.1348/096317902320369703

Ones, D. S. & Viswesvaran, C. (1996). Bandwidth–fidelity dilemma in personality measurement for personnel selection. *Journal of Organizational Behavior, 17*, 609–626. DOI: 10.1002/(SICI)1099-1379(199611)17:6<609::AID-JOB1828>3.0.CO;2-K

Ones, D. S., Viswesvaran, C. (1998). The effects of social desirability and faking on personality and integrity assessment for personnel selection. *Human Performance, 11,* 245-369. DOI:10.1080/08959285.1998.9668033

Ones, D. S., & Viswesvaran, C. (2001). Personality at work: Criterion-focused occupational personality scales used in personnel selection. In B. W. Roberts & R. T. Hogan (Eds.), *Personality psychology in the workplace* (pp. 63-92). Washington, DC: APA.

Ones, D. S., Viswesvaran, C., & Reiss, A. D. (1996). Role of social desirability in personality testing for personnel selection: The red herring. *Journal of Applied Psychology, 81,* 660-679. DOI:10.1037/0021-9010.81.6.660

O'Neill, T. A., & Allen, N. J. (2011). Personality and the prediction of team performance. *European Journal of Personality, 25*, 31-42. DOI:10.1002/per.769

O'Neill, T. A., Goffin, R. D.,&Tett, R. P. (2009). Content validationis fundamental to optimizing the criterion validity of personality tests. *Industrial and Organizational Psychology, 2*, 509–513. DOI:10.1111/j.1754-9434.2009.01184.x

O'Neill, T. A., & Hastings, S. E. (2011). Explaining workplace deviance behavior with more than just the "Big Five". *Personality and Individual Differences, 50,* 268-273. DOI:10.1016/j.paid.2010.10.001

Onwuegbuzie, A. J., Daniel, L. G., & Collins, K. M. T. (2009). A meta-validation model for assessing the score-validity of student teaching evaluations. *Quality and Quantity, 43*, 197-209. DOI:10.1007/s11135-007-9112-4.

Organ, D. W. (1988). *Organizational citizenship behavior: The good soldier syndrome*. Lexington, MA: Lexington Books.

Organ, D. W. (1997). Organizational citizenship behavior: It's construct clean-up time. *Human Performance, 10,* 85–97. DOI:10.1207/s15327043hup1002_2

Organ, D. W., & Paine, J. B. (1999). A new kind of performance for industrial and organizational psychology: Recent contributions to the study of organizational citizenship behavior. *International Review of Industrial and Organizational Psychology, 14,* 337-368. Retrieved from http://psycnet.apa.org.ezproxy.nottingham.ac.uk

Organ, D.W., & Ryan, K. (1995) A meta-analytic review of attitudinal and dispositional predictors of organizational citizenship behavior. *Personnel Psychology, 48*, 775–802. DOI:10.1111/j.1744-6570.1995.tb01781.x

Ostendorf, F. (1990). *Sprache und persönlichkeitsstruktur : Zur validität des fünf-faktorenmodells der persönlichkeit [Language and personality structure: Toward the validation of the five-factor model of personality]. Regensberg, Germany: S. Roderer Verlag.*

Ozer, D. J., & Benet-Martinez, V. (2006). Personality and the prediction of consequential outcomes. *Annual Review of Psychology*, *57*, 401-421. DOI:10.1146/annurev.psych.57.102904.190127

Ozer, D.J., & Reise, S.P. (1994). Personality assessment. *Annual Review of Psychology, 45*, 357-388. DOI:10.1146/annurev.ps.45.020194.002041

Parker, W. D., & Stumpf, H. (1998). A validation of the five-factor model of personality in academically talented youth across observers and instruments. *Personality and Individual Differences, 25*, 1005–1025.DOI: 10.1016/S0191-8869(98)00016-6

Paunonen, S. V. (1998). Hierarchical organization of personality and prediction of behavior. *Journal of Personality and Social Psychology, 74*, 538–556. DOI:10.1037/0022-3514.74.2.538

Paunonen, S. V. (2002). *Design and construction of the supernumerary personality inventory*. Research Bulletin, Vol. 763. London, Ontario: University of Western Ontario.

Paunonen, S. V., & Ashton, M. C. (2001a). Big five factors and facets and the prediction of behavior. *Journal of Personality and Social Psychology, 81*, 524–539. DOI: 10.1037/0022-3514.81.3.524

Paunonen, S. V., & Ashton, M. C. (2001b). Big five predictors of academic achievement. *Journal of Research in Personality, 35*, 78–90. DOI: 10.1006/jrpe.2000.2309

Paunonen, S. V., Haddock, G., Forsterling, F., & Keinonen, M. (2003). Broad versus narrow personality measures and the prediction of behavior across cultures. *European Journal of Personality, 17*, 413–433. DOI: 10.1002/per.496

Paunonen, S. V., & Jackson, D. N. (2000). What is beyond the big five? Plenty! *Journal of Personality, 68*, 821–835. DOI: 10.1111/1467-6494.00117

Paunonen, S. V., & Nicol, A. A. M. (2001). The personality hierarchy and the prediction of work behaviours. In R. Hogan, & B. W. Roberts (Eds.), *Personality psychology in the workplace* (pp. 161–191). Washington, DC: American Psychological Association.

Paunonen, S. V., Rothstein, M. G., & Jackson, D. N. (1999). Narrow reasoning about the use of broad personality measures in personnel selection. *Journal of Organizational Behavior, 20*, 389–405. DOI:10.1002/(SICI)1099-1379(199905)20:3<389::AID-JOB917>3.0.CO;2-G

Peabody, D. & De Raad, B. (2002). The substantive nature of psycholexical personality factors: A comparison across languages. *Journal of Personality and Social Psychology, 83,* 983-997. DOI:10.1037//0022-3514.83.4.983

Penley, J. A., & Tomaka, J. (2002). Associations among the big five, emotional responses, and coping with acute stress. *Personality & Individual Differences, 32,* 1215-1228. DOI:10.1016/S0191-8869(01)00087-3

Perugini, M. & Gallucci, M. (1997). A hierarchical faceted model of the big five. *European Journal of Personality, 11, 279-301.* DOI:10.1002/(SICI)1099-0984(199711)11:4<279::AID-PER282>3.0.CO;2-F

Pervin, L. A. (1989). *Personality: Theory and research* (5th ed.). New York: Wiley.

Piedmont, R. L., McCrae, R. R., Riemann, R., & Angleitner, A. (2000). On the invalidity of validity scales in volunteer samples: Evidence from self-reports and observer ratings in volunteer samples. *Journal of Personality and Social Psychology, 78,* 582–593. DOI:10.1037/0022-3514.78.3.582

Plomin, R., & Caspi, A. (1999). Behavioral genetics and personality. In L.A. Pervin & O.P. John (Eds.), *Handbook of personality: Theory and research.* New York: Guilford Press.

Preacher, K. J. & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers, 36*, 717-731. DOI:10.3758/BF03206553

Preacher, K. J., & MacCallum, R. C. (2002). Exploratory factor analysis in behavior genetics research: Factorr with small sample sizes. *Behavior Genetics, 32*, 153-161. DOI:10.1023/A:1015210025234

Raju, N. S., & Brand, P. A. (2003). Determining the significance of correlations corrected for unreliability and range restriction. *Applied Psychological Measurement*, *27*, 52-71. DOI:10.1177/0146621602239476

Rantanen, J., Pulkkinen, L. & Kinnunen, U. (2005). The big five personality dimensions, work-family conflict, and psychological distress: A longitudinal view. *Journal of Individual Differences*, 26, 155-166. DOI:10.1027/1614-0001.26.3.155

Reilly, R. R., & Chao, G. T. (1982). Validity and fairness of some alternative employee selection procedures. Personnel Psychology, 35, 1-62. DOI:10.1111/j.1744-6570.1982.tb02184.x

Revelle, W. (1987). Personality and motivation: Sources of inefficiency in cognitive performance. Journal of Research in Personality, 21, 436-452. DOI: 10.1016/0092-6566(87)90031-6

Reynolds, S. K., & Clark, L. A. (2001). Predicting dimensions of personality disorder from domains and facets of the five-factor model. Journal of Personality, 69, 199–222. DOI: 10.1111/1467-6494.00142

Riemann, R., Angleitner, A., & Strelau, J. (1997). Genetic and environmental influences on personality: A study of twins reared together using the self-and peer report NEO-FFI scales. *Journal of Personality, 65,* 449–475. DOI: 10.1111/j.1467-6494.1997.tb00324.x

Rindskopf, D., & Rose, T. (1988). Some theory and applications of confirmatory second-order factor analysis. *Multivariate Behavioral Research, 23*, 51-67. DOI:10.1207/s15327906mbr2301_3

Roberts, B., Bogg, T., Walton, K., Chernyshenko, O. & Stark, S. (2004). A lexical investigation of the lower-order structure of conscientiousness. *Journal of Research in Personality, 38*, 164-178. DOI: 10.1016/S0092-6566(03)00065-5

Roberts, B., Chernyshenko, O., Stark, S., & Goldberg, L. (2005). The structure of conscientiousness: An empirical investigation based on seven major personality questionnaires. *Personnel Psychology, 58*, 103-139. DOI:10.1111/j.1744-6570.2005.00301.x

Roberts, B. W., & Del Vecchio, W. F. (2000). The rank-order consistency of personality traits from childhood to old age: A quantitative review of longitudinal studies. *Psychological Bulletin, 126*, 3–25. DOI:10.1037/0033-2909.126.1.3

Roberts, B. W., Harms, P. D., Caspi, A., & Moffitt, T. E. (2007). Predicting the counterproductive employee in a child-to-adult prospective study. *Journal of Applied Psychology, 92*, 1427-1436. DOI:10.1037/0021-9010.92.5.1427

Robertson, I., & Smith, M. (2001). Personnel selection. *Journal of Occupational and Organizational Psychology, 74*, 441-472. DOI:10.1348/096317901167479

Robinson, S. L., & Bennett, R. J. (1995). A typology of deviant workplace behaviors: multidimensional scaling study. *Academy of Management Journal, 38,* 555–572. DOI:10.2307/256693.

Rolland, J. P. (2002). Cross-cultural generalizability of the five-factor model of personality. In R. R. McCrae & J. Allik (Eds.), *The five-factor model of personality across cultures* (pp. 7–28). New York: Kluwer Academic/Plenum Publishers.

Rothstein, M. G., & Goffin, R. D. (2006). The use of personality measures in personnel selection: what does current research support?. *Human Resource Management Review*, *16*, 155-180. DOI: 10.1016/j.hrmr.2006.03.004

Rotundo, M., & Sackett, P. R. (2002). The relative importance of task, citizenship, and counterproductive performance to global ratings of job performance: A policy-capturing approach. *Journal of Applied Psychology, 87,* 66–80. DOI:10.1037/0021-9010.87.1.66

Ryckman, R. M. (2008). *Theories of personality (9th ed.).* Belmont, CA, USA: Thomson Wadsworth.

Sackett, P. R. (2002). The structure of counterproductive work behaviors: Dimensionality and relationships with facets of job performance. *International Journal of Selection and Assessment, 10,* 5–11. DOI:10.1111/1468-2389.00189

Sackett, P. R., Berry, C. M., Wiemann, S. A., & Laczo, R. M. (2006). Citizenship and counterproductive work behavior: Clarifying relations between two domains. *Human Performance, 19*, 441-464. DOI:10.1207/s15327043hup1904_7

Salgado, J. F. (1997). The five factor model of personality and job performance in theEuropean community. *Journal of Applied Psychology, 82*, 30–43. DOI: 10.1037/0021-9010.82.1.30

Salgado, J. (2002) The big five personality dimensions and counterproductive behaviors. *International Journal of Selection and Assessment, 10*, 117–125. DOI: 10.1111/1468-2389.00198

Salgado, J. (2003). Predicting job performance using FFM and non-FFM personality measures. *Journal of Occupational and Organizational Psychology, 76*, 323-346. DOI:10.1348/096317903769647201

Salgado, J. F., Viswesvaran, C., & Ones, D.S. (2002). Predictors used for personnel selection: An overview of constructs, methods and techniques. In N. Anderson, D. S. Ones, H. K. Sinangil & C. Viswesvaran (Eds.), *Handbook of industrial, work and organizational psychology: Vol. 1, Personnel psychology* (pp. 165–199). London: Sage.

Saucier, G. (1994). Trapnell versus the lexical factor: More ado about nothing? *European Journal of Personality, 8*, 291–298. DOI:10.1002/per.2410080406

Saucier, G. (1995). *Sampling the latent structure of person descriptors.* Paper presented at the 103rd annual meeting of the American Psychological Association, New York, NY.

Saucier, G. (1997). Effect of variable selection on the factor structure of person descriptors. *Journal of Personality and Social Psychology, 73*, 1296-1312. DOI:10.1037/0022-3514.73.6.1296

Saucier, *G. (2002).* Orthogonal markers for orthogonal factors: The case of the big five. *Journal of Research in Personality, 36, 1-31.* DOI: 10.1006/jrpe.2001.2335

Saucier, G. (2003). Factor structure of English-language personality type-nouns. *Journal of Personality and Social Psychology, 85*, 695–708. DOI:10.1037/002-3514.85.4.695

Saucier, G. (2004). *An integrative framework for factor structures based on personality lexicons.* Unpublished manuscript, University of Oregon, Oregon, USA.

Saucier, G., & Goldberg, L. R. (1996a). Evidence for the big five in analyses of familiar English personality adjectives. *European Journal of Personality, 10,* 61–77. DOI:10.1002/(SICI)1099-0984(199603)10:1<61::AID-PER246>3.0.CO;2-D

Saucier, G., & Goldberg, L. R. (1996b). The language of personality: Lexical perspectives on the five-factor model. In J. S. Wiggins (Ed.), *The five-factor model of personality: Theoretical perspectives* (pp. 21-50). New York: Guilford.

Saucier, G., & Goldberg, L. R. (1998). What is beyond the big five? *Journal of Personality, 66*, 495-524. DOI:10.1111/1467-6494.00022

Saucier, G., & Goldberg, L. R. (2001). Lexical studies of indigenous personality factors: Premises, products, and prospects. Journal of Personality, 69, 847-880. DOI:10.1111/1467-6494.696167

Saucier, G., & Goldberg, L. R. (2002). Assessing the big five: Applications of 10 psychometric criteria to the development of marker scales. In B. De Raad & M Perugini (Eds.), *Big Five assessment* (pp. 29-58). Geottingen, Germany: Hogrefe & Huber.

Saucier, G. & Goldberg, L. R. (2003). The structure of personality attributes. In M. R. Barrick & A. M. Ryan (Eds.), *Personality and work: Reconsidering the role of personality in organizations* (pp. 1-29). San Francisco, CA: Jossey-Bass.

Saucier, G., Hampson, S. E., & Goldberg, L. R. (2000). Cross-language studies of lexical personality factors. In S. E. Hampson (Ed.), *Advances in personality psychology*, Volume 1 (pp. 1-36). Hove, England: Psychology Press.

Saucier, G., & Ostendorf, F. (1999). Hierarchical subcomponents of the big five personality factors: A cross-language replication. *Journal of Personality and Social Psychology, 76, 613-627.* DOI:10.1037/0022-3514.76.4.613

Schmitt, N., Gooding, R., Noe, R. & Kirsch, M. (1984). Meta-analyses of validity studies published between 1964 and 1982 and the investigation of study characteristics. *Personnel Psychology, 37*, 407-422. DOI:10.1111/j.1744-6570.1984.tb00519.x

Schmidt, F. & Hunter, J. (1998). The validity and utility of selection methods in personnel psychology: Practical and theoretical implication of 85 years of research findings. *Psychological Bulletin, 124*, 262-274. DOI: 10.1037/0033-2909.124.2.262

Schmit, M., Kihm, J., & Robie, C. (2000). Development of a global measure of personality. *Personnel Psychology, 53,* 153-192. DOI:10.1111/j.1744-6570.2000.tb00198.x

Schmutte, P. S., & Ryff, C. D. (1997). Personality and well-being: reexamining methods and meanings. Journal of Personality and Social Psychology, 3, 549–559. DOI:10.1037/0022-3514.73.3.549

Schneider, R. J., Hough, L. M., & Dunnette, M. D. (1996). Broadsided by broad traits: How to sink science in five dimensions or less. Journal of Organizational Behaviour, 17, 639-655. DOI: 10.1002/(SICI)1099-1379(199611)17:6<639::AID-JOB3828>3.0.CO;2-9

Seibert, S. E., & Kramer, M. L. (2001). The five-factor model of personality and career success. *Journal of Vocational Behavior, 58*, 1-21. DOI:10.1006/jvbe.2000.1757

Shiu, E., Pervan, S. J., Bove, L. L., & Beatty, S. E. (2011). Reflections on discriminant validity: Reexamining the Bove et al. (2009) findings. *Journal of Business Research, 64*, 497-500. DOI:10.1016/j.jbusres.2010.04.

Shrout, P. E. & Bolger, N. (2002). Mediation in experimental and non-experimental studies; New procedures and recommendations. *Psychological Methods, 7*, 422-445. DOI:10.1037/1082-989X.7.4.422

Shultz, K. S., & Whitney, D. J. (2004). *Measurement theory in action: Case studies and exercises.* Thousand Oaks, CA: Sage

Skarlicki, D. P., & Folger, R. (1997). Retaliation in the workplace: The roles of distributive, procedural, and interactional justice. *Journal of Applied Psychology*, 82, 434-443. DOI:10.1037/0021-9010.82.3.434

Smith, G. M. (1967). Usefulness of peer ratings of personality in Educational research. *Educational and Psychological Measurement, 27,* 967-984. DOI:10.1177/001316446702700445

Smith, D. B., & Ellingson, J. E.. (2002). Substance versus style: A new look at social desirability in motivating contest. *Journal of Applied Psychology*, *87*, 211-219. DOI:10.1037/0021-9010.87.2.211

Smith, G. T., Fischer, S., & Fister, S. M. (2003). Incremental validity principles in test construction. *Psychological Assessment, 15,* 467–477. DOI:10.1037/1040-3590.15.4.467

Smith, G. T., & McCarthy, D. M. (1995). Methodological considerations in the refinement of clinical assessment instruments. *Psychological Assessment, 7*, 300-308. DOI: 10.1037/1040-3590.7.3.300

Smith, C. A., Organ, D. W., & Near, J. P. (1983). Organizational citizenship behavior: Its nature and antecedents. *Journal of Applied Psychology, 68,* 653-663. DOI: 10.1037/0021-9010.68.4.653

Soldz, S., & Vaillant, G. E. (1999). The big five personality traits and the life course: A 45-year longitudinal study. *Journal of Research in Personality, 33,* 208-232. DOI: 10.1006/jrpe.1999.2243

Somer, O., & Goldberg, L. R. (1999). The structure of Turkish trait-descriptive adjectives. *Journal of Personality and Social Psychology, 76*, 431-450. DOI:10.1037/0022-3514.76.3.431

Soper, D.S. (2013). *A-priori sample size calculator for structural equation models* [Software]. Available from http://www.danielsoper.com/statcalc

Spector, P. E., & Fox, S. (2002). An emotion-centered model of voluntary work behavior: Some parallels between counterproductive work behavior (CWB) and organizational citizenship behavior (OCB). *Human Resource Management Revie*w, 12, 269–292. DOI: 10.1016/S1053-4822(02)00049-9

Steiger, J. H. (1989). *EzPATH: A supplementary module for SYSTAT and SYGRAPH*. Evanston, IL: Systat, Inc.

Steiger, J. H. (1990). Some additional thoughts on components, factors, and factor-indeterminacy. *Multivariate Behavioral Research, 25*, 41-45. DOI:10.1207/s15327906mbr2501_4

Steiger, J. H., & Lind, J. C. (1980). *Statistically-based tests for the number of factors*. Paper presented at the Annual Spring Meeting of the Psychometric Society. Iowa City, Iowa.

Stone, E. F. (1978). *Research methods in organizational behavior*. Glenview, IL: Scott, Foresman.

Streiner, D.L. (2003). Starting at the beginning: An introduction to coefficient alpha and internal consistency. *Journal of Personality Assessment, 80*, 99-103. DOI**:** 10.1207/S15327752JPA8001_18

Steiner, D., & Norman, G. (2000). *Health measurement scales. A practical guide to their development and use.* New York: Oxford University Press.

Stewart, G. L. (1999). Trait bandwidth and stages of job performance: Assessing differential effects for conscientiousness and its subtraits. *Journal of Applied Psychology, 84,* 959-968. DOI:10.1037/0021-9010.84.6.959

Tabachnick, B. G., & Fidell, L. S. (2001). *Using multivariate statistics*. Boston: Allyn and Bacon.

Tabachnick, B., & Fidell, L. (2007). *Using multivariate analysis* (5th ed.). Needham Heights, MA: Allyn & Bacon.

Tanaka, J. S. (1987). “How big is big enough?": Sample size and goodness of fit in structural equation models with latent variables. *Child development, 58*, 134-146. DOI: 10.2307/1130296

Tellegen, A. (1982). Brief manual for the differential personality questionnaire. Unpublished manual, Department of Psychology, University of Minnesota, MN.

Tellegen, A. (1985). Structures of mood and personality and their relevance to assessing anxiety, with an emphasis on self-report. In A. H. Tuma & J. D. Maser (Eds.), *Anxiety and the anxiety disorders* (pp. 681-716). Hillsdale, NJ: Erlbaum.

Tellegen, A. (1994). *Manual for the multidimensional personality questionnaire.* Minneapolis: University of Minnesota Press.

Tellegen, A., & Waller, N. G. (1987). *Reexamining basic dimensions of natural language trait descriptors.* Paper presented at the 95th annual convention of the American Psychological Association, New York.

Tellegen, A., & Waller, N. G. (2008). Exploring personality through test construction:development of the multidimensional personality questionnaire. In G. J. Boyle,G. Matthews, & D. H. Saklofske (Eds.), *The Sage handbook of personality theory and assessment:* Vol. II. *Personality measurement and testing* (pp. 261–292). London: Sage

Terracciano, A., & Costa, P. T., Jr. (2004). Smoking and the five-factor model of personality. *Addiction, 99*, 472-481. DOI:10.1111/j.1360-0443.2004.00687.x

Tett, R. P., Guterman, H. A., Bleier, A., & Murphy, P. J. (2000). Development and content validation of a “hyperdimensional” taxonomy of managerial competence. *Human Performance, 13*, 205-251. DOI:10.1207/S15327043HUP1303_1

Tett, R. P., Jackson, D. N., & Rothstein, M. (1991). Personality measures as predictors of job performance: A meta-analytic review. *Personnel Psychology, 44*, 703–742. DOI:10.1111/j.1744-6570.1991.tb00696.x

Tett, R. P., Steele, J. R. & Beauregard, R. S. (2003). Broad and narrow measures on both sides of the personality–job performance relationship. *Journal of Organizational Behavior, 24*, 335–356. DOI:10.1002/job.191

Thompson, B. (2000). Ten commandments of structural equation modeling. In L. G. Grimm & P. R. Yarnold(Eds.), *Reading and understanding more multivariate statistics* (pp. 261–284). Washington, DC: American Psychological Association.

Trapmann, S., Hell, B., Hirn, J. O. W., & Schuler, H. (2007). Meta-analysis of the relationship between the big five and academic success at university. *Journal of Psychology, 215,* 132-151. DOI:10.1027/0044-3409.215.2.132

Trapnell, P. D., & Wiggins, J. S. (1990). Extension of the interpersonal adjective scales to include the big five dimensions of personality. *Journal of Personality and Social Psychology, 59*, 781-790. DOI:10.1037/0022-3514.59.4.781

Tupes, E. C., & Christal, R. E. (1961/1992). Recurrent personality factors based on trait ratings. *Journal of Personality, 60*, 225–251. DOI: 10.1111/j.1467-6494.1992.tb00973.x

Vaidya, J. G., Gray, E. K., Haig, J., & Watson, D. (2002). On the temporal stability of personality: Evidence for differential stability and the role of life experiences. *Journal of Personality and Social Psychology, 83*, 1469–1484. DOI:10.1037/0022-3514.83.6.1469

Van Dyne, L., Graham, J. G., & Dienesch, R. M. (1994). Organizational citizenship behavior: Construct redefinition, operationalization, and validation. *Academy of Management Journal*, 37, 765-802. DOI:10.2307/256600.

Van Scotter, J. R., & Motowidlo, S. J. (1996). Evidence for two factors of contextual performance: Job dedication and interpersonal facilitation. *Journal of Applied Psychology*, 81, 525-531. DOI:10.1037/0021-9010.81.5.525

Velicer, W. F., Eaton, C. A., & Fava, J. L. (2000). Construct explication through factor or component analysis: A review and evaluation of alternative procedures for determining the number of factors or components. In R. D. Goffin & E. Helmes, (Eds.), *Problems and solutions in human assessment* (pp. 41-71). Boston: Kluwer.

Velicer, W. F., & Fava, J. L. (1998). Affects of variable and subject sampling on factor pattern recovery. *Psychological Methods, 3,* 231-251. DOI: 10.1037/1082-989X.3.2.231

Vinchur, A. J., Schippmann, J. S., Switzer, F. S., & Roth, P. L. (1998). A meta-analytic review of predictors of job performance for salespeople. *Journal of Applied Psychology, 83*, 586–597. DOI: 10.1037/0021-9010.83.4.586

Viswesvaran, C. & Ones, D. S. (2000) Perspectives on models of job performance. *International Journal of Selection and Assessment, 8*, 216–226. DOI: 10.1111/1468-2389.00151

Vollrath, M., Knoch, D., & Cassano, L. (1999). Personality, risky health behavior, and perceived susceptibility to health risks. *European Journal of Personality, 13*, 39-50. DOI: 10.1002/(SICI)1099-0984(199901/02)13:1<39::AID-PER328>3.0.CO;2-J

Wagerman, S. A., & Funder, D. C. (2007). Acquaintance reports of personality and academic achievement: A case for conscientiousness. *Journal of Research in Personality, 41*, 221–229. DOI: 10.1016/j.jrp.2006.03.001

Warr, P., Bartram, D., & Martin, T. (2005). Personality and sales performance: Situational variation and interactions between traits. International Journal of Selection and Assessment, 13, 87-91. DOI: 10.1111/j.0965-075X.2005.00302.x

Watson, D., & Clark, L. A. (1997). Extraversion and its positive emotional core. In R. Hogan, J. A. Johnson & S. R. Briggs (Eds.), *Handbook of personality psychology* (pp. 767-793). San Diego, CA: Academic Press.

Watson, D., & Hubbard, B. (1996). Adaptational style and dispositional structure: Coping in the context of the five-factor model. *Journal of Personality, 64,* 737-774. DOI:10.1111/j.1467-6494.1996.tb00943.x

Weinstock, L. M., & Whisman, M. A. (2006). Neuroticism as a common feature of the depressive and anxiety disorders: A test of the revised integrative hierarchical model in a national sample. *Journal of Abnormal Psychology*, *115*, 68-74. DOI:10.1037/0021-843X.115.1.68

West, S. G., Finch, J. F., & Curran, P. J. (1995). Structural equation models with nonnormal variables: Problems and remedies. In R. H. Hoyle (Ed.), *Structural equation modeling: Concepts, issues and applications* (pp. 56–75). Newbury Park, CA: Sage.

Westland, J. C. (2010). Lower bounds on sample size in structural equation modeling. *Electronic Commerce Research and Applications*, *9*, 476-487. DOI: 10.1016/j.elerap.2010.07.003

Wiggins, J. S. (1991). Agency and communion as conceptual coordinates for the understanding and measurements of interpersonal behavior. In W. M. Grove & D. Cicchetti (Eds.), *Thinking clearly about psychology: Essays in honor of Paul Meehl* (Vol. 2, pp. 8 –113). Minneapolis, MN: University of Minnesota Press.

Wiggins, J. S. (1992). Have model, will travel. *Journal of Personality, 60*, 527-532. DOI:10.1111/j.1467-6494.1992.tb00983.x

Wiggins, J. S., & Pincus, A. L. (1992). Personality: Structure and assessment. *Annual Review of Psychology,* 43, 473-504. DOI:10.1146/annurev.ps.43.020192.002353

Wiggins, J. S., & Trapnell, P. D. (1996). A dyadic-interactional perspective on the five-factor model. In J. S. Wiggins (Ed.), *The five-factor model of personality: Theoretical perspectives* (pp. 180-207). New York: Guilford.

Williams, L. J., & Anderson, S. E. (1991). Job satisfaction and organizational commitment as predictors of organizational citizenship and in-role behaviours. *Journal of Management, 17,* 601-617. DOI:10.1177/014920639101700305

Woods, S. (2003). Five reasons to be optimistic about the future of personality assessment as a selection tool. *Selection & Development Review, 19*(4), 12-14.

Wood, J. M., Tataryn, D. J., & Gorsuch, R. L. (1996). Effects of under- and overextraction on principal axis factor analysis with varimax rotation. *Psychological Methods*, *1*, 354-365. DOI: 10.1037/1082-989X.1.4.354

Yuan, K.-H., Bentler, P. M., & Kano, Y. (1997). On averaging variables in a CFA model. *Behaviormetrika*, *24*, 71-83. DOI: 10.2333/bhmk.24.71

Zhao, H., & Seibert, S. E. (2006). The big five personality dimensions and entrepreneurial status: A meta-analytical review. *Journal of Applied Psychology*, 91, 259-271. DOI:10.1037/0021-9010.91.2.259

Zwick, W. R., & Velicer, W. F. (1982). Factors influencing four rules for determining the number of components to retain. *Multivariate Behavioral Research, 17,* 253-269. DOI:10.1207/s15327906mbr1702_5

Zwick, W. R., & Velicer, W. F. (1986). A comparison of five rules for determining the number of components to retain. *Psychological Bulletin, 99,* 432-442. DOI:10.1037/0033-2909.99.3.432

Appendix A

Data Analysis Strategy

Study	Analysis Techniques	Rational
Study 1		
	Exploratory Factor Analysis (EFA); Parallel Analysis; The Root Mean Square Error of Approximation Goodness of Fit Index (RMSEA); and Correlations	The purpose of the Study 1 was to identify the shared overall lower-order structure for each of the Big Five domains by factor analysing facet scale scores from nine major personality inventories. The rationale for this study is discussed in more detailed in sections 1.2 and 2.1.6. *EFA* To derive an initial lower-order structure of each Big Five factor, the data driven, EFA approach was preferred over a theory-oriented confirmatory factor analysis (CFA). CFA requires researchers to have explicit hypotheses as to which factors exists, and how factors relate to the variables as well as each other (Gorsuch, 1997). Gorsuch further noted that devoid of such presumptions, exploratory analyses are needed. As Finch and West (1997) purported, when the researcher does not have any explicit hypotheses which can guide the probing of the underlying structure of data, EFA techniques are most suitable. Currently, there is no empirical or theoretical underpinning for the lower-order taxonomy of each Big Five factor (Conscientiousness, Extraversion, Emotional Stability, Agreeableness, and Openness to Experience). As a consequence, there is no basis on which to make sound assumptions about the number of lower-order factors that comprise each Big Five personality factor or

what particular personality scales they influence. In this context, EFA was used as it is likely to be a more practicable approach than CFA, because the number of plausible alternative models is so great it would be infeasible to test each pattern in CFA (Fabrigar et al., 1999). An EFA may be useful in a preliminary study to generate and focus hypotheses that can be subjected to confirmatory analyses in later studies (Gorsuch, 1997; MacCallum et al., 1999).

EFA extraction methods, maximum likelihood estimation (MLE) and principal-axis factoring generally produce the best results (Costello & Osborne, 2005). The main advantages of the MLE procedure is that it allows for the computation of a wide range model-data fit statistics; it produces goodness of fit information that can be used to determine the number of factors to retain (Fabrigar, et al., 1999). In this study, the root mean square error of approximation goodness of fit index (RMSEA; Browne & Cudeck, 1993; Steiger & Lind, 1980), which is one of the goodness of fit statistics produced by MLE (Fabrigrar et al., 1999) was one of the techniques used determine how many lower-order factors to retain for each of the Big Five factors. RMSEA is a measure of fit based on the chi-square value and the degrees of freedom (Browne & Cudeck, 1993; Steiger & Lind, 1980). Moreover, RMSEA can be calculated using the chi-square and the degrees of freedom produced by maximum likelihood factor analysis (Browne & Cudeck, 1993). This is the main reason why MLE was chosen over the principal-axis factoring extraction method. Furthermore, MLE allows for the computation of statistical significant tests of factor loadings and correlations among factors and of confidence intervals for these parameter estimates (Fabrigar, et al., 1999). Also, MLE have

the added advantage of accuracy in large samples over other extraction methods such as principal factor analysis (Finch & West, 1997). Given that a major drawback of MLE is its assumption of multivariate normality of the measured variables (Fabrigar et al., 1999), the univariate skewness and kurtosis values for individual scales were investigated according to the guidelines of severe nonnormality (i.e., skew> 2; kurtosis > 7) proposed by West, Finch, and Curran (1995). Furthermore, Ferguson and Cox (1993) purported that the final solution in EFA is not adversely affected by an acceptability level of 25% of variables showing non-normality. In addition, Mardia's (1970) coefficient was conducted to test for multivariate normality of measured variables. If the distribution only deviates marginally from that of a normal distribution, Mardia's coefficient will be close to 0.00 with a nonsignificant normalized estimate. Mardia's values outside the range of – 3.00 to +3.00 indicate a departure from multivariate normality (Bentler, 2006).

Scales from the nine personality inventories together were subjected to MLE extraction with orthogonal (varimax) rotation to determine which of the Big Five domains each facet had its highest loading. This empirical approach to determining where the scales fit within the Big Five domains was preferred because: "the fact that a scale has been conceptually located in one of the Big Five domains may not be the best guide to determine whether the scale is statistically located in that domain" (DeYoung et al., 2007, p. 885). In addition, facets with their highest loading on each of the Big Five domains were then subjected to separate EFAs, MLE extractions with oblique (promax) rotation. Goldberg and Velicer (2006) recommended that researchers used an

orthogonal rotation if the emphasis is on higher-level factors and an oblique rotation if they seek lower level factors in a single domain.

Parallel Analysis

Parallel analysis, a method based on the generation of random variables (Horn, 1965) and RMSEA (Browne & Cudeck, 1993; Steiger & Lind, 1980) were used to determine how many lower-order factors to retain for each of the Big Five factors. The Kaiser-Guttman rule of computing the eigenvalues for correlation matrix, which recommend that the number of factors to be extracted is determined by the number of eigenvalues greater than 1 (Guttman, 1954; Kaiser, 1960) was not used in this study because the application of this rule to eigenvalues of the reduced correlation matrix rather than eigenvalues of the unreduced correlation matrix is an invalid procedure (Fabrigar et al., 1999). Additionally, simulation studies found that the Kaiser-Guttman procedure led to considerable overfactoring, often by 30-50% and occasionally to underfactoring (Gorsuch, 1983; Hakstian, Rogers, & Cattell, 1982; Velicer, Eaton, & Fava, 2000; Zwick & Velicer, 1982, 1986).

Parallel analysis was proposed by Horn (1965) as means to improving the Kaiser-Guttman rule by providing a comparison baseline. In this method, actual sample data eigenvalues from the correlation matrix obtained in principal factors or PCA are compared against the eigenvalues obtain from random data correlation matrices based on the same sample size and the number of variables (Fabrigrar et al., 1999; Horn, 1965). For parallel analysis, the optimal number

of factors is determined by the number of eigenvalues from the actual sample data correlation matrix that are greater than the corresponding mean eigenvalue from the random data correlation matrices (Finch & West, 1997; Horn, 1965; Humphreys & Montanelli, 1975; O'Connor, 2000). Simulation research has indicated that parallel analysis is one of the most consistently accurate methods for determining the number of factors to be retained (Humphreys & Montanelli, 1975; Longman et al., 1989; Velicer et al. 2000; Zwick & Velicer, 1986).

RMSEA

RMSEA goodness of fit index was introduced by Steiger and Lind (1980) for evaluating covariance structure models. The advantages of RMSEA index is the availability of both a point of estimate and corresponding confidence interval (Steiger, 1989, 1990). As a result, many of problems and paradoxes apparent in testing models with large sample sizes are reduced (Steiger, 1989, 1990). The RMSEA index of fit is one of the goodness of fit statistics produced by the MLE for EFA procedure (Fabrigrar et al., 1999) and CFA (Hair et al., 2010). As mentioned above, RMSEA can be calculated using the chi-square and the degrees of freedom produced by maximum likelihood factor analysis (Browne & Cudeck, 1993). To use the RMSEA goodness of fit index to determine the optimal number of factors, RMSEA statistics was computed for factor analysis model of increasing complexity until a RMSEA index of .05 or less is obtained. A RMSEA index of fit of .05 represents good fit (Brown & Cudeck, 1993; Steiger, 1989). The aim of such an approach is to select a model that explains the data substantially better than alternative models with fewer factors, but performs as

well or almost as well as alternative models with more factors (Fabrigrar et al., 1999).

Correlations

After EFA analysis was used to identify facets of each Big Five domain that was interpretable, correlations were used to examine the convergent and discriminant validity of the tweny-nine as well as to confirm that there were no redundant facets within the respective Big Five domains. First, scale scores for the 162 scales were standardised to z-score metric by subtracting the mean from a score and dividing by the standard deviation so that scales from different inventories were on the same metric. Based on the EFA results for each Big Five domain, the standardised scores for scales that loaded on a facet were summed to obtain a single score for that facet. To test for convergent and discriminant validity, Pearson's correlations between facet indicators and the Big Five global factor indicators were computed. The size of the correlation between a facet indicator and its overall Big Five domain composite (the composite was created by summing standardized scores for all facets in the Big Five domain excluding the studied facet) was compared against the correlation between the respective facet and the other four Big Five global factor indicators. For example, correlations between affiliation (an indicator of Extraversion) and the four Big Five global indicators (Conscientiousness, Emotional Stability, Agreeableness, and Openness to Experience) were compared to the correlation of affiliation with an overall Extraversion composite of social boldness, sociability, expressiveness, assertiveness, and enthusiasm, excluding affiliation.

Study 2			
	Phase 1: Scale Development Process–Initial Item Generation	Bivariate Correlations	The purpose of Study 2 was to develop and validate the Hierarchical Personality Assessment Questionnaire (HPAQ) to explicitly represent the twenty-nine facets identified in Study 1 of this thesis as underlying the Big Five personality factors. The development of the HPAQ progressed through a number of stages, and was guided by intuitive or rational and internal strategies. The rationale for this study as well as the approach used for developing the scales is discussed in more detailed in sections 4.1 and 4.2. In the development of the HPAQ, constructs to be measured were first identified (Study 1) and sets of items intended to tap these constructs were drawn from over 2,000 public domain items contained in the IPIP that have been administered to members of Eugene-Springfield Community Sample (ESCS) , who were included in analyses for Study 1. The IPIP is “uniquely well-suited to the empirical characterisation of factor content at the item level” (DeYoung et al., 2007, p. 885). Therefore, the IPIP may allow for a more accurate characterisation of the twenty-nine facets. Consistent with prior studies (), the IPIP items were correlated with the factor scores for the twenty-nine facets from Study 1. Thus, analyses were performed using data from the 375 ESCS participants who completed all of the IPIP items and had a factor score for each of the twenty-nine facets. The 12 items demonstrating the highest correlations with each facet were selected for the initial pool of items. The goal in the development of the HPAQ was to create scales with 8 common items so as to ensure that the test is

		of a manageable length. Saucier and Goldberg (2002) noted that in most cases four-item scales seem to be a practical minimum. However, an 8- to 10-item scale is likely to produce scores with a more Gaussian distribution than would a scale comprising only four-items (Saucier & Goldberg, 2002). For the initial pool of items, 20% more items than actually needed were chosen so that an adequate quantity of good items would be available for the final version of the test (Aiken & Groth-Marnat, 2006). Hence, 12 items for each facet were included in the initial pool of items. To ensure adequate discrimination between the twenty-nine facets as well as avoid undue item cross-loading on the other Big Five domains, items were excluded if they correlated with more than one factor and the difference between correlations was less than .1. Special care was made to ensure that a balanced number of negatively and positively keyed items were included in each scale to control for acquiescence, which "is likely to be confounded with item content and social desirability responding" (Saucier & Goldberg, 2002, p. 31). The process used to generate the initial item pool is discussed in more detail in section 4.2.1 and 4.2.2.
Phase 2: Scale Development Process–Final Item Selection and Reduction	Corrected item-total correlation; EFA; and Cronbrach's coefficient alpha	The initial pool of 348 IPIP items to mark the twenty-nine facets was administered to a large sample of undergraduate and postgraduate students (N= 778) at a University in the English-speaking Caribbean with the intention of choosing 8 items that best marked each of the facets, based on their psychometric properties in the new sample.

Exploratory Factor Analysis (EFA) was adopted as the basis for item selection. For conducting analyses, EFA was preferred to PCA as EFA is the more appropriate choice for the researcher when goal is on identifying latent constructs that are expected to be underlying measured observed variables and thus when the researcher has an a priori assumption about the underlying structure of measured variables (Fabrigar et al., 1999; Tabachnick & Fidell, 2007). EFA is a data reduction technique, but with the assumptions of an underlying theoretical structure in the measured variables while PCA is purely a data reduction technique (Fabrigar et al., 1999; Tabachnick & Fidell, 2007). Moreover, an EFA method such as Principal-axis factoring is preferred to PCA "because the principal-components method of analysis mixes common, specific, and random error variances" (Hinkin, 1998, p. 112).

Final item selection was not solely empirical as the researcher guided the analyses in several ways. Following the recommendations of Hinkin (1998), item analyses began by calculating the inter-item correlations for the items with each facet scale prior to conducting factor analysis. Moreover, the corrected item-total correlation was used to determine if items should be retained or omitted from scales. If the corrected item-total correlation is moderately high or high (.4 and above), the item would be deemed as fitting the scale psychometrically well (Leech, Barrett, & Morgan, 2005). However, other researchers have recommended a minimum cut-off for the corrected item-total correlation of .2 (Streiner & Norman, 2000) or .3 (Nunnally & Bernstein, 1994). In this study, a lower acceptable minimum cut-off for the corrected item-total correlation of .2 was used in order

to avoid placing too strict criteria for item deletion.

Items retained based on the corrected item-total correlation criteria were subjected to EFAs. First, items within each Big Five domain were subjected to Principal-axis Factoring with oblique (promax) rotation to define facets. The remaining items were then factor analysed at the Big Five domain level using Principal-axis Factoring with orthogonal (varimax) rotation. Goldberg and Velicer (2006) recommended the use of oblique rotation if the researcher seeks lower-level factors within a single domain and the use of an orthogonal rotation if the emphasis is on higher-level factors. The researcher also ensured that there were a roughly equal number of positively and negatively keyed items representing each of the facets to control for acquiescence (Saucer & Goldberg, 2002). Scales were not allowed a ratio of negatively to positively items (or vice versa) greater than 5/3. Data was screened on the basis of a number of rules. Items were omitted if:

- they loaded less than 0.4 on a factor;
- they loaded on more than one factor and the difference between loadings was less than 0.1;
- and being exploratory in nature, if they did not have their highest loading on the intended facet and Big Five domain.

Once all items that do not meet the minimum criteria for retention are removed, the reliability of scales should then be examined for internal consistency (Gerbing & Anderson, 1988). In this study, scale reliability estimates (Cronbrach's coefficient alpha) were calculated for all scales. Cronbrach's alpha is arguably the most widely used measure of reliability

		of a scale (Streiner, 2003), and is an estimate of internal consistency and the extent to which items in a scale are homogeneous (Cooper & Emory, 1995). There is currently no universal agreement among researchers as to minimum acceptable value of Cronbach's alpha for a scale before it can be considered unreliable (Bryant et al., 2007). A number of authors have proposed different criteria for minimum acceptable value of alpha. For example, Nunnally (1967) recommended a minimum acceptance alpha coefficient level of .50-.60 for research in its early stage, .80 basic research instruments, and .90 for clinical research purposes. However, in later versions of his book (Nunnally 1978, Nunnally & Bernstein, 1994), Nunnally recommended a minimum alpha coefficient level of .70. Other researchers have recommended a minimum alpha coefficient level of .60 for new scales, such as the one developed in this study (Flynn et al., 1994; Hair et al., 1998). Moreover, Kline (1998) suggested that alpha coefficients level below .50 should be avoid while alpha coefficients of .70 are adequate, .80 are good, and .90 are excellent. However, in the current study, the minimum level ($\alpha \geq .70$) was used to ensure that only reliable scales are retained in the instrument. This is in keeping with the minimum acceptance alpha coefficient level used by many researchers (Bryant et al., 2007).
Phase 3: Construct Validation	Confirmatory factor analysis (CFA); Average variance extracted (AVE); Composite	An objective of present research was to examine the construct validity of the HPAQ. The psychometric properties of the new personality instrument was assessed using a separate independent sample from the development sample, consisted of 807 working and non-working undergraduate and postgraduate students at a University in the English-

reliability.

speaking Caribbean receiving credit for research participation. Some researchers have argued that it is inappropriate to use same sample both to develop an instrument and to assess its psychometric properties (e.g. Campbell, 1976) as factors that may be sample specific, yielding high reliabilities, are likely to result from the use of factor analytic techniques to develop the scales (Krzystofiak et al., 1988). In this respect, some researchers have recommended using independent samples for scale development and for assessing their psychometric properties (e.g. Stone, 1978). Also, the use of independent samples enhances the generalisability of new developed instruments.

Instrument validation can be divided into three forms referred to as criterion validity, content validity, and construct validity. When validating an instrument, researchers usually aim to provide evidence of one or more of these forms (Hinkin, 1998). Up to this point, evidence that the HPAQ possess content validity has been established (see Sections 4.2.2 and 4.2.3.2). Content validity refers to the extent to which items within an instrument are relevant to and representative of the targeted construct (Onwuegbuzie et al., 2009).

Construct validity refers to the extent to which an instrument measures the theoretical construct of interest (Anastasi & Urbina, 1997). In the present research, construct validity of HPAQ was assessed through an examination of the instrument's factor structure or structural validity, convergent validity, and discriminant validity. Despite the fact that EFA analyses have been a commonly used empirical approach to assess structural validity (Onwuegbuzie, et al.,

2009), in a multiple-indicator measurement model, items that clearly load on a factor in an EFA due to the lack of external consistency may demonstrate inadequate fit (Gerbing & Anderson, 1988). Therefore, confirmatory factor analysis (CFA) is recommended to confirm the factor structure of the scales revealed from the EFA (Hinkin, 1998). Thus, providing further evidence of the construct validity of new instrument. The present research conducted a second-order CFA using AMOS 18 was performed on the university scale validation sample data to assess the structural validity of the HPAQ structure derived from EFA. The HPAQ was developed to explicitly represent the Big Five model. More specifically, as mentioned previously, the HPAQ was constructed to assess a hierarchical structure with the Big Five domains represented at the top hierarchy and the 29 facets identified in Study 1 as underlying the trait domain of Big Five represented below. In a second-order CFA model, higher order latent variables are modelled as causal variables impacting first-order latent variables (i.e. typical latent variables with measured indicators), and thus second-order latent variables are not directly connected to any measured items (Hair et al., 2010). In the second-order CFA model to examine the structure of the HPAQ instrument, the Big Five personality factors were represented at the top hierarchy as higher-order latent variables modelled as causing 29 facets represented as first-order latent factors measured by eight indicators or observed variables (items) each.

It has been suggested that CFA may not be appropriate for evaluating personality structure because most personality items and scales are multifactor in nature (McCrae et al.,

1996). CFA is considered a better approach than EFA when there is a sufficient theoretical and empirical basis for a researcher to hypothesise a structure that they believe underlies the data (Fabrigar et al., 1999). This is because specific hypotheses about the data can be tested using CFA (Finch & West, 1997; Fabrigar et al., 1999). Furthermore, because of the a priori nature of CFA, the researcher is not likely to capitalise on chance characteristics in the data (Fabrigar et al., 1999).

For an instrument to have adequate construct validity, it should have high correlations with different measures of the same construct – convergent validity; and low correlations with measures of different constructs – discriminant validity (Aiken & Groth-Marnat, 2006; Anastasi & Urbina, 1997). As individual facet scales are intended to represent one of the five broad domains, all facets in a domain should share many correlates. However, it is also necessary for scales to show differential relations in order to be truly valuable for understanding specific traits (Costa & McCrae, 1992a). Using AMOS 18, CFA was employed to examine the internal convergent of the HPAQ Big Five domain scales and the HPAQ facet scales. The properties of the second-order CFA measurement model conducted to assess the structural validity of the HPAQ structure were used to assess the internal convergent validity of the HPAQ Big Five domain scales and the HPAQ facet scales. To assess internal convergent validity of the HPAQ, factor loadings, composite reliabilities, and average variance extracted (AVE) estimates were examined for each HPAQ Big Five domain and facet scale. Item factor loadings that are statistically significant and exceed the minimum cut-off of 0.5 provide evidence of

adequate convergent validity (Hair, Black, Babin, Anderson, & Tatham, 2006). Composite reliability assesses the degree to which a set of latent construct indicators share the measurement of a construct (Fornell & Larcker, 1981). Composite reliability values of 0.60 and higher are considered adequate for convergent validity (Bagozzi & Yi, 1988; Fornell & Larcker, 1981; Hair et al., 1998). Fornell and Larcker (1981) suggest using AVE to assess convergent validity. The AVE is the average variance shared between a construct and its measure (Fornell & Larcker, 1981). Convergent validity is established when the AVEs of scales exceed the minimum cut-off of 0.5 as recommended by Fornell and Larcker (1981).

The discriminant validity of the HPAQ Big Five domain scales and the HPAQ facet scales was assessed using three procedures based on confirmatory factor analysis. The properties of the second-order CFA measurement model conducted to assess the structural validity of the HPAQ structure were used to assess the internal discriminant validity of the HPAQ Big Five domain scales. Whereas the properties of a first-order CFA measurement model including the 29 facets as latent variables measured by their eight item indicators was used to assess the discriminant validity of the HPAQ facet scales. Firstly, the squared correlations between constructs were compared with the AVE estimates for each construct (Fornell & Larcker, 1981; Hair et al., 2006). In order to establish discriminant validity, the squared correlations between constructs should be less than the AVE of the said construct (Fornell & Larcker, 1981). Secondly, the nested model approach in SEM was also used to assess discriminant validity. This approach involves

comparing a constrained pair of constructs (e.g., correlation between the two facets is fixed to 1) with an unconstrained pair of the same constructs (the correlation between two facets is freely estimated) based on a Chi-Square difference test (Anderson & Gerbng, 1988; Bagozzi & Philips, 1982; Bagozzi, Yi, & Phillips, 1991). As the difference in chi-square will have a chi-square distribution with one degree of freedom, a chi-square difference value exceeding 3.84 indicates that the correlation between the pair of constructs is significantly different from 1.00 at the .05 significance level (Shiu et al., 2011). Where these two models (unconstrained and constrained) differ significantly on Chi-square difference, evidence of discriminant validity on these pairs of latent variables is revealed (Anderson & Gerbing, 1988; Bagozzi & Philips, 1982; Bagozzi et al., 1991). Within the CFA model, the nested approach analysis was performed for one pair of latent variables at a time. Thirdly, the discriminant validity of the HPAQ Big Five domain scales and the HPAQ facet scales was assessed by examining the 95% confidence interval for correlations between pairs of the Big Five personality factors and pairs of the HPAQ facets (Bagozzi et al., 1991). Where the 95% confidence interval does not contain 1.00, it indicates that the correlation between the two constructs is significantly less than 1 at the 5% significance level, and thus the two constructs are distinct.

Anastasi (1988) noted that “it is only through the empirical investigation of the relationship of test scores to other external data that we can discover what a test measures” (p. 162). To further assess the convergent and discriminant validity of the HPAQ, correlations between the HPAQ five broad domains and the five broad factors of the

		NEO-PIR (Costa & McCrae, 1992a) were computed. Moreover, correlations between the facet scores of the HPAQ and the five broad factors of the NEO-PIR were calculated. According to Cohen (1988), $r \geq 0.5$ (or $r^2 \geq 0.25$) denotes a large effect size, indicating evidence of convergent validity.
Study 3		
	CFA; Bivariate Correlations; and Disattenuated Multiple Regression	The purpose of Study 3 was to investigate the differential criterion-related validity of the twenty-nine lower-order facets of the Big Five derived in Study 1 in predicting task performance, CWBO (counterproductive work behaviours towards the organisation), CWBI (counterproductive work behaviours towards the individual), and three organisation citizenship behaviours – OCBO (organisational citizenship behaviours towards the organisation), interpersonal courtesy, and interpersonal helping. In addition, this study also examined the incremental validity of those twenty-nine lower-order facets above and beyond the broad Big Five personality factors in the prediction of the above mentioned job performance criteria. Before investigating the relationships between personality variables and the six job performance criteria, CFA was used to assess the factor structure of the various instruments used to measure variables. In particular, a second-order CFA using AMOS 18 was performed to assess the factor structure of the HPAQ structure. Bivariate correlations among all variables were corrected or disattenuated for unreliability using the Cronbach's alpha estimates of the corresponding variables as well as Nunnally and Bernstein (1994) correction for attenuation procedure.

More specifically, the attenuated and disattenuated Pearson correlation coefficients between the HPAQ Big Five domain scales, the 29 HPAQ facet scales, and the NEO-FFI-3 Big Five domain scales and six job performance criteria were examined. Discussion of correlations between personality variables and the various job performance criteria are based on the uncorrected correlations as interpretations are facilitated by statistical significance testing. Given the exploratory nature of the analyses conducted here, as a solution to the problem of capitalisation on chance, this study used the Bonferroni correction approach for adjusting the selected alpha level (p = .05) to control for the overall Type 1 error rate for correlation (Howell, 2012). Testing 234 correlations require an adjusted p value of somewhat lower than .001 (a Bonferroni correction of p = .05/234 = .0002 level). This means that correlations have to be significant at .000. Therefore, the criterion correlations for the NEO-FFI-3 Big Five domain scales, HPAQ domain scales, and HPAQ facet scales were assessed in terms of p < .0002.

Criterion Validity

Separate disattenuated multiple regression analyses were conducted to examine the criterion-related validity of the broad HPAQ Big Five personality factors, the HPAQ facet scales, and the NEO-FFI-3 Big Five factor scales in predicting the six job performance criteria (task performance, CWBO, CWBI, OCBO, interpersonal courtesy, and interpersonal helping). For all disattenuated multiple regression analyses, the corrected correlation matrices between personality variables and job performance criteria were submitted to AMOS 18. Moreover, the bootstrapping method using the

Monte Carlo utility within AMOS 18 based on 5000 resamples was employed to test statistical significance of the multiple correlation (R), the squared multiple correlation (R^2), and the standardised beta weights (β). The Bootstrapping approach "is a process by which statistics (e.g., regression weights) are generated over a very large number replications, with samples drawn with replacement from a data set" (Tabachnick & Fidell, 2007, p. 141). The Monte Carlo Utility within AMOS 18 allowed corresponding raw data with the same inter-variable correlations, means, and standard deviations to be generated from which 95% confidence interval estimates based on 5000 bootstrapped resamples could be derived. It is important to note that using the bootstrapping method reduces the likelihood of Type 1 error as the number of inferential tests is minimised (Preacher & Hayes, 2004; Shrout & Bolger, 2002). Furthermore, bootstrapping is also a useful technique for avoiding overfitting data when using statistical regression (Tabachnick & Fidell, 2007). Additionally, given the non-existence of a well-established sampling theory for determining the statistical significance of effects disattenuated for unreliability, this procedure is deemed appropriate (Raju & Brand, 2003). Also, more accurate estimates of parameters can be obtained using bootstrapping. For bootstrap analyses, the R, R^2, and beta weights are considered significant when zero is not contained in their respective 95% confidence intervals. As the AMOS 18 computer software package does not compute an adjusted R^2 value (a modification of the coefficient of determination statistic that takes into consideration the number of predictors in the regression model and the sample size), an

adjusted R^2 for each regression equation was calculated.

Incremental Validity

Disattenuated hierarchical regression analyses using bootstrapping method employing the Monte Carlo utility within AMOS 18 based on 5000 resamples were conducted to explore the incremental validity of the lower level personality traits (HPAQ facet scales) above and beyond the broad Big Five personality factors (NEO-FFI-3 Big Five domain scales) in the prediction of task performance, CWBO, CWBI, OCBO, interpersonal courtesy, and interpersonal helping. Testing lower level personality traits from one questionnaire against higher level traits from a different questionnaire was deemed appropriate as such an approach would ensure that lower level and higher level measures with high linear dependencies are not included in the analyses (for instance, HPAQ Big Five domain scales are simple algebraic sums of participant scores on the HPAQ facet scales). A similar approach was also employed in other studies (For example, Paunonen & Ashton, 2001a; Paunonen, 1998). To illustrate incremental validity for each job performance criteria, two disattenuated hierarchal multiple regressions with reverse entry of only the predictive HPAQ facet scales for the criterion and the NEO-FFI-3 Big Five domain scales were performed. The reason for including only significant HPAQ facet scale predictors in the examination of incremental validity was so as to ensure an accurate estimation of the multiple correlation between predictors and criteria. Therefore, “the minimum value of the multiple correlation will be the most predictive facets’ correlation with the criterion” (Smith et al., 2003). In the first hierarchal

regression, in model 1, the NEO-FFI-3 Big Five domain scales were entered to predict the criterion. Then, the predictive HPAQ facet scales were added to the prediction equations in the second model to see whether they significantly increased the coefficient of determination (R^2) so as to evaluate their incremental contributions to criterion-related validity. The results were then compared with those from the reverse situation (second hierarchical regression), in which the predictive HPAQ facet scales were entered into the regression equations in model 1, and the NEO-FFI-3 Big Five domain scales were entered in model 2 to evaluate their incremental contributions to criterion-related validity.

Appendix B

Sample Characteristics for each Study

	Study 1		Study 2						Study 3	
	ESCS (N = 375)		ESCS (N= 375)		UDS (N =778)		UVS (N =807)		ES (N =545)	
	N	%	N	%	N	%	N	%	N	%
Gender										
Male	158	42.1	158	42.1	253	32.5	298	36.9	207	38.0
Female	217	57.9	217	57.9	525	67.5	509	63.1	338	62.0
Ethnicity										
White	367	97.8	367	97.8						
Hispanic	2	.5	2	.5						
Asian American	3	.8	3	.8						
Native American	1	.3	1	.3						
Black Caribbean					723	92.9	766	94.9	523	96
White American					8	1.0	4	.5		
White Caribbean					8	1.0	5	.6	5	.9
South Asian Caribbean					23	2.9	16	2	10	1.8
East Asian Caribbean					11	1.4	8	1	7	1.3
Did not report their ethnicity	3	.8	3	.8	5	.6	8	1		
Employment Status										
Full-time	173	46.1	173	46.1	118	15.2	104	12.9	545	100
Part-time	56	15.0	56	15.0	201	25.8	192	23.8		
Retired	113	30.1	113	30.1						
Homemaker	33	8.8	33	8.8						

Not Employed (full-time Student)					459	59.0	511	63.3		
Job / Organisational Level										
Senior Manager									13	2.4
Middle Manager									29	5.3
Supervisor									46	8.4
Employee (Non-Manual)									267	49.0
Employee (Manual)									190	34.9
	M	SD	M	SD	M	SD	M	SD	MD	SD
Tenure in current org.									9.01	6.37
Time in current job									6.92	5.22
Age	51.5	12.00	51.5	12.00	26.00	9.22	26.56	8.19	36.16	9.36
Age Range	(20-82)		(20-82)		(18-62)		(18-61)		(20-60)	

Note. ESCS = Eugene-Springfield community sample; UDS = university development sample; UVS = university validation sample; ES = employee or worker sample.

Appendix C

Descriptive Statistics for Facets from Each of the Nine Personality Inventories

Personality Inventory	Facet Name	N	Number of items	Scale Reliability	Mean	SD	Skewness	Kurtosis
Revised NEO	Anxiety	857	8	.83	14.66	5.61	.26	-.24
Personality Inventory	Angry Hostility	857	8	.80	12.18	4.91	.58	.34
	Depression	857	8	.85	12.61	5.92	.59	.08
	Self-Consciousness	857	8	.74	14.46	5.00	.41	.01
	Impulsiveness	857	8	.72	16.40	4.69	-.06	-.41
	Vulnerability	857	8	.79	9.73	4.32	.63	1.06
	Warmth	857	8	.80	22.66	4.44	-.62	.42
	Gregariousness	857	8	.80	14.87	5.60	-.03	-.28
	Assertiveness	857	8	.80	16.19	5.14	-.13	-.36
	Activity	857	8	.72	17.82	4.73	-.15	-.20
	Excitement Seeking	857	8	.64	15.30	4.96	-.06	-.04
	Positive Emotion	857	8	.81	20.18	5.08	-.40	.19
	Fantasy	857	8	.82	18.00	5.37	.04	-.45
	Aesthetics	857	8	.84	18.52	6.09	-.26	-.31
	Feelings	857	8	.75	21.33	4.33	-.16	-.10
	Actions	857	8	.64	15.89	4.09	.06	-.21
	Ideas	857	8	.82	19.25	5.73	-.31	-.14
	Values	857	8	.78	20.65	5.12	-.61	.21
	Trust	857	8	.84	21.49	4.69	-1.05	1.50
	Straightforwardness	857	8	.74	21.91	4.69	-.47	.16
	Altruism	857	8	.72	23.71	3.53	-.27	.17
	Compliance	857	8	.73	19.28	4.50	-.33	-.02
	Modesty	857	8	.75	18.41	4.64	-.17	-.11

Appendix C Continued

Personality Inventory	Facet Name	N	Number of items	Scale Reliability	Mean	SD	Skewness	Kurtosis
Revised NEO	Tender-mindedness	857	8	.61	19.92	3.84	-.27	.55
Personality Inventory	Competence	857	8	.70	23.02	3.67	-.37	.58
	Order	857	8	.74	18.47	4.83	-.33	.03
	Dutifulness	857	8	.67	23.92	3.88	-.43	.50
	Achievement Striving	857	8	.67	18.69	4.55	-.21	-.19
	Self-Discipline	857	8	.80	21.20	4.64	-.56	.60
	Deliberation	857	8	.70	18.01	4.21	-.09	-.07
Sixteen Personality	Warmth	680	11	.72	12.80	4.97	-.25	-.74
Factor Questionnaire	Reasoning	680	15	.73	10.97	2.91	-.76	-.06
	Emotional Stability	680	10	.76	14.52	4.66	-.97	.32
	Dominance	680	10	.68	10.97	4.53	-.11	-.73
	Liveliness	680	10	.69	9.05	4.64	.15	-.68
	Rule-Consciousness	680	11	.75	15.06	4.94	-.54	-.52
	Social Boldness	680	11	.72	9.95	6.27	.00	-1.24
	Sensitivity	680	11	.78	12.93	5.65	-.35	-.77
	Vigilance	680	10	.73	9.01	4.32	.28	-.45
Hogan Personality	Empathy	742	5	.62	2.82	1.56	-.26	-1.01
Inventory	Not Anxious	742	4	.82	2.19	1.58	-.21	-1.51
	No Guilt	742	6	.69	3.57	1.70	-.38	-.87
	Calmness	742	4	.44	3.08	1.00	-.93	.17
	Even-tempered	742	5	.59	3.43	1.35	-.70	-.17

Appendix C Continued

Personality Inventory	Facet Name	N	Number of items	Scale Reliability	Mean	SD	Skewness	Kurtosis
Hogan Personality Inventory	No Somatic Complaints	742	5	.56	4.01	1.19	-1.24	.93
	Trusting	742	3	.56	2.19	.95	-.89	-.28
	Good Attachment	742	5	.78	2.86	1.74	-.26	-1.25
	Competitive	742	5	.55	3.77	1.24	-.90	.23
	Self-Confidence	742	3	.60	2.40	.84	-1.31	.87
	No Depression	742	6	.78	5.34	1.27	-2.18	4.25
	Leadership	742	6	.86	3.52	2.23	-.35	-1.35
	Identity	742	3	.82	2.41	1.02	-1.51	.77
	No Social Anxiety	742	6	.75	3.62	1.89	-.41	-1.01
	Likes Parties	742	5	.67	1.72	1.41	.22	-1.16
	Likes Crowds	742	4	.80	1.30	1.47	.72	-.98
	Experience-seeking	742	6	.68	3.65	1.80	-.34	-.98
	Exhibitionistic	742	5	.74	2.35	1.58	.08	-1.06
	Entertaining	742	4	.67	1.83	1.31	.08	-1.13
	Easy to live with	742	5	.55	4.61	.79	-2.59	7.76
	Sensitive	742	4	.29	3.41	.78	-1.26	1.12
	Caring	742	4	.43	3.69	.64	-2.46	7.00
	Likes People	742	6	.75	4.71	1.61	-1.33	.95
	No Hostility	742	3	.43	1.96	.96	-.51	-.77
	Moralistic	742	5	.46	1.71	1.28	.54	-.33
	Mastery	742	4	.34	2.83	.98	-.48	-.45
	Virtuous	742	5	.34	3.26	1.04	-.48	-.08
	Not Autonomous	742	3	.70	2.10	1.06	-.87	-.58
	Not Spontaneous	742	4	.36	2.89	.94	-.66	.10

Appendix C Continued

Personality Inventory	Facet Name	N	Number of items	Scale Reliability	Mean	SD	Skewness	Kurtosis
Hogan Personality Inventory	Impulse Control	742	5	.60	2.87	1.41	-.21	-.78
	Avoids Trouble	742	5	.53	3.76	1.24	-.95	.39
	Science Ability	742	5	.69	3.07	1.61	-.42	-.99
	Curiosity	742	3	.64	2.02	.99	-.42	-1.16
	Thrill-seeking	742	5	.65	1.16	1.35	1.10	.32
	Intellectual Games	742	3	.50	1.83	1.01	-.33	-1.04
	Generates Ideas	742	5	.67	3.08	1.50	-.34	-.85
	Culture	742	4	.59	2.23	1.30	-.19	-1.09
	Education	742	3	.77	2.19	1.08	-.99	-.48
	Math	742	3	.78	1.42	1.23	.05	-1.60
	Good Memory	742	4	.54	2.37	1.24	-.33	-.91
	Reading	742	4	.71	2.33	1.44	-.31	-1.25
Temperament and Character Inventory	Exploratory Excitability	727	8	.72	25.65	4.86	-.20	-.10
	Impulsiveness	727	7	.75	18.24	4.49	.39	.10
	Extravagance	727	8	.83	22.82	6.26	.45	-.07
	Disorderliness	727	6	.68	15.15	4.16	.40	-.12
	Worry & Pessimism	727	11	.80	26.34	6.01	.60	.63
	Fear of uncertainty	727	7	.75	22.17	4.98	-.15	-.07
	Shyness with Strangers	727	7	.87	19.57	6.07	.19	-.62
	Fatigability & Asthenia	727	7	.85	17.04	5.38	.52	.04
	Sentimentality	727	8	.71	28.38	4.48	-.24	.25

Appendix C continued

Personality Inventory	Facet Name	N	Number of items	Scale Reliability	Mean	SD	Skewness	Kurtosis
	Warm							
Temperament and	Communication	727	10	.86	35.03	7.00	-.39	-.26
Character Inventory	Attachment	727	5	.86	16.51	4.62	-.24	-.73
	Dependence	727	6	.58	21.15	3.43	-.32	.01
	Eagerness of Effort	727	10	.84	35.22	6.08	-.25	.24
	Work Hardened	727	8	.75	28.52	4.39	-.24	.14
	Ambitious	727	10	.79	34.15	5.80	-.09	-.02
	Perfectionist	727	8	.76	27.14	5.05	-.08	-.27
	Responsibility	727	8	.78	32.04	4.70	-.52	.26
	Purposefulness	727	5	.77	19.60	3.61	-.83	.81
	Resourcefulness	727	5	.72	19.04	3.17	-.62	.60
	Self-acceptance	727	10	.82	35.15	7.33	-.39	-.02
	Enlightened second nature	727	11	.84	43.48	6.11	-.65	.78
	Social Acceptance	727	8	.77	32.19	3.95	-.58	.65
	Empathy	727	5	.67	18.99	2.77	-.42	.55
	Helpfulness	727	8	.64	32.57	3.39	-.13	-.26
	Compassion	727	7	.88	28.38	5.16	-1.14	1.25
	Self-forgetful	727	10	.79	28.41	6.83	.31	-.11
	transpersonal	727	8	.77	22.25	5.75	.13	-.28
	Pure-hearted Conscience	727	8	.58	33.48	4.00	-.51	-.07

Appendix C continued

Personality Inventory	Facet Name	N	Number of items	Scale Reliability	Mean	SD	Skewness	Kurtosis
Multidimensional	Well-being	733	23	.90	41.37	5.04	-1.52	1.87
Personality	Social Potency	733	25	.89	34.74	6.30	.28	-.89
Questionnaire	Achievement	733	20	.84	31.35	4.50	-.31	-.67
	Social Closeness	733	21	.86	34.16	4.84	-.34	-.65
	Stress Reaction	733	23	.89	30.73	5.79	.68	-.40
	Aggression	733	19	.72	21.32	2.34	1.47	2.45
	Alienation	733	20	.82	21.57	2.68	2.77	8.91
	Control	733	24	.83	41.18	4.72	-.81	.23
	Harm Avoidance	733	26	.82	45.65	4.88	-.85	.09
	Traditionalism	733	27	.87	44.58	5.72	-.53	-.49
	Absorption	733	34	.90	48.60	7.30	.30	-.49
Jackson Personality	Complexity	711	20	.66	7.86	3.31	.47	.01
Inventory-Revised	Breath of Interest	711	20	.82	1.91	4.44	-.19	-.67
	Innovation	711	20	.88	1.97	5.27	-.20	-.99
	Tolerance	711	20	.65	1.54	3.39	-.17	-.26
	Empathy	711	20	.76	1.61	4.00	-.09	-.57
	Anxiety	711	20	.83	9.03	4.58	.25	-.83
	Cooperativeness	711	20	.79	7.56	4.06	.37	-.53
	Sociability	711	20	.82	6.93	4.31	.48	-.37
	Social Confidence	711	20	.87	11.95	4.98	-.37	-.93
	Energy Level	711	20	.78	11.76	4.08	-.31	-.54

Appendix C continued

Personality Inventory	Facet Name	N	Number of items	Scale Reliability	Mean	SD	Skewness	Kurtosis
Jackson Personality Inventory-Revised	Social Astuteness	711	20	.66	8.26	3.39	.17	-.34
	Risk Taking	711	20	.84	6.43	4.55	.63	-.48
	Organization	711	20	.73	12.50	3.65	-.34	-.27
	Traditional Values	711	20	.79	11.43	4.02	-.29	-.52
	Responsibility	711	20	.66	15.76	2.83	-.91	.85
Six Factor Personality Questionnaire	Affiliation	691	6	.78	19.21	4.08	-.10	-.43
	Dominance	691	6	.86	17.74	4.89	-.05	-.75
	Exhibition	691	6	.80	17.49	4.59	-.14	-.58
	Abasement	691	6	.54	15.85	3.14	.02	-.09
	Even-tempered	691	6	.65	19.60	3.64	-.37	.05
	Good-natured	691	6	.58	18.94	3.14	-.06	.11
	Cognitive Structure	691	6	.56	2.07	3.34	-.08	-.47
	Deliberateness	691	6	.68	21.53	3.40	-.68	.54
	Order	691	6	.78	2.04	4.56	-.31	-.51
	Autonomy	691	6	.59	16.56	3.65	.27	-.19
	Individualism	691	6	.74	18.48	4.08	.12	-.35
	Self-Reliance	691	6	.57	18.58	3.45	.06	-.31
	Change	691	6	.63	15.25	3.79	.35	-.30
	Understanding	691	6	.74	19.46	4.43	-.13	-.47
	Breath of Interest	691	6	.69	18.55	4.02	-.24	-.24
	Achievement	691	6	.47	21.81	2.89	-.08	.10
	Endurance	691	6	.59	19.87	3.19	-.09	-.22
	Seriousness	691	6	.61	18.29	3.45	.08	-.08

Appendix C continued

Personality Inventory	Facet Name	N	Number of items	Scale Reliability	Mean	SD	Skewness	Kurtosis
HEXACO Personality Inventory	Sincerity	734	8	.74	3.77	.56	-.26	.48
	Fairness	734	7	.78	4.23	.58	-.86	.53
	Greed Avoidance	734	8	.81	3.69	.66	-.28	-.22
	Modesty	734	8	.8	3.85	.61	-.50	.18
	Fearfulness	734	8	.79	2.98	.69	-.07	-.46
	Anxiety	734	8	.81	3.13	.70	.02	-.35
	Dependence	734	7	.78	2.91	.63	.00	-.11
	Sentimentality	734	8	.79	3.66	.60	-.34	-.16
	Expressiveness	734	8	.85	2.94	.72	.30	-.26
	Social Boldness	734	8	.84	3.18	.75	-.34	-.44
	Sociability	734	7	.81	3.14	.67	-.31	-.36
	Liveliness	734	8	.79	3.63	.60	-.30	.06
	Forgiveness	734	8	.84	2.90	.67	-.15	-.39
	Gentleness	734	8	.79	3.21	.61	-.47	.07
	Flexibility	734	8	.67	3.08	.53	-.17	-.19
	PATIENCE	734	8	.80	3.39	.63	-.39	.26
	Organization	734	7	.87	3.53	.78	-.36	-.45
	Diligence	734	7	.79	3.57	.60	-.32	-.02
	Perfectionism	734	8	.73	3.55	.56	-.27	.20
	Prudence	734	8	.77	3.59	.55	-.60	.80
	Aesthetic	734	8	.81	3.66	.68	-.51	.04
	Inquisitiveness	734	7	.79	3.65	.67	-.35	-.13
	Creativity	734	8	.81	3.25	.72	-.10	-.41
	Unconventionality	734	8	.79	3.15	.64	.04	-.23

Appendix C continued

Personality Inventory	Facet Name	N	Number of items	Scale Reliability	Mean	SD	Skewness	Kurtosis
AB5C Scales from	Gregariousness	501	10	.83	28.55	7.40	.10	-.57
the International	Friendliness	501	10	.85	34.42	7.31	-.28	-.38
Item Pool	Assertiveness	501	12	.75	42.94	6.44	-.49	.13
	Poise	501	10	.82	35.99	6.49	-.51	.33
	Leadership	501	10	.82	33.51	6.49	-.23	-.26
	Provocativeness	501	11	.72	27.57	6.01	.18	-.19
	Self-Disclosure	501	10	.78	30.00	6.58	-.06	-.44
	Talkativeness	501	10	.84	22.65	7.02	.52	-.11
	Sociability	501	10	.66	24.22	5.33	.34	.30
	Understanding	501	10	.81	41.37	5.03	-.73	.93
	Warmth	501	11	.84	44.73	5.94	-.56	.11
	Morality	501	12	.73	5.79	5.41	-.72	.60
	Pleasantness	501	12	.76	45.36	5.96	-.58	.18
	Empathy	501	9	.70	36.63	4.18	-.42	.06
	Cooperation	501	12	.73	49.40	6.06	-.70	.90
	Sympathy	501	12	.74	43.93	5.66	-.46	.55
	Tenderness	501	13	.74	45.58	7.12	-.17	-.40
	Nurturance	501	13	.71	49.63	6.13	-.33	-.12
	Conscientiousness	501	13	.75	52.26	6.32	-.82	.96
	Efficiency	501	11	.83	41.35	6.82	-.63	.81
	Dutifulness	501	13	.78	54.54	5.90	-.51	-.20
	Purposefulness	501	12	.81	46.18	6.51	-.95	1.83
	Organization	501	12	.78	49.26	5.38	-.37	.01
	Cautiousness	501	12	.77	38.61	6.90	-.16	-.22

Appendix C continued

Personality Inventory	Facet Name	N	Number of items	Scale Reliability	Mean	SD	Skewness	Kurtosis
AB5C Scales from	Rationality	501	14	.67	47.50	6.41	.14	.07
the International	Perfectionism	501	9	.76	3.66	5.61	-.08	-.34
Item Pool	Orderliness	501	10	.78	37.63	5.98	-.45	-.12
	Stability	501	10	.86	35.00	6.98	-.50	-.13
	Happiness	501	10	.84	36.81	6.78	-.69	.43
	Calmness	501	10	.83	37.23	6.64	-.75	.51
	Moderation	501	10	.76	35.40	6.14	-.50	.21
	Toughness	501	12	.84	43.37	7.58	-.52	.34
	Impulse Control	501	11	.78	39.89	6.56	-.48	.15
	Imperturbability	501	9	.84	3.41	7.23	-.47	-.32
	Cool-Headedness	501	10	.73	28.11	5.73	.26	-.09
	Tranquility	501	11	.76	32.06	6.53	-.36	-.30
	Intellect	501	11	.81	42.12	6.53	-.32	-.28
	Ingenuity	501	9	.84	32.95	6.01	-.33	-.09
	Reflection	501	10	.75	4.95	5.38	-.94	1.43
	Competence	501	8	.74	32.00	3.91	-.28	.17
	Quickness	501	10	.84	39.23	6.01	-.43	.01
	Introspection	501	12	.71	43.06	5.85	-.08	.18
	Creativity	501	10	.81	34.36	6.68	-.20	-.44
	Imagination	501	10	.78	35.68	6.73	-.41	.05
	Depth	501	9	.77	31.90	5.73	-.17	-.18

Appendix D

The Five Factor solution for the 162 facet scales from Nine Personality Instruments

	Factor				
	Emotional Stability	**Extraversion**	**Openness to Experience**	**Conscientiousness**	**Agreeableness**
AB5C Stability	**.83**	-.08	.04	.02	.20
JPIR Anxiety	**-.81**	.03	-.08	.02	-.02
MPQ Stress Reaction	**-.81**	-.14	-.07	-.01	-.02
AB5C Happiness	**.81**	.25	.10	.17	.06
NEO Anxiety	**-.78**	-.07	-.06	-.04	.07
AB5C Toughness	**.77**	.00	.23	.13	-.05
NEO Depression	**-.76**	-.18	-.02	-.18	.01
AB5C Tranquility	**.73**	-.12	-.25	.03	-.05
16PF Emotional Stability	**.73**	.19	-.06	.17	.06
AB5C Calmness	**.72**	-.03	.02	-.03	.41
TCI Worry & Pessimism	**-.72**	-.17	-.18	-.04	-.09
NEO Vulnerability	**-.71**	-.11	-.12	-.29	.04
HEXACO Anxiety	**-.70**	-.06	-.09	.06	.03
NEO Angry Hostility	**-.69**	.04	.04	.02	-.38
HPI Not Anxious	**.69**	.06	.10	-.10	.00
16PF Apprehension	**-.68**	-.17	-.05	.04	.18
AB5C Moderation	**.66**	.00	-.05	.47	.16
NEO Self-Consciousness	**-.65**	-.36	-.14	-.09	.10
HPI Calmness	**.63**	-.24	.00	.10	.02
HPI No Depression	**.60**	.23	.06	.15	.09
AB5C Imperturbability	**.58**	-.22	-.06	.14	-.30
HPI No Guilt	**.58**	.13	.03	.18	.09
HPI Even-tempered	**.57**	.01	-.09	.05	.29
HPI Empathy	**.56**	.01	-.01	-.18	.38

6FPQ Even-tempered	**.53**	-.18	-.08	-.10	.38
NEO Impulsiveness	**-.53**	.17	.11	-.32	-.12
TCI Responsibility	**.51**	.23	.17	.06	.23
HPI Self-Confidence	**.50**	.24	.11	.26	-.20
NEO Trust	**.47**	.25	.01	-.01	.33
HEXACO Patience	**.45**	-.16	.00	-.13	.32
HPI Identity	**.45**	.07	-.02	.18	.12
16PF Tension	**-.45**	-.08	-.03	.06	-.27
HPI No Somatic Complaints	**.44**	.11	.09	.08	-.12
TCI Fatigability & Asthenia	**-.42**	-.20	-.11	-.22	.12
HPI Trusting	**.41**	.26	.09	-.04	.28
16PF Vigilance	**-.41**	-.18	-.08	.04	-.29
6FPQ Good-natured	**.40**	-.05	-.03	-.19	.30
AB5C Gregariousness	.12	**.84**	.13	-.04	-.12
TCI Warm Communication	.00	**.78**	.13	.07	.37
AB5C Friendliness	.24	**.77**	-.01	.07	.30
16PF Social Boldness	.29	**.75**	.12	.07	-.12
6FPQ Affiliation	.21	**.74**	.05	.00	.17
6FPQ Exhibition	.15	**.73**	.19	.04	-.21
MPQ Social Closeness	.03	**.71**	-.09	.06	.30
JPIR Social Confidence	.31	**.71**	.32	.14	-.20
HEXACO Sociability	.02	**.70**	.00	.01	.18
TCI Attachment	-.05	**.67**	.13	-.02	.29
HPI Likes People	.17	**.67**	.06	.02	.27
NEO Gregariousness	.08	**.66**	-.09	-.06	.14
HEXACO Expressiveness	-.17	**.66**	.27	-.01	-.19
AB5C Leadership	.25	**.65**	.36	.24	-.21

JPIR Sociability	-.02	**.64**	-.10	-.01	.21
HEXACO Social Boldness	.32	**.64**	.30	.12	-.26
16PF Privateness	-.02	**-.64**	-.07	.11	-.18
16PF Warmth	-.04	**.62**	.00	-.03	.40
MPQ Social Potency	.07	**.60**	.29	.20	-.40
TCI Shyness with Strangers	-.41	**-.60**	-.19	-.07	.10
AB5C Poise	.38	**.60**	.16	.12	.07
AB5C Talkativeness	-.15	**.60**	.08	-.11	-.39
16PF Liveliness	-.04	**.59**	.11	-.20	.02
AB5C Self-Disclosure	.02	**.58**	.27	-.21	.06
NEO Assertiveness	.23	**.55**	.25	.26	-.33
HPI Likes Parties	.02	**.54**	.04	.00	-.05
AB5C Sociability	-.04	**.53**	-.23	-.07	.00
NEO Positive Emotion	.24	**.50**	.19	-.02	.27
HPI No Social Anxiety	.35	**.50**	.22	.15	-.20
16PF Self-Reliance	-.02	**-.48**	.11	.07	-.26
HEXACO Liveliness	.31	**.48**	.23	.17	.10
HPI Entertaining	.03	**.46**	.20	-.02	-.22
HPI Exhibitionistic	-.06	**.45**	.27	-.12	-.36
AB5C Imagination	-.08	.10	**.76**	-.15	.13
NEO Ideas	.09	-.03	**.75**	.13	-.08
HEXACO Unconventionality	-.03	-.02	**.75**	-.17	-.10
16PF Openness to Change	.05	.16	**.73**	-.07	.03
JPIR Innovation	.06	.15	**.73**	.12	-.12
AB5C Creativity	.13	.11	**.73**	.15	-.27
HEXACO Creativity	.06	.20	**.71**	.05	-.06
AB5C Intellect	.13	.12	**.71**	.14	.00
JPIR Complexity	-.10	.01	**.70**	-.10	-.01
6FPQ Breath of Interest	.16	.10	**.66**	-.02	.18

NEO Aesthetics	-.05	.11	**.66**	-.09	.29
JPIR Breath of Interest	.11	.10	**.65**	.03	.15
HEXACO Aesthetic	.00	.00	**.64**	-.05	.31
6FPQ Understanding	.04	.00	**.64**	.00	.10
AB5C Quickness	.32	.03	**.63**	.27	-.09
AB5C Ingenuity	.29	.28	**.61**	.22	-.18
NEO Fantasy	-.04	.12	**.60**	-.25	-.04
HEXACO Inquisitiveness	.12	-.06	**.59**	.05	.03
TCI Self-forgetful	-.18	.11	**.57**	-.09	.05
MPQ Absorption	-.25	.07	**.56**	-.05	.21
16PF Abstractness	-.21	-.03	**.55**	-.38	-.12
HPI Experience-seeking	.12	.19	**.53**	-.06	-.17
TCI Exploratory Excitability	.13	.25	**.53**	-.07	-.03
NEO Actions	.11	.19	**.53**	-.12	.09
HPI Generates Ideas	.22	.35	**.52**	.12	-.21
HPI Culture	.05	.00	**.52**	-.10	.17
MPQ Traditionalism	-.09	-.03	**-.51**	.35	.06
6FPQ Change	.05	.02	**.50**	-.15	-.13
NEO Values	.18	.08	**.47**	-.25	.05
HPI Reading	.03	.02	**.43**	-.03	.16
HPI Science Ability	.13	-.05	**.42**	.16	-.21
AB5C Conscientiousness	.09	.05	-.11	**.83**	.03
AB5C Efficiency	.25	.17	.00	**.78**	.03
AB5C Organisation	.14	.05	.26	**.75**	.03
JPIR Organisation	.02	.05	-.14	**.74**	-.05
16PF Perfectionism	-.12	.00	-.20	**.74**	-.02
AB5C Purposefulness	.36	.04	.00	**.73**	.03
NEO Order	-.03	-.01	-.20	**.73**	.00
NEO Self-Discipline	.32	.06	-.07	**.72**	.02
AB5C Orderliness	-.09	.05	-.35	**.69**	.08

HEXACO Organisation	-.03	.05	-.20	**.68**	.06
6FPQ Order	.03	.03	-.15	**.68**	-.01
AB5C Rationality	.07	-.07	-.17	**.67**	-.33
AB5C Perfectionism	-.32	.04	-.12	**.67**	-.20
NEO Achievement Striving	.12	.15	.17	**.64**	-.14
HEXACO Diligence	.07	.10	.26	**.63**	-.07
NEO Dutifulness	.13	-.03	-.15	**.61**	.18
6FPQ Deliberateness	.23	-.23	-.14	**.61**	.08
Control MPQ	.12	-.17	-.25	**.58**	.05
HEXACO Prudence	.32	-.14	.03	**.57**	.12
TCI Perfectionist	-.02	.07	.17	**.57**	-.06
NEO Competence	.41	.11	.08	**.57**	-.02
NEO Deliberation	.24	-.18	-.07	**.55**	.12
6FPQ Cognitive Structure	-.04	-.10	-.28	**.55**	.02
HEXACO Perfectionism	-.18	-.07	.10	**.54**	.01
TCI Ambitious	.02	.20	.18	**.53**	-.15
HPI Mastery	-.12	-.02	-.10	**.53**	.10
AB5C Cautiousness	.13	-.33	-.27	**.53**	.01
AB5C Dutifulness	.21	.05	-.15	**.51**	.36
TCI Eagerness of Effort	.17	.19	.08	**.49**	.09
TCI Work Hardened	.11	-.03	.23	**.48**	-.03
TCI Impulsiveness	.04	.20	.07	**-.46**	-.12
MPQ Achievement	-.05	.03	.31	**.46**	-.09
6FPQ Achievement	.08	.06	.26	**.44**	.09
6FPQ Endurance	.04	-.10	.30	**.43**	-.01
AB5C Nurturance	.06	.03	-.23	.11	**.77**
AB5C Sympathy	-.14	.34	.16	-.08	**.73**
AB5C Understanding	-.01	.23	.22	.14	**.70**
AB5C Pleasantness	.41	.05	-.06	-.01	**.69**
AB5C Warmth	.09	.48	.21	.09	**.66**
NEO Altruism	.19	.22	-.03	.21	**.63**

NEO Compliance	.29	-.16	-.13	-.06	**.62**
AB5C Cooperation	.12	-.14	-.09	.19	**.62**
TCI Sentimentality	-.30	.28	.01	-.03	**.60**
TCI Compassion	.26	-.03	.16	-.01	**.57**
TCI Social Acceptance	.26	.09	.21	-.08	**.55**
NEO Tender-mindedness	-.08	.04	.06	-.10	**.54**
TCI Empathy	.06	.29	.27	.07	**.54**
HEXACO Sentimentality	-.32	.25	.18	.06	**.54**
AB5C Empathy	-.05	.21	.38	.19	**.53**
AB5C Tenderness	-.32	.37	.04	.03	**.53**
NEO Straightforwardness	.09	-.18	-.15	.09	**.51**
HEXACO Modesty	-.02	-.20	-.23	-.12	**.51**
TCI Dependence	.00	.15	-.22	.05	**.51**
TCI Helpfulness	.17	.22	.15	.10	**.50**
MPQ Aggression	-.28	.08	-.03	.01	**-.50**
NEO Modesty	-.24	-.30	-.15	-.06	**.50**
JPIR Empathy	-.35	.31	.17	.07	**.49**
HEXACO Fairness	.11	.04	-.02	.23	**.45**
16PF Sensitivity	-.18	.15	.27	-.16	**.43**
HPI Caring	.02	.29	.16	.07	**.42**

N = 375. Maximum Likelihood Estimation extraction with orthogonal (varimax) rotation. NEO = The revised NEO Personality Inventory; 16PF = The Sixteen Personality Factor Questionnaire Fifth Edition; HPI = Hogan Personality Inventory; TCI = Temperament and Character Inventory Revised; MPQ = The Multidimensional Personality Questionnaire; JPIR = The Jackson Personality Inventory Revised; 6FPQ = The Six Factor Questionnaire; HEXACO = The HEXACO Personality Inventory; AB5C = AB5C scales from the International Item Pool.

Appendix E

The Hierarchical Personality Questionnaire Scales

	Scale	r with factor score (ESCS)	Factor Loading (University Sample)
	Extraversion		
Affiliation			
ITEM 1	Make friends easily.	.63	.41
ITEM 2	Warm up quickly to others.	.62	.58
ITEM 3	Am interested in people.	.52	.54
ITEM 4	Feel comfortable around people.	.64	.64
ITEM 5	Act comfortably with others.	.53	.63
ITEM 6	Avoid contacts with others. (R)	-.57	-.41
ITEM 7	Keep others at a distance. (R)	-.58	-.58
ITEM 8	Often feel uncomfortable around others. (R)	-.52	-.38
Sociability			
ITEM 1	Talk to a lot of different people at parties.	.53	.48
ITEM 2	Enjoy being part of a loud crowd.	.46	.65
ITEM 3	Usually like to spend my spare time with people.	.55	.48
ITEM 4	Enjoy being part of a large group.	.56	.51
ITEM 5	Love large parties.	.62	.53
ITEM 6	Don't like crowded events. (R)	-.60	-.52
ITEM 7	Avoid crowds. (R)	-.58	-.54
ITEM 8	Prefer to be alone. (R)	-.44	-.43
Social Boldness			
ITEM 1	Express myself easily.	.62	.49
ITEM 2	Am skilled in handling social situations.	.59	.53
ITEM 3	Am good at making impromptu speeches.	.61	.51
ITEM 4	Have leadership abilities.	.54	.72
ITEM 5	Start conversations.	.52	.42
ITEM 6	Find it difficult to approach others. (R)	-.62	-.48
ITEM 7	Am quiet around strangers. (R)	-.63	-.56
ITEM 8	Have little to say. (R)	-.60	-.54

Note. (R) point to items to be reversed scored; ESCS = Eugene-Springfield community sample (N =375); university development sample (N = 778).

[a] These items were keyed in the opposite direction for the ESCS.

[b] These are new items, which were not included in the International Personality Item Pool or administered to the ESCS.

Appendix E continued

Scale		r with factor score (ESCS)	Factor Loading (University Sample)
Expressiveness			
ITEM 1	Talk a lot.	.63	.75
ITEM 2	Make myself the center of attention.	.56	.58
ITEM 3	Am the life of the party.	.70	.62
ITEM 4	Don't mind being the center of attention.	.58	.56
ITEM 5	Have an intense, boisterous laugh.	.46	.41
ITEM 6	Don't talk a lot. (R)	-.65	-.74
ITEM 7	Say little. (R)	-.50	-.78
ITEM 8	Don't like drawing attention to myself. (R)	-.61	.44
Assertiveness			
ITEM 1	Try to lead others.	.58	.62
ITEM 2	Take charge.	.64	.66
ITEM 3	Want to be in charge.	.60	.62
ITEM 4	Have a natural talent for influencing people.	.60	.40
ITEM 5	See myself as a good leader.	.65	.65
ITEM 6	Don't take control of things.[a] (R)	.45	-.55
ITEM 7	Lack the talent for influencing people. (R)	-.54	-.60
ITEM 8	Find it difficult to talk others into doing things.[a] (R)	.54	-.51
Enthusiasm			
ITEM 1	Am usually active and full of energy.	.52	.71
ITEM 2	Radiate joy.	.58	.41
ITEM 3	Smile a lot.	.50	.54
ITEM 4	Have great stamina.	.51	.72
ITEM 5	Feel healthy and vibrant most of the time.	.47	.62
ITEM 6	Don't look forward to each new day.[a] (R)	.42	-.47
ITEM 7	Don't have much energy. (R)	-.48	.71
ITEM 8	Don't have a lot of fun.[a] (R)	.47	-.45

Note. (R) point to items to be reversed scored; ESCS = Eugene-Springfield community sample(N =375); university development sample (N = 778).

[a] These items were keyed in the opposite direction for the ESCS.

[b] These are new items, which were not included in the International Personality Item Pool or administered to the ESCS.

Appendix E continued

Scale		r with factor score (ESCS)	Factor Loading (University Sample)
Conscientiousness			
Industriousness			
ITEM 1	Carry out my plans.	.63	.56
ITEM 2	Am always prepared.	.56	.47
ITEM 3	Follow through with my plans.	.54	.64
ITEM 4	Finish what I start.	.53	.52
ITEM 5	Find it difficult to get down to work. (R)	-.53	-.64
ITEM 6	Waste my time. (R)	-.57	-.44
ITEM 7	Don't see things through. (R)	-.56	-.47
ITEM 8	Have difficulty starting tasks. (R)	-.56	-.65
Achievement			
ITEM 1	Push myself very hard to succeed.	.57	.44
ITEM 2	Work Hard.	.51	.43
ITEM 3	Do more than what is expected of me.	.46	.41
ITEM 4	Plunge into tasks with all my heart.	.45	.45
ITEM 5	Excel in what I do.	.42	.58
ITEM 6	Do too little work. (R)	-.41	-.43
ITEM 7	Stop when work becomes too difficult. (R)	-.41	-.61
ITEM 8	Do just enough work to get by. (R)	-.51	-.69
Orderliness			
ITEM 1	Keep things tidy.	.67	.73
ITEM 2	Like order.	.61	.47
ITEM 3	Like to tidy up.	.58	.71
ITEM 4	Continue until everything is perfect.	.54	.64
ITEM 5	Leave a mess in my room. (R)	-.62	-.78
ITEM 6	Leave my belongings around. (R)	-.58	-.54
ITEM 7	Often forget to put things back in their proper place. (R)	-.57	-.68
ITEM 8	Am not bothered by disorder. (R)	-.56	-.47

Note. (R) point to items to be reversed scored; ESCS = Eugene-Springfield community sample(N =375); university development sample (N = 778).

[a] These items were keyed in the opposite direction for the ESCS.

[b] These are new items, which were not included in the International Personality Item Pool or administered to the ESCS.

Appendix E continued

	Scale	r with factor score (ESCS)	Factor Loading (University Sample)
Self-control			
ITEM 1	Don't make rash decisions.[a]	-.47	.51
ITEM 2	Reflect on things before acting.	.43	.61
ITEM 3	Don't act wild and crazy.[a]	-.45	.40
ITEM 4	Do crazy things. (R)	-.49	-.43
ITEM 5	Jump into things without thinking. (R)	-.59	-.71
ITEM 6	Rush into things. (R)	-.47	-.67
ITEM 7	Don't know why I do some of the things I do. (R)	-.45	-.48
ITEM 8	Do things without thinking of the consequences. (R)	-.46	-.71
	Openness to Experience		
Culture/Artistic Interest			
ITEM 1	Believe in the importance of art.	.60	.74
ITEM 2	Like concerts.[a]	-.49	.40
ITEM 3	Like music.	.41	.44
ITEM 4	Enjoy the beauty of nature.[a]	-.41	.40
ITEM 5	Do not like art. (R)	-.62	-.72
ITEM 6	Seldom notice the emotional aspects of paintings and pictures. (R)	-.57	-.63
ITEM 7	Do not like poetry. (R)	-.56	-.56
ITEM 8	Do not enjoy going to art museums. (R)	-.62	-.74
Imagination			
ITEM 1	Like to get lost in thought.	.46	.66
ITEM 2	Do things that others find strange.	.42	.43
ITEM 3	Do unexpected things.	.42	.46
ITEM 4	Love to daydream.	.41	.71
ITEM 5	Get lost in my dreams.	.48	.71
ITEM 6	Seldom daydream. (R)	-.47	-.60
ITEM 7	Do not have a good imagination. (R)	-.43	-.44
ITEM 8	Don't indulge in my fantasies.[a] (R)	.42	-.41

Note. (R) point to items to be reversed scored; ESCS = Eugene-Springfield community sample(N =375); university development sample (N = 778).

[a] These items were keyed in the opposite direction for the ESCS.

[b] These are new items, which were not included in the International Personality Item Pool or administered to the ESCS.

Appendix E continued

	Scale	r with factor score (ESCS)	Factor Loading (University Sample)
Creativity			
ITEM 1	Come up with something new.	.54	.52
ITEM 2	Love to think up new ways of doing things.	.53	.58
ITEM 3	Have excellent ideas.	.63	.63
ITEM 4	Am an original thinker.	.62	.69
ITEM 5	Quickly think up new ideas.	.57	.71
ITEM 6	Rarely come up with bold plans.[a] (R)	.51	-.41
ITEM 7	Am not full of ideas.[a] (R)	.61	-.51
ITEM 8	Am not considered to have new and different ideas. (R)	-.59	-.58
Intellect			
ITEM 1	Have a rich vocabulary.	.47	.67
ITEM 2	Show a mastery of language.	.40	.56
ITEM 3	Read quickly.	.40	.56
ITEM 4	Quick to understand things.	.40	.55
ITEM 5	Learn quickly.	.41	.57
ITEM 6	Have a poor vocabulary. (R)	-.45	-.54
ITEM 7	Skip difficult words while reading. (R)	-.41	-.49
ITEM 8	Can't handle a lot of difficult information.[a] (R)	.46	-.45
Change/Variety Seeking			
ITEM 1	Like to visit new places.	.42	.48
ITEM 2	Seek adventure.	.49	.41
ITEM 3	Like variety.	.43	.50
ITEM 4	Try out new things.	.49	.45
ITEM 5	Dislike changes. (R)	-.49	-.68
ITEM 6	Don't like to travel. (R)	-.41	-.42
ITEM 7	Don't like the idea of change. (R)	-.40	-.77
ITEM 8	Dislike new foods. (R)	-.46	-.47

Note. (R) point to items to be reversed scored; ESCS = Eugene-Springfield community sample(N =375); university development sample (N = 778).

[a] These items were keyed in the opposite direction for the ESCS.

[b] These are new items, which were not included in the International Personality Item Pool or administered to the ESCS.

Appendix E continued

	Scale	r with factor score (ESCS)	Factor Loading (University Sample)
Traditionalism			
ITEM 1	Believe that we should be tough on crime.	.46	.41
ITEM 2	Believe that laws should be strictly enforced.	.51	.47
ITEM 3	Believe in the importance of tradition.	.45	.60
ITEM 4	Believe that traditional values should be obeyed and practiced.[b]		.49
ITEM 5	Keep old traditions.	.43	.62
ITEM 6	Believe that it is okay to change tradition.[b] (R)		-.44
ITEM 7	Believe that people should be allowed to dress the way they like.[b] (R)		-.51
ITEM 8	Am not considered to be a traditional person.[b] (R)		-.57
Intellectual Curiosity			
ITEM 1	Find the world a very interesting place.	.44	.46
ITEM 2	Love to hear about other countries and cultures.	.46	.48
ITEM 3	Like to know how things work.	.37	.45
ITEM 4	Seek explanations of things.	.42	.40
ITEM 5	Am not excited by many different activities.[a](R)	.53	-.60
ITEM 6	Am not all that curious about the world. (R)	-.53	-.45
ITEM 7	Have few interests. (R)	-.42	-.51
ITEM 8	Don't want to know the reasons why.[a] (R)	.35	-.61
	Emotional Stability		
Fearlessness/Low Anxiety			
ITEM 1	Rarely worry.	.60	.55
ITEM 2	Am not easily bothered by things.	.45	.44
ITEM 3	Don't worry about things that have already happened.	.49	.42
ITEM 4	Worry about things. (R)	-.52	-.58
ITEM 5	Often worry about things that turn out to be unimportant. (R)	-.49	-.46
ITEM 6	Get stressed out easily. (R)	-.48	-.45
ITEM 7	Panic easily. (R)	-.47	-.58
ITEM 8	Fear for the worst. (R)	-.44	-.58

Note. (R) point to items to be reversed scored; ESCS = Eugene-Springfield community sample(N =375); university development sample (N = 778).

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Appendix E continued

Scale		r with factor score (ESCS)	Factor Loading (University Sample)
Stability			
ITEM 1	Remain calm under pressure.	.55	.47
ITEM 2	Keep my emotions under control.	.58	.43
ITEM 3	Keep my cool.	.52	.52
ITEM 4	Have frequent mood swings. (R)	-.60	-.55
ITEM 5	Change my mood a lot. (R)	-.56	-.42
ITEM 6	Get caught up in my problems. (R)	-.58	-.53
ITEM 7	Burst into tears. (R)	-.52	-.58
ITEM 8	Experience my emotions intensely. (R)	-.58	-.73
Low Irritability			
ITEM 1	Am not easily annoyed.	.53	.74
ITEM 2	Rarely get irritated.	.57	.77
ITEM 3	Find that it takes a lot to make me feel angry at someone.	.51	.69
ITEM 4	Get irritated easily. (R)	-.52	-.81
ITEM 5	Get angry easily. (R)	-.60	-.83
ITEM 6	Grumble about things. (R)	-.53	-.61
ITEM 7	Lose my temper. (R)	-.49	-.64
ITEM 8	Often feel angry with people.[a] (R)	.51	-.52
Low Depression			
ITEM 1	Feel comfortable with myself.	.55	.62
ITEM 2	Love life.	.45	.63
ITEM 3	Rarely feel depressed.	.49	.45
ITEM 4	Often feel blue. (R)	-.61	-.49
ITEM 5	Am often down in the dumps. (R)	-.51	-.56
ITEM 6	Have a low opinion of myself. (R)	-.56	-.72
ITEM 7	Feel that my life lack direction. (R)	-.66	-.62
ITEM 8	Am not sure where my life is going. (R)	-.57	-.68

Note. (R) point to items to be reversed scored; ESCS = Eugene-Springfield community sample(N =375); university development sample (N = 778).

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Appendix E continued

	Scale	r with factor score (ESCS)	Factor Loading (University Sample)
Trust			
ITEM 1	Trust others.	.44	.77
ITEM 2	Believe that others have good intentions.	.49	.59
ITEM 3	Trust what people say.	.40	.72
ITEM 4	Believe that people are basically moral.	.48	.52
ITEM 5	Feel that most people can be trusted.[a]	-.47	.73
ITEM 6	Distrust people. (R)	-.49	-.67
ITEM 7	Suspect hidden motives in others. (R)	-.41	-.54
ITEM 8	Believe that people are essentially evil. (R)	-.43	-.43
Adaptability			
ITEM 1	Adapt easily to new situations.	.41	.43
ITEM 2	Don't get upset if others change the way that I have arranged things.	.31	.41
ITEM 3	Adjust easily.	.55	.58
ITEM 4	Am not hard to satisfy.[a]	-.39	.45
ITEM 5	Am hard to reason with. (R)	-.42	-.47
ITEM 6	Want to have the last word. (R)	-.34	-.40
ITEM 7	Find it difficult to cope with changes in situations.[b] (R)		-.52
ITEM 8	Tend not to be flexible.[b] (R)		-.50
	Agreeableness		
Sympathy			
ITEM 1	Feel others' emotions.	.56	.46
ITEM 2	Am deeply moved by others misfortunes.	.48	.52
ITEM 3	Sympathize with others' feelings.	.43	.63
ITEM 4	Have a soft heart.	.44	.63
ITEM 5	Immediately feel sad when hearing of an unhappy event.	.44	.50
ITEM 6	Don't believe that crying helps me feel better.[a] (R)	.49	-.54
ITEM 7	Am indifferent to the feelings of others. (R)	-.41	-.59
ITEM 8	Don't have a soft side. (R)	-.41	-.58

Note. (R) point to items to be reversed scored; ESCS = Eugene-Springfield community sample(N =375); university development sample (N = 778).

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Appendix E continued

Scale		r with factor score (ESCS)	Factor Loading (University Sample)
Compassion			
ITEM 1	Reassure others.	.59	.40
ITEM 2	Inquire about others well-being.	.60	.49
ITEM 3	Take an interest in other people's lives.	.55	.76
ITEM 4	Am concerned about others.	.56	.43
ITEM 5	Take time out for others.	.47	.46
ITEM 6	Am not really interested in others. (R)	-.57	-.62
ITEM 7	Am not interested in others people's problems. (R)	-.57	-.77
ITEM 8	Can't be bothered with others needs. (R)	-.54	-.66
Cooperation			
ITEM 1	Value cooperation over competition.	.37	.48
ITEM 2	Am able to cooperate with others.	.28	.49
ITEM 3	Don't put people under pressure.[a]	-.42	.46
ITEM 4	Love a good fight. (R)	-.43	-.54
ITEM 5	Seek conflict. (R)	-.50	-.63
ITEM 6	Think too highly of myself. (R)	-.34	-.40
ITEM 7	Comment loudly about others. (R)	-.46	-.44
ITEM 8	Insult people. (R)	-.47	-.42
Peacefulness			
ITEM 1	Try to forgive and forget.	.48	.74
ITEM 2	Accept people as they are.	.47	.49
ITEM 3	Have a good word for everyone.	.49	.48
ITEM 4	Respect others.	.48	.41
ITEM 5	Find it hard to forgive others. (R)	-.57	-.75
ITEM 6	Hold grudges. (R)	-.57	-.69
ITEM 7	Get back at others. (R)	-..44	-.60
ITEM 8	Speak ill of others. (R)	-.43	-.44

Note. (R) point to items to be reversed scored; ESCS = Eugene-Springfield community sample(N =375); university development sample (N = 778).

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Appendix E Continued

	Scale	r with factor score (ESCS)	Factor Loading (University Sample)
Morality			
ITEM 1	Return extra change when a cashier makes mistakes.	.23	.42
ITEM 2	Would never cheat on my taxes.	.45	.62
ITEM 3	Don't take advantage of others.[a]	-.41	.41
ITEM 4	Use flattery to get ahead. (R)	-.40	-.50
ITEM 5	Tell people what they want to hear so that they will do what I want them to do. (R)	-.42	-.41
ITEM 6	Cheat to get ahead. (R)	-.47	-.56
ITEM 7	Pretend to be concern for others. (R)	-.35	-.40
ITEM 8	Admire a really clever scam. (R)	-.48	-.41
Modesty			
ITEM 1	Am just an ordinary person.	.52	.54
ITEM 2	Would never be described as arrogant.	.43	.46
ITEM 3	Don't boast about my accomplishment.	.41	.54
ITEM 4	Believe that I am better than others. (R)	-.62	-.48
ITEM 5	Like to stand out in a crowd. (R)	-.50	-.44
ITEM 6	Like to attract attention. (R)	-.46	-.49
ITEM 7	Am likely to show off if I get the chance. (R)	-.42	-.52
ITEM 8	Boast about my virtues. (R)	-.48	-.71

Note. (R) point to items to be reversed scored; ESCS = Eugene-Springfield community sample(N =375); university development sample (N = 778).

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