

# Assessing the nomological network of the South African Personality Inventory among industrial psychologists

**M Bruwer**  
**22063706**

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Supervisor: Prof JA Nel  
Co-supervisor: Prof LI Jorgensen  
Co-supervisor: Dr S Brouwers

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## COMMENTS

The reader is reminded of the following:

- The editorial style of this manuscript follows the guidelines of the *South African Journal of Industrial Psychology* (SAJIP). The referencing in this mini-dissertation follows the format prescribed by the Publication Manual (6th edition) of the American Psychological Association (APA). These practices are in line with the policy of the Programme in Industrial Psychology of the North-West University (Potchefstroom) to use the APA style of referencing in all scientific documents as from January 1999.
- The format guidelines as put forth by the *South African Journal of Industrial Psychology* are followed in this mini-dissertation.
- The mini-dissertation is submitted in the form of a research article which can be viewed in Chapter 2. The reader should keep in mind that the length of the research article will exceed the total pages required by most accredited journals.
- Although the title indicates that industrial psychologists form part of this study, the reader should keep in mind that various levels of the profession were included (i.e. students, interns and psychometrists).

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## DECLARATION

I, Monique Bruwer, hereby declare that “Assessing the nomological network of the South African Personality Inventory among industrial psychologists” is my own work and that the views and opinions expressed in this work are those of the author, and relevant literature references as cited in the manuscript.

I further declare that the content of this research was not and will not be submitted for any other qualification at any other tertiary institution.

A handwritten signature in cursive script, appearing to read 'Bruwer', with a large, stylized initial 'B'.

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Monique Bruwer

November 2015

## LANGUAGE EDITING STATEMENT

128 Fairbridge  
Cnr Davidson and Danielle Street  
Fairlands

Tel: 072 499 7497

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### PROFESSIONAL EDITING SERVICES

To Whom It May Concern:

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This letter serves to confirm that I have edited the language used in the mini-dissertation entitled **Assessing the nomological network of the South African Personality Inventory among industrial psychologists** written by Monique Bruwer and submitted for examination at North West University. I am satisfied with the quality of the language used in the mini-dissertation.

Please feel free to contact me should you have any queries.

Regards

Dr Carol Saccaggi  
MA (English), MA (Clin Psyc), D Litt et Phil (Psychology)

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## SUMMARY

**Title:** Assessing the nomological network of the South African Personality Inventory among industrial psychologists

**Keywords:** cultural intelligence, industrial psychologists, personality, psychological wellbeing, South Africa, South African Personality Inventory (SAPI), validity.

To date, personality has mostly been assessed using westernised inventories that evidently have limited reliability and validity in a diverse nation such as South Africa. The South African Personality Inventory (SAPI) project was initiated with the goal of providing South Africa with a valid and reliable personality measure that can be applied fairly across the diverse nation. The SAPI is currently in the developmental stage, and part of the developmental process requires rigorous analysis on its nomological network within different occupational groups. This study therefore assessed the nomological network of the SAPI among emerging and registered industrial psychologists.

The general objective of this study was to assess the internal and external validity of the SAPI in order to expand its nomological network. Internal validity was determined through construct validity and discriminant validity, whereas external validity was determined through concurrent validity and predictive validity. The external validity was determined through analysing the personality constructs measured by the SAPI in relation to Cultural Intelligence and Psychological Wellbeing constructs.

A quantitative research approach was used to examine the psychometric properties of the SAPI and contribute to the expansion of its nomological network. The study made use of a cross-sectional design and a purposive non-probability sampling procedure. The targeted sample consisted of emerging industrial psychologists and registered industrial psychologists ( $N=465$ ).

The results showed that the SAPI consists of a six-factor model (Conscientiousness, Extraversion, Neuroticism, Openness, Negative- and Positive Social Relational factor), which is dissimilar to the nine factor and five factor models that have been reported previously. The constructs of these models were distinct from each other and therefore unique. This finding

confirmed both construct and discriminant validity. External validity in terms of concurrent validity and predictive validity were also proven. It is evident from the analysis that many of the SAPI constructs correlated with Cultural Intelligence and Psychological Wellbeing constructs and also predicted various constructs of these theoretical models as outcomes.

## OPSOMMING

**Onderwerp:** Die assessering van die nomologiese netwerk van die Suid-Afrikaanse Persoonlikheid Instrument onder bedryfsielkundiges

**Sleutelwoorde:** bedryfsielkundiges, geldigheid, kulturele intelligensie, persoonlikheid, psigologiese welstand, Suid-Afrika, Suid-Afrikaanse Persoonlikheid Instrument (SAPI)

Tot op hede word persoonlikheid hoofsaaklik met westerse maatstawwe assesser en dit het sodoende beperkte betroubaarheid en geldigheid in 'n diverse nasie soos Suid-Afrika. Gevolglik was die SAPI (Suid-Afrikaanse Persoonlikheid Instrument) projek inisieer met die spesifieke doel om 'n betroubare en geldige persoonlikheidsmaatstaf te ontwikkel wat regverdig afgeneem kan word in Suid-Afrika. Die SAPI is tans in 'n ontwikkelingsfase wat sodoende van navorsing vereis om die nomologiese netwerk van die SAPI binne verskillende beroepsgroepe te assesser en te bepaal. Die beroepsgroep van keuse was dus geregistreerde bedryfsielkundiges asook bedryfsielkundiges wat in opleiding is.

Die oorhoofse doel van hierdie studie was om die interne en eksterne geldigheid van die SAPI te evalueer om ten einde sy nomologiese netwerk uit te brei. Meer spesifiek, is die interne geldigheid bepaal deur konstrukgeldigheid en diskriminante geldigheid, terwyl eksterne geldigheid bepaal is deur middel van konkurrente geldigheid en voorspellingsgeldigheid. Die eksterne geldigheid is bepaal deur die ontleding van die persoonlikheidskonstrukte, soos gemeet deur die SAPI, in verhouding met die teoretiese konstrukte: Kulturele Intelligensie en Psigologiese Welstand.

'n Kwantitatiewe navorsingsbenadering is toegepas om die psigometriese eienskappe van die SAPI te ondersoek en ten einde by te dra tot die uitbreiding van die SAPI se nomologiese netwerk. 'n Dwarssnitnavorsingsbenadering is gebruik, asook 'n doelgerigte nie-waarskynlikheidssteekproefneming. Die geteikende steekproef het bestaan uit bedryfsielkundiges wat in opleiding is, sowel as bedryfsielkundiges wat reeds in die praktyk is (N = 465).

Die resultate het getoon dat die SAPI uit 'n ses faktor model bestaan (Ekstroversie, Konsensieusheid, Neurotisme, Openheid, Negatiewe - en Positiewe Sosiale Verhoudinge),

in stede van die opponerende nege faktor model of vyf faktor model. Dit was ook duidelik dat die konstrunkte uniek van mekaar is. Die bogenoemde bevindinge bevestig dus beide konstrunkte en diskriminante geldigheid. Eksterne geldigheid ten opsigte van konkurrente geldigheid en voorspellende geldig is ook bewys. Dit is duidelik uit die ontleding van die eksterne geldigheid dat van die SAPI konstrunkte nie net korreleer met konstrunkte van Kulturele Intelligensie en Psigologiese Welstand nie, maar ook verskeie konstrunkte van hierdie teoretiese modelle as uitkomstes voorspel.

## **CHAPTER 1**

### **INTRODUCTION**

## Introduction

Personality is largely assessed using westernised inventories that do not take into account culture specific meanings and descriptions assigned to universal concepts. There is thus a need for the fair application of personality measures across various cultures (SAPI, 2015). The South African Personality Inventory (SAPI) project was initiated eight years ago by South African and Dutch researchers with the aim of developing a personality measure that could be used fairly in the South African context (Nel *et al.*, 2012). The project initially used the combined emic-etic approach (Goldberg, 1981) to determine how personality is conceptualised within the eleven official languages of South Africa (Hill *et al.*, 2013; Nel *et al.*, 2012; Valchev *et al.*, 2013). The SAPI aimed to identify universal personality traits as well as culture specific personality traits that are appropriate to all the eleven official languages of South Africa in order to develop a unified personality inventory (Nel *et al.*, 2012). This approach was used because existing personality measures in use in South Africa do not account for the eleven official languages or the distinct characteristics unique to each individual and this has a major impact on the fairness and equivalency of assessment in South Africa (Foxcroft & Roodt, 2009; Nel *et al.*, 2012). Due to the use of a combined emic-etic approach, this new personality inventory may adhere to the guidelines of the Employment Equity Act 55 (Government Gazette, 1998), which clearly stipulates that all psychometric tests utilised in the South African context must be valid and reliable for all linguistic and cultural groups.

Using the emic-etic approach, 1200 participants across all eleven official languages were interviewed in their native language and their responses were translated into English by language editors. These English responses were subsequently content analysed (Nel *et al.*, 2012). The researchers then identified and clustered unique facets (using the emic approach) for certain languages and generated common facets (using the etic approach) for all the languages, resulting in the identification of nine clusters (Valchev *et al.*, 2013). These clusters were labelled Extraversion, Soft-Heartedness, Conscientiousness, Emotional Stability, Intellect, Openness, Integrity, Relationship Harmony, and Facilitating. The researchers also identified 37 sub-clusters and 188 personality facets (Nel *et al.*, 2012). This phase formed the groundwork for the development of an indigenous personality instrument for the South African context, namely the South African Personality Inventory (SAPI).

In order to develop items for the SAPI the research team evaluated the responses from the first phase (as reported in Nel *et al.*, 2012; see summary in previous paragraph). Each of the 188 personality facets had ten or more items, while each of the nine clusters had 117 to 482 items. This resulted in a total of 2574 items (Fetvadjiev, Meiring, Van de Vijver, Nel, & Hill, 2015; Hill *et al.*, 2013; Nel *et al.*, 2012). The SAPI team managed to reduce the item pool to 571 items (Fetvadjiev *et al.*, 2015). Questionnaires for each of the nine clusters were administered to students and police workers in samples that ranged from 439 to 1023 participants. An item selection procedure was then applied. The item selection was performed in accordance with psychometric criteria where all items with extreme means, kurtosis, and skewness were removed (Fetvadjiev *et al.*, 2015; Hill *et al.*, 2013). Principal component analysis was then applied and this was followed by hierarchical factor analysis (items with loadings of a minimum of .30 were retained, the cut-off point being .40). Items were also selected based on substantive criteria (Fetvadjiev *et al.*, 2015; SAPI, 2015).

The substantive criteria specified that the items that were selected enhanced construct representation, reduced content overlap within and across clusters, and were aligned with the designed rules of behaviour focus, simple language, and translatability (Fetvadjiev *et al.*, 2015; SAPI, 2015). In addition, all 571 items were translated from English to the other ten official languages by proficient language experts (Fetvadjiev *et al.*, 2015). Independent language experts then commented on the linguistic and cultural adequacy of the translations of the 571 items (Fetvadjiev *et al.*, 2015). Inadequate items were discarded. In addition, complex items were avoided by discarding items that consisted of more than ten words in any of the languages and discarding items that contained abstract terms. Through these item reduction process the SAPI was reduced to 250 items (Fetvadjiev *et al.*, 2015). These 250 items were then administered to a multicultural sample and were then reduced to the final item set of 146 items (156 items including Social Desirability items) by performing factor and internal-consistency reliability analysis on all the items within each cluster (Fetvadjiev *et al.*, 2015). Based on the various procedures described above, the final SAPI contains a six dimensional factor structure consisting of six clusters (and not nine clusters as initially identified by Nel *et al.*, 2012). These six factors were labelled Extraversion, Conscientiousness, Negative Social-Relational, Neuroticism, Openness, and Positive Social-Relational (Fetvadjiev *et al.*, 2015). The development process for the SAPI described here was aimed at developing a fair and unbiased measurement of personality in South Africa, thus ensuring a valid personality inventory appropriate for the multicultural and multi-

linguistic South African context (Nel *et al.*, 2012). However, the SAPI project is ongoing and limited research is currently available concerning the psychometric properties of the SAPI, particularly in relation to its validity.

This research study forms part of the final stage of the SAPI project. During this final stage validation studies will be conducted on the SAPI in various occupations, institutions and business organisations (SAPI, 2015). In response, this research study focused specifically on industrial psychologists in South Africa which includes emerging industrial psychologists such as students, interns, and psychometrists. All registered industrial psychologists as well as emerging industrial psychologists (including psychometrists) are regulated by the Health Professions Council of South Africa (HPCSA). As a result, industrial psychologists are obliged to conduct practices that fall within their scope of practice and that are in accordance with the ethical rules of conduct for practitioners registered under the HPCSA (Schreuder & Coetzee, 2010). The HPCSA state that the scope of industrial psychologists are to plan and develop strategies within the workplace based on paradigms, theory, and psychology principles in order to understand, adjust, and enhance behaviours among individuals, groups, and organisations (Health Professions Act 56, 1974). Nevertheless, in a previous study on the SAPI Fetvadjev *et al.* (2015) explored the nomological network of the SAPI in order to determine its convergent validity with the Basic Trait Inventory (BTI), which measures the Big Five. This study yielded adequate results. In order to expand on the nomological network of the SAPI, the primary aim of the current study was to determine the internal and external validity of the SAPI among industrial psychologists in South Africa. These aspects are further explored in the following section.

## 1.1 Problem statement

This study aimed to investigate the nomological network of the SAPI as this is able to provide evidence of a valid instrument. A nomological network is defined as a theoretical framework that represents the basic features of the internal structure of a measurement and also assesses the external validity of a measurement (Cronbach & Meehl, 1955). The nomological network is used to explore whether a psychological construct has any meaningful individual variation. Without meaningful individual variation a construct is not worth investigating as it cannot be used to understand human behaviours, emotions, or thought processes (Cronbach & Meehl, 1955). The internal structure assesses aspects such as

the construct and discriminant validity of an instrument, while external validity elements may consist of observable criteria or theoretically-related variables (Peterson & Zimmerman, 2004). Therefore, the nomological network assesses if a measurement, in this case the SAPI, is an adequate and sufficient instrument to be used within a specific framework. This framework is further explored in the following paragraphs.

An integral part of the current study, which aimed to validate the SAPI and establish the nomological network, was to first determine the internal validity of the constructs. As previously mentioned, the SAPI was initially conceptualised as a nine cluster instrument (Nel *et al.*, 2012), but developed into a six cluster instrument as the project progressed (Fetvadjev *et al.*, 2015). It is therefore important to determine whether the nine or six cluster instrument is more statistically valid. Therefore, prior to the assessment of the various validity elements, it was important to determine the construct validity of the SAPI as a basis for establishing the nomological network (Foxcroft & Roodt, 2013).

In order to understand what construct validity means, it is necessary to first define and discuss the construct. Construct validity relates to whether a particular measure accurately displays the theoretical basis upon which the measure was formed (De Vos, Strydom, Fouché, & Delpont, 2011; Foxcroft & Roodt, 2013). Construct validity is not only the mere validation of a measure but also the validation of the underlying theoretical basis. It also determines the validity of the relationships between variables (De Vos *et al.*, 2011). In terms of the SAPI, construct validity relates to the extent to which the SAPI measures the constructs it was developed to measure, (Foxcroft & Roodt, 2013). In order to be able to determine construct validity, there are two steps researchers can take. First, they can use exploratory factor analysis (EFA) to determine the number of dimensions in the instrument and the strength of the factors loadings (Tabachnick & Fidell, 2007). Since the SAPI is still a new instrument and previous studies indicated either a nine-factor model (Hill *et al.*, 2013) or a six-factor model (Fetvadjev *et al.*, 2015), EFA is considered to be a rewarding exercise. However, the research by Fetvadjev *et al.* (2015) confirmed the six-factor model of the SAPI through EFA and therefore further research, other than EFA, is required. More specifically, it is important to determine whether the six-factor model determined by EFA can be replicated in confirmatory factor analysis (CFA). A CFA provides a more conservative test of the theoretical model expected by the researchers and was therefore the analysis of choice in the current study.

In addition to construct validity the current study also investigated two or three competing models (in this case a nine-factor model; Nel *et al.*, 2012; and a five-factor model; Taylor & De Bruin, 2005) and compared their goodness-of-fit with the hypothesised six-factor model (Fetvadjiev *et al.*, 2015). Chi-square difference tests were then used based on the values generated for the hypothesised and competing models. For instance, the competing five-factor model as proposed by Taylor and De Bruin (2005) was used to determine whether the following clusters are unrelated to each other: intellect and openness to form the unified Intellect Openness construct; and soft-heartedness, relationship harmony, facilitating, and integrity, which were joined to form the negative social relational and positive social relational constructs. In the study conducted by Fetvadjiev *et al.* (2015) these constructs appeared to be highly correlated. Additionally, by testing the five-factor model as proposed by various scholars, specifically South African scholars (Meiring, Rothmann, & Van de Vijver, 2006; Taylor & De Bruin, 2005), the study aimed to determine whether the six-factor model of Fetvadjiev *et al.* (2015) is in fact a five-factor model (depending on the results). More specifically, this was tested by using CFA to determine whether intellect and openness are once again a unified factor and also whether soft-heartedness, relationship harmony, facilitating and integrity together form one factor. Discussions by Nel *et al.* (2012) and Hill *et al.* (2013) suggested that these constructs may share underlying elements of personality although this was only proven statistically by Fetvadjiev *et al.* (2015)'s study.

After the final model are identified, discriminant validity is determined. Discriminant validity aims to determine whether constructs within a specific measuring instrument are distinct from each other (De Vos *et al.*, 2011; Foxcroft & Roodt, 2013; Görgens-Ekermans & Herbert, 2013). For example, if an instrument measures a five-factor structure it is important to ensure that those five structures are not related to each other. In order to determine discriminant validity in the current study the hypothesised model's (in this case the proposed six-factor model; Fetvadjiev *et al.*, 2015) fit (as the unconstrained model) was compared to a few constrained models (by correlating two factors in each constrained model with 1.0) (Byrne, 2001). Through determining the best fit it was possible to determine whether some of the clusters are related or unrelated to each other.

In addition to the determination of the internal validity described above, this study also aimed to determine the SAPI's external validity in order to adequately assess the nomological network of the SAPI. In order to determine external validity it is useful to investigate the

relationship of a psychometric measure with other psychometric measures, thus enabling researchers to predict future behaviour or individual statuses with a certain measure. According to De Vos *et al.* (2011) it is important to have one or more external measures/criteria against which scores can be compared. In order to determine the external validity two additional measures were included in the current study, namely the Cultural Intelligence Scale (CQS) and the Psychological Wellbeing Scale (PWBS). These measures were selected due to their ability to assist in the determination of the nomological network as well as to aid in determining the concurrent and predictive validity.

According to Schreuder and Coetzee (2010) the use of personality as a determinant of personal-related outcomes is very important, especially to establish a nomological network (Peterson & Zimmerman, 2004). Cronbach and Meehl (1955) clearly stated that a nomological network involves the ways in which theoretical constructs hypothetically relate to each other. More specifically, the nomological network refers to how theoretical constructs relate with their specific observed variables/items or to how various opposing theoretical constructs relate to one another. Evidence of concurrent and predictive validity can be provided by a nomological network (Abele & Wiese, 2008).

Concurrent validity enables researchers to draw inferences concerning the relationships between variables within different measurements (Foxcroft & Roodt, 2013; Wissing *et al.*, 2010). In the current study concurrent validity was assessed by drawing inferences regarding the relationship between personality and cultural intelligence (CQ), as well as the relationship between personality and psychological well-being (PWB). Both CQ and PWB have been shown to be theoretically related to personality in previous studies (see discussion in Chapter 2). In this study concurrent validity was determined using product-moment correlations analysis to investigate the relationships between the constructs (Görgens-Ekermans & Herbert, 2013). Through conducting product-moment correlation analysis, the direction and strength of relationships between the SAPI and the constructs of CQ and PWB was determined (Görgens-Ekermans & Herbert, 2013). Thus, the nomological network between personality and CQ/PWB (as different theoretical constructs) was established. Once a relationship has been established between theoretical constructs and/or various opposing theoretical constructs, researchers are able to determine the predictive validity of a measure (Abele & Wiese, 2008).

Predictive validity is the extent to which a measure can predict certain criteria or outcomes (De Vos *et al.*, 2011; Foxcroft & Roodt, 2013). Predictive validity was determined with multiple regression analysis, which clarified the predictive ability of personality on CQ and PWB (Foxcroft & Roodt, 2013; Pallant, 2005). In this analysis the dependent variables were the constructs of CQ and PWB (as the outcomes) and the SAPI constructs were the predictors of the dependents. In order to understand how each of these dependent variables are constituted, PWB and CQ are discussed further in the paragraphs below.

PWB is based on individuals' need to function optimally and to realise attributes and talents that are unique to their own beings (Ryff & Keyes, 1995). Psychological wellbeing focuses specifically on identity, purpose and meaning, and relations to others (Ryff & Singer, 1995). Psychological wellbeing is regarded as a process and the measure looks at challenges in attaining the specific aspects of wellbeing, rather than seeing wellbeing as an outcome or end state (Deci & Ryan, 2008). PWB as a variable in this study consists of Self-regard (acceptance of self and one's past life), Environmental Mastery (managing and manipulating one's life and the environment in which one exists), level of Autonomy (overall independence and independent regulation of behaviour), Relationships with others (positive and trusting relationships with others), the extent and level of purposefulness and the meaning an individual has in life (the belief that one has meaning and a sense of meaning, direction and purpose in life), and an individual's sense of growth (to continually grow, develop and optimise one's potential) (Ryff, 1989, 1995).

Various researchers have investigated the relationship between PWB and personality (Grant, Langan-Fox, & Anglim, 2009; Keyes, 2006; Ryff, 1989). Research by Anglim and Grant (2014) indicated an average correlation of 0.41 between the Big Five personality factors and PWB. More specifically, the research suggests that Neuroticism, Extraversion, and Conscientiousness have the most significant relationships with PWB, followed by Openness and Agreeableness. Overall, Salami (2011) indicated that the Big Five personality traits correlate significantly with PWB. More specifically, Schmutte and Ryff (1997) found that the PWB constructs of Environmental Mastery, Purpose in Life, and Self-acceptance correlate with Conscientiousness, Extraversion, and Neuroticism. The research also suggests that Autonomy correlates with Neuroticism, Personal Growth correlates with Extraversion and Openness to Experience, and Positive Relations with others correlates with Agreeableness and Extraversion. In addition, Grant *et al.* (2009) indicated that Personal Growth correlates

with both Extraversion and Conscientiousness, and Positive Relationships correlates with Extraversion and Agreeableness. Furthermore, Autonomy correlates with Neuroticism, and Purpose in Life correlates with Openness to Experience. However, despite this research a need still exists to determine the relationship between various personality models and PWB, as well as to determine the extent to which personality can predict PWB (Paunonen & Ashton, 2001).

The current study also made use of the Cultural Intelligence Scale (CQS). Cultural intelligence (CQ) is defined as an individual's ability to deal with situations involving cultural diversity (Earley & Ang, 2003). CQ consists of four components (Ang, Dyne, & Koh, 2006; Earley & Ang, 2003) namely, Meta-cognitive CQ (the processes used by an individual to gain and understand knowledge concerning cultures), Cognitive CQ (the knowledge an individual has concerning cultures), Motivational CQ (the amount of energy an individual invests in gaining knowledge concerning cultures and attempting to function effectively in cross-cultural environments), and Behavioural CQ (an individual's ability to express appropriate verbal and non-verbal behaviours and actions in cross-cultural settings/situations) (Ang *et al.*, 2006; Earley & Ang, 2003).

In recent times a need has emerged to move away from focusing only on the outcomes CQ and instead also determine the predictors of CQ (Ang *et al.*, 2006). Ang *et al.* (2006) responded to this need and investigated the correlation between personality (the constructs of the Five Factor Model; FFM) and CQ. The results suggest that Meta-cognitive CQ is related to Conscientiousness, and Openness. In addition, Behavioural CQ is related to Agreeableness, Emotional Stability, Extraversion, and Openness. They also reported that Motivational and Cognitive CQ are related to Extraversion and Openness. In relation to the SAPI, a study conducted by Nel, Nel, Adams, and De Beer (2015) found that some constructs of the SAPI showed acceptable relationships with the constructs of CQ. Conscientiousness, Emotional Stability, Extraversion, Facilitating, Intellect and Openness related positively to Meta-cognitive CQ, while Facilitating, Intellect and Openness were found to be positively related to Motivational CQ. Furthermore, Conscientiousness, Emotional Stability, Extraversion, Intellect, Relationship Harmony and Soft-heartedness related positively with Behavioural CQ. Therefore, it seems that most of the SAPI constructs were related to all four CQ constructs. In addition to the evidence in the literature highlighting concurrent validity (relationship between personality and CQ), Ang *et al.* (2006) suggested that future research

should focus on the extent to which personality can predict CQ (in order to determine predictive validity). Nel *et al.* (2015) found that the SAPI constructs of Intellect and Facilitating predict Meta-cognitive CQ, while Soft-heartedness, Facilitating, and Extraversion have a positive effect on Motivational CQ. Furthermore, Soft-heartedness and Conscientiousness have a positive effect on Behavioural CQ.

It suggested that future research use complex models and additional personality models. In response to these needs, the current study assessed the relationship between the SAPI and a Psychological Wellbeing model, as well as a Cultural Intelligence model. The study focused specifically on Ryff's PWB scale and the CQS. The study therefore focused on the extent to which personality can predict PWB and CQ. The inclusion of two external measures enhanced the strength of the assessment of the validity of the SAPI and also made it possible to determine the extent to which the SAPI correlates with additional theoretical models and structures (concurrent validity), as well as the extent to which the SAPI can predict certain outcomes (predictive validity).

In summary, it is clear that there is a great need for reliable and valid personality measures in South Africa. Görgens-Ekermans and Herbert (2013) stated that it is crucial to establish the validity of psychometric measurements, especially those measurements unique to the South African context. It is therefore vital that the South African Personality Inventory (SAPI) show evidence of internal validity, which refers to specifically construct and discriminant validity. The scale's external validity (concurrent and predictive validity) should also be established. In an attempt to address the above issues, this study set out to determine the validity of the SAPI among South African industrial psychologists. Rothmann and Cilliers (2002) added that research, specifically in the context of industrial psychology, should focus on aspects such as diversity, cultural differences, as well as the measurement and development of an organisation's human capital. Research could therefore include constructs such as personality, cultural intelligence etc. It is also evident that personality is frequently used by industrial psychologists in understanding and predicting work behaviour (Schreuder & Coetzee, 2010). Therefore, two additional measures were included in the study, a Cultural Intelligence measure (CQS) and a Psychological Wellbeing measure (PWB scale), for the purpose of the determination of the external validity of the SAPI.

Based on the research problem described above, the following research questions were formulated:

- How are the SAPI and validity (especially construct, discriminant, concurrent and predictive validity) conceptualised in the literature?
- What is the internal validity (i.e. construct validity and discriminant validity) of the SAPI among industrial psychologists and emerging industrial psychologists in South Africa?
- What is the external validity (i.e. concurrent validity and predictive validity) of the SAPI among industrial psychologists and emerging industrial psychologists in South Africa?
- What recommendations can be made for future research and for practice?

## 1.2 Expected contribution of the study

This study assessed the psychometric properties of the SAPI, which entailed the assessment of the validity of the SAPI. The internal validity (construct validity and discriminant validity) as well as the external validity (concurrent and predictive validity) were assessed. Furthermore, the present study aimed to present evidence that the SAPI is a valid instrument that can be used to measure personality among industrial psychologists.

### **Organisational contribution**

This study has significant value for organisations as the results generated from the data will indicate whether the personality of an individual, specifically of an industrial psychologist, can predict cultural intelligence and psychological wellbeing. Additionally, the study also indicates whether organisations are able to use a personality inventory that has been proved to be valid for the whole of South Africa.

### **Individual contribution**

The results of this study will indicate whether the personalities of individuals, in particular industrial psychologists, can be assessed in a valid manner using the SAPI. It will indicate whether the results from the personality inventory will portray a true description of their actual personalities. This study will determine whether this personality inventory is valid,

regardless of an individual's age, gender, language, social-economic status, occupation, and background.

## **Literature contribution**

This study presents information of the validity of the newly developed SAPI, as limited research on the validation of the SAPI exists. More specifically, the results indicate whether the SAPI has construct and discriminant validity. It also indicates the extent to which the results are valid when the scale is used for industrial psychologists in South Africa. This study also indicates whether the SAPI validly predicts cultural intelligence and psychological wellbeing among industrial psychologists in South Africa.

### **1.3 Research objectives**

#### **1.3.1 General objective**

The general objective of this study was to validate the SAPI among industrial psychologists and emerging industrial psychologists in South Africa by assessing the following aspects: 1) the internal validity of the SAPI, which includes the construct validity and the discriminant validity; and 2) the external validity of the SAPI, which includes concurrent validity and predictive validity.

#### **1.3.2 Specific objectives**

The specific objectives of this study were:

- To conceptualise the SAPI and validity (especially construct, discriminant, concurrent and predictive validity) according to literature.
- To determine whether the SAPI shows internal validity (construct and discriminant validity) among industrial psychologists and emerging industrial psychologists in South Africa.

- To determine whether the SAPI shows external validity (concurrent and predictive validity) with measures of psychological wellbeing and cultural intelligence among industrial psychologists and emerging industrial psychologists in South Africa.
- To provide recommendations for future research and practice.

#### 1.4 Research hypotheses

- **Hypothesis 1:** The SAPI consists of a six-factor model that achieved the best goodness-of-fit in comparison to a nine-factor or five-factor model and with constrained models.
- **Hypothesis 2:** The SAPI constructs show concurrent validity by corresponding with relevant constructs of cultural intelligence and psychological wellbeing.
- **Hypothesis 3:** The SAPI constructs show predictive validity with relevant constructs of cultural intelligence and psychological wellbeing.

#### 1.5 Research method

##### 1.5.1 Literature review

A complete and thorough literature review on personality, the SAPI, construct validity, discriminant validity, concurrent validity, and predictive validity, (which includes the cultural intelligence scale and the psychological wellbeing scale) was completed. In this literature review scientific sources were used. These sources were retrieved through Google scholar accessed through the NWU library. Literature was searched in accordance with the keywords of this study. The keywords used to assist in research and obtaining useful resources were South African Personality Inventory (SAPI), personality, validity, industrial psychologists, South Africa, cultural intelligence, and psychological wellbeing. Thereafter, the journal in which articles were published was consulted by using the A-Z list on the library's database. The volume number and the year the article was published were used as guidelines to retrieve the specific identified article. The journals used include *South African Journal of Industrial Psychology*, *Journal of Personality and Social Psychology*, *Journal of Psychology*, *Journal of Research in Psychology*, *International Journal of Intercultural Relations*, *Organizational*

*Research Methods, Educational & Psychological Measurement, and Group & Organizational Management.* Other sources included presentations from conferences and workshops as well as the relevant academic text books.

### **1.5.2 Research design**

The study followed a quantitative research design and made use of structured data collection procedures. Data was collected through inventories (SAPI, CQS, PWB) and the data was analysed statistically. The inventories were administered to the research population and the findings were interpreted through various statistical methods using the SPSS and AMOS programmes. The study thus made use of primary data, which implies that data that was collected for the specific purposes of the study. A cross-sectional design with inventories as the method of data collection was used. According to De Vos *et al.* (2011) this specific design entails the examination of several groups of people at a specific point in time. The implication in using the cross-sectional design is that it can't be utilised to analyse behaviour over a period of time. This design is used to determine whether a particular problem exists within a group of participants.

### **1.5.3 Research participants**

This study was interested in individuals registered with the HPCSA as industrial psychologists, students in industrial psychology, psychometrists and interns within the field of industrial psychology. In order to achieve the specific objectives of this study, a purposive non-probability sample ( $N = 465$ ) was extracted. When using purposive non-probability sampling, the units within the sampling frame do not have an equal chance of being included in the study and therefore the likelihood of an individual being selected is indefinite (De Vos *et al.*, 2011). The characteristics of the sample significantly contributed to the purpose of this study. Therefore, the following inclusion criteria were used: 1) The participant needs to be registered with the HPCSA as an intern industrial psychologist, student in industrial psychology, psychometrist, or industrial psychologist; and 2) The participant must work or study within the field of industrial psychology.

#### 1.5.4 Measuring instrument(s)

The measuring instruments that were used to generate the data are described below.

- A biographical questionnaire was used to obtain information about the respondents such as gender, age, ethnicity, home language, educational level and occupational level.
- The South African Personality Inventory (SAPI) was developed by Fetvadjiief *et al.* (2015). The scale administered to the participants consists of 50 items and measures six factors, namely Conscientiousness, Extraversion, Neuroticism, Openness, Negative and Positive Social-Relational factor. Each of the items within the dimensions is measured on a five- point response scale that ranges from 1 (strongly disagree) to 5 (strongly agree). The constructs are measured as follow: Positive Social Relational, 12 items (e.g., “I help people realize their potential”); Negative Social Relational, 8 items (e.g., “I abuse my power over others”); Neuroticism, 4 items (e.g., “I worry a lot”); Conscientiousness, 12 items (e.g., “I am involved in my work”); Extraversion, 7 items (e.g., “I make friends easily”); and Intellect Openness, 7 items (e.g., “I search for answers when I do not have them”). A previous study (Fetvadjiief *et al.*, 2015) yielded the following Cronbach Alpha coefficients: Conscientiousness  $\alpha= 0.780$ ; Extraversion  $\alpha=0.795$ ; Neuroticism  $\alpha= 0.745$ ; Openness  $\alpha=0.740$ ; Negative Social Relational  $\alpha=0.710$ ; and Positive Social Relational  $\alpha=0.810$ .
- A twenty item scale developed by Ang, Van Dyne, Koh, and Ng (2004) was used to measure cultural intelligence. The scale consists of four dimensions, namely Meta-cognitive CQ, Cognitive CQ, Motivational CQ, and Behavioral CQ. Each of these dimensions is measured by 5 items, and items are answered on a five-point response scale that ranges from 1 (strongly disagree) to 5 (strongly agree). Sample items from this scale are as follow: Meta-cognitive CQ - “I am conscious of the cultural knowledge I use when interacting with people with different cultural backgrounds”; Cognitive CQ - “I know the legal and economic systems of other cultures”; Motivational CQ - “I enjoy interacting with people from different cultures”; and Behavioral CQ - “I use pause and silence differently to suit different cross-cultural situations.”. Additionally, the CQS’s Cronbach Alpha coefficient ranges from 0.71 to 0.85 (Van Dyne & Koh, 2005).

- The Psychological Wellbeing scale was developed by Ryff (1989). The scale consists of 84 items and measures six dimensions, namely Autonomy, Environmental Mastery, Personal Growth, Positive Relations with others, Purpose in Life, and Self-acceptance. Each of the items is measured on a five-point response scale that ranges from 1 (strongly disagree) to 5 (strongly agree). Sample items from this are as follows: Autonomy - “Sometimes I change the way I act or think to be more like those around me”; Environmental Mastery - “I am quite good at managing the many responsibilities of my daily life”; Personal Growth - “I don’t want to try new ways of doing things - my life is fine the way it is”; Positive Relations with others - “I often feel lonely because I have few close friends with whom to share my concerns”; Purpose in Life - “Some people wander aimlessly through life, but I am not one of them”; and Self-acceptance - “I like most aspects of my personality”. A study conducted by Ryff and Keyes (1995) provided Alpha coefficients as follow: Autonomy  $\alpha= 0.37$ ; Environmental Mastery  $\alpha= 0.49$ ; Personal Growth  $\alpha= 0.40$ ; Positive Relations  $\alpha= 0.56$ ; Purpose in Life  $\alpha= 0.33$ ; and Self-acceptance  $\alpha= 0.52$ .

### **1.5.5 Research procedure**

The participants that are included in the study were all registered with the HPCSA as industrial psychologists, psychometrists, intern industrial psychologists or students in industrial psychology. The measuring instruments were distributed in hardcopy (paper and pencil based) as well as electronically. The hardcopy and electronic versions both explained that the study is anonymous in the sense that their names and surnames were not indicated and that participation was strictly voluntary. The purpose of the measures was also explained, as well as the fact that the study aimed to validate the SAPI as part of a mini-dissertation. The participants had to complete three measures and were given approximately three weeks to complete these measures. The measures were then collected and the data collection process was terminated.

### **1.5.6 Statistical analysis**

The aim of the study was to determine the construct validity, discriminant validity, concurrent validity and predictive validity of the SAPI in order to establish a nomological

network for the SAPI. Furthermore, it is important to notice that a measure cannot be valid unless it is proven to be reliable (Foxcroft & Roodt, 2009), thus the reliability was also determined.

Since the SAPI is a newly developed measure the hypothesised six-cluster model and alternative (competing) models were tested in order to determine the construct and discriminant validity. The use of EFA to explore the relationships of the sets of variables within the SAPI was initially considered. When using EFA the number of factors to be extracted is determined by the eigenvalues; all factors that show eigenvalues higher than 1 are extracted to represent a theoretical model (Pallant, 2005). In addition, factor loadings are assessed to determine whether the items load onto the factors on which they are supposed to load (Pallant, 2005). However, although EFA is regarded as the most effective way to determine the number of factors that should be extracted the current study decided to make use of CFA through Structural Equation Modelling (SEM). This decision was taken due to the current phase of the SAPI project, as the underlying dimensions are already clear.

SEM is a statistical methodology that applies a confirmatory approach, also known as a hypothesis-testing approach (Byrne, 2001). Confirmatory factor analysis (CFA) is thus used to determine construct validity. By means of CFA, two competing models were tested to determine discriminant validity. Firstly, the six-factor model of the SAPI (as proposed by Fetvadjev *et al.*, 2015, consisting of Conscientiousness, Extraversion, Negative Social-relational, Neuroticism, Openness, and Positive Social-relational) was tested. Thereafter, the first competing model of the SAPI (as proposed by Hill *et al.*, 2013, and Nel *et al.*, 2012), which consists of nine factors (Conscientiousness, Emotional Stability, Extraversion, Facilitating, Integrity, Intellect, Openness, Relationship Harmony, and Soft-heartedness) was tested. Lastly, a five-factor model consisting of the factors of Conscientiousness, Extraversion, Neuroticism, Openness, and Social-relational (as proposed by Taylor & De Bruin, 2005) was tested. After testing competing models to acquire the best goodness-of-fit model, discriminant validity was tested. Discriminant validity refers to the extent to which one construct is distinct from other constructs in the same measurement instrument. This is determined through constraining the estimated correlation parameter between two estimated constructs to 1.0 (Byrne, 2001). Thereafter, chi-square difference tests are applied to the values generated for the constrained and unconstrained models. In cases where the results of the chi-square difference test of the unconstrained model are greater than the chi-square

difference test of the constrained model, discriminant validity is satisfactory (Byrne, 2001). However, if the chi-square difference tests values do not differ between the constrained and unconstrained models, discriminant validity does not exist.

Concurrent validity was determined with the assistance of the SPSS programme (IBM SPSS, 2014). Product-moment correlations were calculated to assess the relationships of the constructs of the SAPI with other measures (cultural intelligence and psychological wellbeing). The product-moment correlations determine the relationship between personality and cultural intelligence, as well as personality and psychological wellbeing. Practically significant differences are reported. Values of 0.3 and higher are indicative of practically significant correlations with a medium effect and values of 0.5 and higher are also indicative of practically significant correlations but with a large effect. Additionally, values range from -1 to 1, where -1 being a complete negative relationship between personality and cultural intelligence / psychological wellbeing; 1 being a complete positive relationship between personality and cultural intelligence / psychological wellbeing; and 0 indicating no relationship between personality and cultural intelligence/ psychological wellbeing (Pallant, 2005).

Predictive validity was also determined. Once again, SPSS was used to analyse predictive validity. More specifically, multiple regression analysis was used. Multiple regressions are used to determine how a set of variables is able to predict a particular outcome (Pallant, 2005). Each independent variable is then evaluated on predictive power. More specifically, this study determined the extent to which personality can predict Cultural Intelligence (Behavioural CQ, Cognitive CQ, Meta-cognitive CQ, and Motivational CQ) as well as psychological wellbeing (Autonomy, Environmental Mastery, Personal Growth, Positive relations with others, Purpose in Life, and Self-acceptance).

Other additional statistics were also determined. Reliability was measured for all the constructs. Pallant (2005) has indicated 0.70 and higher to be an acceptable reliability coefficient, but lower thresholds are sometimes used in the literature. Furthermore, descriptive statistics (means, standard deviation, standard skewness and kurtosis) were also measured. According to Stapel (2013) the mean is defined as the process where all the numbers are added together and then divided by the total units, also known as the arithmetic mean. Standard deviation indicates the “average spread of the scores from the mean and

therefore is usually reported along the mean” (De Vos *et al.*, 2011, p. 262). Skewness is seen as an asymmetry in a statistical distribution, in which the curve appears distorted or skewed either to the left or to the right. Kurtosis refers to the distributions’ ‘flatness’ or ‘peakedness’ (Pallant, 2005).

### **1.5.7 Ethical considerations**

The ethical considerations are in alignment with the general ethical rules and annexure 12 (which are the rules of conduct that all professions in psychology should adhere to) of the Health Professions act (Health Professions Council of South Africa, HPCSA, 2006).

#### *Avoidance of harm*

Participation in this study brought no harm to any individual as the inventories were not related to any sensitive or harming subjects.

#### *Voluntary participation*

Participation within the study was voluntary and this was clearly communicated to participants. The participants completed the inventories of their own free will and could withdraw from the study at any time.

#### *Informed consent*

The participants were able to provide informed consent as they were provided with adequate information concerning the goal of the study, the expected duration of their involvement, the procedures that were followed during the study, the possible advantages and disadvantages to which they may have been exposed and the credibility of the study.

#### *Privacy, anonymity and confidentiality*

Confidentiality in this study refers to the agreements between the researchers and the participants that limit others’ access to private information that was provided by the respondents. The individuals were requested to not provide the researcher with any confidential and personal information.

### *Actions and competence of researchers*

The researcher was fully equipped to administer the measures to participants (the SAPI, PWBS, and CQS).

### *Publication of the findings*

The information was formulated and conveyed honestly, clearly and unambiguously in the form of a research article and a mini-dissertation.

## 1.6 Chapter division

Chapter 1: Introduction

Chapter 2: Research article

Chapter 3: Conclusions, limitations, and recommendations

## 1.7 Chapter summary

Chapter 1 provided a discussion on the problem statement and research objectives. Furthermore, the research method and the measuring instruments were discussed. The chapter concluded by providing a brief overview of the structure of the mini-dissertation.

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## **CHAPTER 2**

### **RESEARCH ARTICLE**

## **Assessing the nomological network of the South African Personality Inventory among industrial psychologists**

**Orientation:** Personality is often assessed with westernised inventories that have limited reliability in South Africa. The South African Personality Inventory (SAPI) project was initiated with the aim of developing a reliable and valid instrument for the measurement of personality in the South Africa context. The project has progressed through various stages and the current study forms part of the validation phase of the project. The goal of this phase is to determine the validity of the SAPI to the point where the instrument is accredited by the HPCSA. In this study the internal and external validity of the SAPI were determined using a sample of emerging and registered industrial psychologists.

**Research purpose:** The general objective of this study was to assess the nomological network of the SAPI among industrial psychologists and emerging industrial psychologists.

**Motivation for the study:** Westernised inventories are currently used to assess personality in South Africa. The SAPI project aims to counteract the use of westernised inventories and provide South Africa with a valid and reliable personality inventory. This study contributes to the SAPI project.

**Research design, approach and method:** A quantitative approach was used and the study was cross-sectional in nature. The sample consisted of emerging and current industrial psychologists ( $N=465$ ). The measuring instruments included in the study were South African Personality Inventory, the four-factor model Cultural Intelligence scale, as well as Ryff's (1989) Psychological Wellbeing scale.

**Main findings:** The results confirmed a six-factor SAPI structure and provided evidence in terms of internal validity. The six distinct personality factors showed practically significant correlations with various CQ and PWB constructs and also demonstrated predictive power in relation to both CQ and PWB constructs.

**Practical implications:** This study contributed to the process of assessing the psychometric properties of a measure of personality in order to deliver a valid and reliable tool that organisations can use to assess personality.

**Contribution/ value add:** Research concerning the psychometric properties of the SAPI is limited and this study contributed to assessing the instrument's nomological network.

**Keywords:** cultural intelligence, industrial psychologists, personality, psychological wellbeing, South Africa, South African Personality Inventory (SAPI), validity.

## **Introduction**

The development and implementation of psychometric testing in South Africa has a long history and remains a cause for concern (see Foxcroft, 1997; Van der Vijver & Rothmann, 2004; Van Zyl, 2014). The use of psychometric assessments is regarded as a psychological act (Health Professions Council of South Africa, HPCSA, 2006) that is included in the scope of practice for emerging and registered industrial psychologists, and psychometrists (Health Professions Act, 1974). These professions and acts are governed and regulated by the Health Professions Council of South Africa (HPCSA). It is thus imperative that professionals practicing within these disciplines use scientific principles and procedures as well as expert knowledge during the development of a psychometric inventory (regardless of the purpose of the inventory, which may include assessments of aptitude, cognition, interest and personality) (Health Professions Act 56, 1974). Moreover, the HPCSA requires that newly developed psychometric inventories are proven to be reliable, valid, and should demonstrate the ability to be applied fairly in a multicultural and multi-lingual context (see the Employment Equity Act 55, Government Gazette, 1998). As a result, trends among South African researchers, especially pertaining to psychometric testing, have focused on the development of psychometric inventories that adhere to these regulations.

Despite these stipulations very few assessments currently in use adhere to these regulations, and inventories adapted from western contexts are commonly used despite their limited appropriateness (Meiring, Van de Vijver, Rothmann, & Barrick, 2005). In response to the need for inventories that can be used in a multicultural and a multi-lingual context and that display comprehensive and rigorous psychometric properties (Foxcroft, 2004; Foxcroft & Roodt, 2009; Paterson & Uys, 2005; Van der Vijver, & Rothmann, 2004; also see the Health Professions Council of South Africa's website, Form 208; HPCSA, 2006) the South African Personality Inventory (SAPI) project was initiated almost a decade ago.

The SAPI project's goal is to provide South Africa with a personality inventory that takes into account culture specific and universal aspects pertaining to all the 11 official languages

(Afrikaans, English, isiNdebele, isiXhosa, isiZulu, Northern Sotho, Setswana, Siswati, Southern Sotho, Tshivenda, and Xitsonga) and that substantiates a psychometrically sound inventory in terms of reliability and validity (Fetvadjiev, Meiring, Van de Vijver, Nel, & Hill, 2015; Nel *et al.*, 2012). The project consists of two stages (Fetvadjiev *et al.*, 2015; Hill *et al.*, 2013; Nel *et al.*, 2012). The first stage was qualitative of nature. During this stage field workers who were proficient in the target languages conducted semi-structured interviews with 1217 participants from the 11 official language groups. These interviews generated 53 139 responses (Nel *et al.*, 2012). In an attempt to convert these responses into a reduced and manageable dataset a three-stage analysis process took place (similar to the analysis described by Valchev *et al.*, 2011). The three stages were labelling, categorizing, and semantic clustering. Throughout the stages of analysis, language experts and researchers involved in the SAPI project were consulted on a regular basis. The large number of responses was condensed to 188 facets, 37 sub-clusters, and nine clusters.

The SAPI project then progressed to the quantitative phase. The first step in the phase involved transforming the responses into a total of 2574 items. Using various quantitative research approaches the number of items has now been reduced to 146. Items that were removed showed inadequate psychometric properties, were regarded as complex, and were also proven to have linguistic and cultural inadequacies by language experts (detailed information and discussion on both these phases can be found in Fetvadjiev *et al.*, 2015; Nel *et al.*, 2012).

The current phase of the SAPI project involves proving the validity of the instrument in various organisational settings/frameworks/occupations. Therefore, the generation of empirical evidence concerning the internal validity and external validity of the SAPI is important. This will not only provide a valid personality measure but, through ongoing research, the personality factors and their relationships with certain outcomes/states/behaviours can contribute significantly to the field of organisational/industrial psychology (Rothmann & Cilliers, 2002; Schreuder & Coetzee, 2010). Similar studies have been conducted by Colbert, Mount, Harter, Witt, and Barrick (2004), Judge, Heller, and Mount (2002), and Salgado (2003). In addition, the latest research by Fetvadjiev *et al.* (2015) provides evidence concerning the SAPI factor structure.

## Research purpose and objectives

The general objective of this study was to assess the nomological network of the SAPI among industrial psychologists in South Africa through the evaluation of the instrument's 1) internal validity, consisting of construct validity and discriminant validity, and 2) external validity, consisting of concurrent and predictive validity.

### **Specific objectives**

The specific objectives of this study were:

- To conceptualise the SAPI and validity (especially construct, discriminant, concurrent and predictive validity) according to literature.
- To determine whether the SAPI shows internal validity (construct and discriminant validity) among industrial psychologists and emerging industrial psychologists in South Africa.
- To determine whether the SAPI shows external validity (concurrent and predictive validity) with measures of psychological wellbeing and cultural intelligence among industrial psychologists and emerging industrial psychologists in South Africa.
- To provide recommendations for future research and practice.

## Literature review

### **The SAPI's internal structure**

Although the conceptual model of the SAPI showed a nine-factor model (Conscientiousness, Emotional Stability, Extraversion, Facilitating, Integrity, Intellect, Openness, Relationship Harmony, and Soft-Heartedness; Nel *et al.*, 2012) research suggests that the measure assesses six factors (Conscientiousness, Extraversion, Neuroticism, Openness-Intellect, negative and positive Social-Relational factor; Fetvadjev *et al.*, 2015). The constructs are defined below in accordance with the definitions developed in the SAPI process. Conscientiousness is defined as an individual's orientation towards success, precision, and conventionalism. It is best represented by Achievement Orientation, Orderliness, Traditionalism-Religiosity, and

Integrity with factor loadings ranging from 0.31 to 0.81 (Fetvadjiev *et al.*, 2015). Extraversion is an individual's tendency towards spontaneous interactions while being likely to entertain others through jokes and stories. Its facets consist of Playfulness and Sociability with factor loadings ranging from 0.64 to 0.83. Neuroticism is the tendency to be impulsive and have fluctuating emotions. It is represented by Emotional Balance and Negative Emotionality with factor loadings of 0.38 and 0.81. Openness is the quality of being well-informed, rational, and a progressive thinker. It consists of Broad-Mindedness, Epistemic Curiosity, and Intellect with factor loadings ranging from 0.43 to 0.59. Negative Social-Relational is the tendency of approaching relations with others in a contentious manner and is best represented by Conflict-Seeking, Deceitfulness, and Hostility-Egosim. The factor loadings range from 0.65 to 0.92. The sixth factor, Positive Social-Relational, is an inclination towards a positive approach in managing relations with others. The subgroups are Facilitating, Integrity, Social Intelligence, Interpersonal Relatedness, and Warm-Heartedness with factor loadings that range from 0.37 to 0.88. Although the six-factor internal structure has been confirmed and evidence of reliability and validity has been published, comprehensive research on the psychometric properties of the SAPI (within various frameworks) is still limited.

### **Expansion of the SAPI nomological network**

The published research on the SAPI's nomological network includes the analysis of the nomological network conducted by Fetvadjiev *et al.* (2015), which focused on the internal structure of the SAPI, the association with Social Desirability, and the relationship between the SAPI (an indigenous measure) and the Five-Factor Model (an imported measure). A nomological network is established when a theoretical construct is adequately and statistically represented by its internal structure (internal validity), as well as when different theoretical constructs relate with each other (external validity), thus delivering a valid network. Although the internal structure of the SAPI has been determined (Fetvadjiev *et al.*, 2015) in the current stage of the SAPI project the aim is to validate the newly developed SAPI in a wide variety of frameworks such as different occupational groups (Hill *et al.*, 2013; SAPI, 2015). As such, the current study aimed to further expand the nomological network through assessing the external and internal validity of the SAPI among industrial psychologists and emerging industrial psychologists. More specifically, external validity was determined through assessing the ability of the SAPI to predict CQ and PWB (predictive

validity), as well as the correlation between the SAPI factors and the CQ and PWB factors (concurrent validity). Moreover, internal validity consists of construct and discriminant validity.

### **Construct validity**

The construct validity of an inventory is evident when empirical evidence is provided in terms of the association between the internal network and its hypothesised relationships (Byrne, 1984; Cronbach & Meehl, 1955). Since industrial psychologists are required to develop psychometric inventories on the basis of theoretical principles (Health Professions Act, 1974), construct validity provides evidence regarding the extent to which the inventory portrays the theory on which it is grounded. In statistically determining internal validity (generating empirical evidence), researchers mainly use Exploratory factor analysis (EFA) or Confirmatory factor analysis (CFA). Various studies have used Factor analysis (FA) procedures as a statistical approach to determine the construct validity of personality inventories and models (e.g., Aluja, García, García, & Seisdedos, 2005; Cooper, Smillie, & Corr, 2010; Hopwood & Donnellan, 2010; Hopwood, Wright, & Donnellan, 2011; Laher, 2010; Vassend, & Skrandal, 2011; Ypofanti *et al.*, 2015).

Research by Aluja *et al.* (2005) supported a five-factor model for the NEO-PI-R through the application of various FA procedures (this finding is similar to research conducted by Hopwood & Donnellan, 2010). Hopwood and Donnellan (2010) conducted both EFAs and CFAs and extracted factors based on the inventories' theoretical structures. Inventories included in the research were the five-factor International Personality Scale questionnaire (Goldberg, 1999), Cattell's Sixteen Personality Factor Questionnaire (16PF) (Conn & Rieke, 1994), The California Psychological Inventory (Gough & Bradley, 1996), the HEXACO personality inventory (Lee & Ashton, 2004), the Hogan personality inventory (Hogan & Hogan, 1995), the Multidimensional Personality Questionnaire (MPQ) (Tellegen & Waller, 2008), the NEO-PI-R (Costa & McCrae, 1992), and the Six-Factor Personality Questionnaire (Jackson, Paunonen, & Tremblay, 2000). The study yielded interesting results relating to the internal structures of the inventories. The MPQ provided evidence of both a three- and four-factor model, the NEO-PI-R (as well as the revised NEO-PI-R) showed a five-factor model, whereas the 6 Six Factor Personality Questionnaire, 16PF, and HEXACO provided evidence of a six-factor model and the Hogan Personality Inventory provided a seven-factor model. In

addition to determining the internal structures of the inventories Hopwood and Donnellan (2010) also aimed to determine the capability of both EFA and CFA to assess the internal structure of an inventory. Based on their findings Hopwood and Donnellan (2010) argued that EFA procedures should not be neglected and such procedures' power should not be underestimated as these analyses provide enhanced understanding pertaining to personality inventories.

Although a previous quantitative study on the SAPI (Hill *et al.*, 2013) used principle component analysis (PCA) to determine the number of factors to be extracted, the latest research on the SAPI's internal structure used EFA to provide evidence of a six-factor personality structure (Fetvajiev *et al.*, 2015). PCA and FA are similar techniques in the sense that both attempt to produce a smaller number of linear combinations and they both tend to produce similar results (Pallant, 2005). Nevertheless, the original SAPI Openness and Integrity factors (nine-factor model) have now merged as an Openness factor with Intellect as a facet. In addition, Emotional Stability, Facilitating, Integrity, Relationship Harmony, and Soft-Heartedness have formed Positive and Negative Social Relational factors (see Fetvadjev *et al.*, 2015 for more details) (Valchev *et al.*, 2011). In the present study, CFA was used instead of EFA because the factor structure of the SAPI has already been established (Fetvajiev *et al.*, 2015) and more advanced statistical knowledge concerning the nomological network of the SAPI is now required.

In this regard CFA is a valuable approach because knowledge concerning the underlying variable structure already exists and researchers are therefore able to draw inferences regarding the suggested relationships between observed measures and underlying factors (Byrne, 2001). These inferences will contribute to construct validity. It is important to remember the importance of expanding the nomological network in a variety of frameworks. Therefore, in order to determine the internal nomological network, it is necessary to test alternative theoretical models to refine the construct validity of a measure (Musek, 2007). Through CFA researchers are able to compare different theoretical models which include a hypothesised model and competing theoretical models (Cable & DeRue, 2002; Foxcroft & Roodt, 2013; Görgens-Ekermans & Herbert, 2013; Hill & Hughes, 2007). More specifically, researchers are able to take various personality models and compare them to one another in order to determine whether the constructs of each model are distinct from one another and which theoretical personality model is the best fit and most accurately measures personality.

Studies conducted by Aluja, Garcia, and Garcia (2004), Musek (2007) and Cooper *et al.* (2010) analysed and compared multiple personality models. Cooper *et al.* (2010) compared the five-factor mini-IPIP to a four-factor model and to a two-factor model. They found that the mini-IPIP five-factor model yielded only poor to moderate model fit (Chi-square=1323.12; CFI= 0.82; RMSEA= 0.07). However, regardless of the model fit pertaining to the five-factor model, it still had a superior model fit to the four-factor model (Chi-square=2131.17; CFI=0.70; RMSEA=0.09) and the two-factor model (Chi-square=4009.54; CFI= 0.42; RMSEA= 0.12). A similar study by Aluja *et al.* (2004) tested the goodness-of-fit for the three-factor (Chi-square=1323.77; CFI=0.81; RMSEA=0.14), four-factor (Chi-square=920.32; CFI=0.87; RMSEA=0.12), and five-factor (Chi-square=943.19; CFI=0.86; RMSEA=0.13) models of the personality model suggested by Zuckerman, Kuhlman, Teta, Joireman, and Kraft (1993).

### **Discriminant validity**

Discriminant validity is evident when independent factors within a measure correlate minimally (Foxcroft & Roodt, 2013). As such if a theoretical model consists of six factors, those factors should be distinct from one another. For discriminant validity, Chi-square difference tests and other goodness-of-fit indexes may be applied to determine the distinctiveness of factors within the same model (Hills & Hugh, 2007). The same goodness-of-fit indexes as described with the construct validity sub-section apply in the same instances (Görgens-Ekermans & Herbert, 2013). According to Foxcroft and Roodt (2013) researchers compare the goodness-of-fit indexes of an unconstrained model (where constructs are uncorrelated) with several constrained models (the total are depended on the total constructs). With the constrained models, the estimated correlation parameters between two estimated constructs are constrained to 1.0 (Byrne, 2001) in order to determine if two constructs correlates or not. If the goodness-of-fit indexes of the unconstrained model still yield the best values from the constrained models, then discriminant validity is evident.

In the previous two sub-sections of the literature review, the aspects relevant for internal validity were discussed. This formed part of the internal nomological network of an assessment measure. In the following sub-sections, the external validity will be discussed in order to understand the external nomological network on an assessment measure.

## **External validity of the SAPI measure**

In order to expand the SAPI's external nomological network empirical evidence needed to be generated concerning the correlations as well as the predictive ability of the SAPI factors in relation to external theoretical models. In the current study two external models were included, namely Cultural Intelligence (CQ) and Psychological Wellbeing (PWB). Correlations with external models suggest that the SAPI is not just an indigenous measure but could also be applied universally and could contribute to the field of industrial psychology through being scientifically proven to make inferences with regards to CQ and PWB.

## **Concurrent validity**

Concurrent validity occurs when the correlation between a factor structure of a theoretical model is compared to the factor structure of an external theoretical model (Carmines & Zeller, 1979). The correlations between certain variables such as items or factors in different inventories can be determined. Generally this is done through the analysis of product moment correlations, and this was the procedure followed in this study. More specifically, the use of product moment correlations through SPSS allows for the identification of the strength and direction of relationships between variables. The direction of the relationship between two variables will either be negative or positive. A positive relationship indicates that as the value of one variable increases, the value of the other variable will also increase. A negative relationship indicates that as the value of one variable increases, the value of the other variable decreases. Furthermore, the value of the strength in correlation ranges from -1.00 to 1.00; with 1.00 being an absolute positive relationship, -1.00 the absolute negative relationship, and 0 indicating no relationship between variables. The values between 0 and 1/-1 are interpreted differently by researchers, although the most accepted interpretations suggest that variables with correlation values ranging from  $r=0.10$  to  $r=0.29$  have a small relationship, whereas a medium relationship is represented by values ranging from  $r=0.30$  to  $r=0.49$  and a strong relationship is represented by values ranging from  $r=0.50$  to  $r=1.00$ .

Research on concurrent validity does not necessarily utilise product moment correlations. There is a fair amount of research concerning the correlation between personality models and external models (e.g., DeNeve & Cooper, 1998; Grant, Langan-Fox, & Anglim, 2009; Ozer & Benet-Martinez, 2006; Sellbom & Bagby, 2008). Despite the extensive research on the

relationship between personality and SWB (Subjective Wellbeing) there is limited empirical evidence available regarding the correlation between personality and PWB. As a result, this study compared the best fit factor model of the SAPI (determined using internal validity, in this case it was the six-factor model) to CQ and PWB. As mentioned previously, the predictive power of the SAPI is also important.

### **Predictive validity**

The predictive power of an inventory refers to its ability to predict certain states and/outcomes (Pallant, 2005; Shultz, Whitney, & Zickar, 2014). If an inventory is proven to have predictive power through statistical approaches, such as multiple regression analysis, predictive validity is confirmed. It is evident from existing research that the assessment of the predictive validity of personality has been regarded as a matter of importance. Many of the existing studies (e.g., Asendorpf, 2003; Barrick & Mount, 1996; Jain, 2013; Rothstein & Johnston, 1996) made use of multiple regression analysis to assess the predictive ability of personality in relation to certain outcomes, behaviours and/or states -other than CQ and PWB- unique to industrial/organisational psychology. In addition, the established relationships between the SAPI factors and external factors of CQ and PWB expanded the external nomological network.

### **Relationships between personality and external variables**

PWB (as defined by Ryff, 1989, and Ryff and Keyes, 1995) includes the following factors: Autonomy (Going about in accordance with one's personal standards rather than the opinions of others); Environmental mastery (participation in external activities); Personal growth (to advance in knowledge, skills, and potential); Positive relations with others (the presence of close relationships with others in one's life); Purposefulness (having a sense of determination and significance in one's life); and Self-Regard (Maintaining a positive attitude towards self). Previous studies indicate that the Big Five personality traits (Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to experience) correlate with the PWB factors (e.g., Brackett & Mayer, 2003; DeNeve & Cooper, 1998; Singh, Singh, & Singh, 2012). Singh *et al.* (2012) assessed the relationship between the Big Five Inventory-10 (Rammstedt & John, 2007) and PWB among students in professional academic courses. All items from the distinct factors unique to PWB were grouped together to attain a total PWB score. The

study found evidence of a negative relationship between Neuroticism and PWB and a positive relationship between Agreeableness and PWB. However, there were no significant associations between Conscientiousness, Extraversion, Openness and PWB. Singh *et al.* (2012) also provided further evidence of predictive validity. Neuroticism explained 9% of the total variance in PWB, whereas Agreeableness, Conscientiousness, Extraversion, and Openness explained 6.6% of the total variance. The study thus suggests that Neuroticism is the strongest predictor of PWB.

Garcia (2011) conducted similar research and also summarised the PWB scale to measure PWB as a whole and not the distinct factors. Results also showed a negative relationship between Neuroticism and PWB, whereas both Extraversion and Conscientiousness have a positive relationship with PWB. In terms of the predictive power of personality traits on PWB Extraversion and Conscientiousness predicted high levels of PWB, whereas Neuroticism predicted low levels of PWB. In addition, Burns and Machin (2010) concluded that PWB is associated with personality although they provided limited evidence on concurrent analysis. More specifically Burns and Machin (2010) found that Agreeableness, Conscientiousness, Extraversion, and Openness had positive correlations with Autonomy and Positive Relations with others (the correlations ranged from -0,031 to -0.499). Grant *et al.* (2009) provided evidence concerning the correlations between Openness and Purpose in life, Agreeableness and Positive relations with others, Conscientiousness and Personal Growth, Neuroticism and Autonomy, as well as Extraversion and both Personal growth and Positive relations with others.

Thus far, the limited body of research available concerning the predictive power of personality in relation to PWB supports the hypothesised relationships between the SAPI factors and the PWB factors. In summary, it is evident from previous empirical research on personality and PWB that the Big Five model is related to PWB. However, research pertaining to the personality model of the SAPI and PWB is scarce and further investigation is required. In addition to the importance of obtaining empirical evidence regarding the relationship between personality and PWB, research on CQ in relation to personality could also make a valuable contribution to the field of industrial/organisational psychology (Ang *et al.*, 2006).

CQ is defined as an individual's ability to function in a multicultural setting or situation (Early & Ang, 2003). According to Ang *et al.* (2007) CQ consists of various dimensions, namely behavioural CQ (an individual's ability to behave and act appropriately and in accordance with multicultural aspects, such as values and beliefs of different cultures), cognitive CQ (an individual's knowledge pertaining to multicultural aspects, meta-cognitive CQ (an individual's thought processes in order to understand cultural contexts), and motivational CQ (the amount of energy an individual invests in understanding multicultural aspects). Early and Ang (2003) initiated research on CQ and research on this topic has been ongoing. Although research focusing particularly on the relationship between personality and CQ is currently limited, it is increasing (e.g., Nel, Nel, Adams, & De Beer, 2015; Smith, 2012). Ang *et al.* (2006) investigated the relationship between CQ and the Big Five traits in a sample of business graduates. The research produced evidence of relationships between Conscientiousness and Meta-cognitive CQ; Agreeableness, Emotional stability and Behavioural CQ; Extraversion and Behavioural CQ, Cognitive CQ, and Motivational CQ; and Openness to experience and all four CQ factors. Research by Ward *et al.* (2008) assessed the MPQ (consisting of Cultural empathy, Emotional Stability, Flexibility, Open-mindedness, and Social intuitive) in relation to CQ. Although the CQ factors all had moderate to strong associations with all MPQ factors, the strongest relationships were between Meta-cognitive CQ and Cultural empathy, as well as between Motivational CQ and Cultural empathy, Flexibility, Open-mindedness, and Social intuitive.

Furthermore, it is imperative in the field of industrial psychology to not only investigate the outcomes of CQ but also to investigate more complex personality models in association with CQ in various occupational settings (Ang *et al.*, 2006). Such research includes comprehensive assessment of the correlations between personality and CQ as well as investigations regarding the predictive ability of personality in relation to CQ. To date Nel *et al.*, (2015) has provided evidence on the ability of SAPI factors (Nel *et al.*, 2012) to predict CQ. More specifically, Intellect and Facilitating predicted Meta-cognitive CQ; Soft-heartedness, Facilitating, and Extroversion predicted Motivational CQ; whereas Soft-heartedness and Conscientiousness predicted Behavioural CQ. However, little research has been published on the relationship between CQ (as well as PWB) and the SAPI factors. There is thus a need for rigorous research in relation to the SAPI's internal and external validity.

It is evident from the literature that comprehensive research on the expansion of the internal and external nomological network of the SAPI is of utmost importance. In an attempt to address this need, this study determined the SAPI's construct and discriminant validity, as well as its concurrent and predictive validity through the inclusion of external variables (CQ and PWB). This study thus not only addressed the need for validation studies in relation to the SAPI but it also addressed the general need to provide South African organisations with a measure that can be applied in culture specific and universal settings. Also, based on the outcomes of this research, industrial psychologists would be able to make inferences concerning personality and certain outcomes/statuses/behaviours.

Based on the research discussed above a series of hypotheses were postulated for the current study

## **Hypotheses**

The following hypotheses were tested to achieve the objectives of the study.

- **Hypothesis 1:** The six-factor model of the SAPI will achieve the best goodness-of-fit in comparison to a nine-factor or five-factor model and with constrained models.
- **Hypothesis 2:** The SAPI constructs will show concurrent validity by corresponding with relevant constructs of cultural intelligence and psychological wellbeing.
- **Hypothesis 3:** The SAPI constructs will show predictive validity with relevant constructs of cultural intelligence and psychological wellbeing.

## **Research design**

### Research approach

The research objectives were investigated and inferences concerning the data were made through the utilisation of a cross-sectional design. The cross-sectional survey design allowed for inferences to be drawn regarding various variables included within certain populations at

a single point in time (Levy & Lemeshow, 2013; MacKenzie, Podsakoff, & Podsakoff, 2011). This design does not allow researchers to analyse behaviour over a period of time. More specifically, this design was beneficial for the current study as it allowed for the assessment of various instruments and their relations (SAPI, PWB, and CQ) as well as the assessment of competing factor models unique to the hypothesised six-factor SAPI (Fetvadjev *et al.*, 2015), namely the nine-factor model (Nel *et al.*, 2012) and the five-factor model (Taylor & De Bruin, 2005). The cross-sectional design meant that there was no need to follow up with participants following the initial data collection period and data collection was therefore terminated immediately after the participants had completed the surveys.

## Research method

### **Research participants**

The aim of this study was to expand the nomological network of the newly developed SAPI by assessing the measure's internal and external validity. Purposive non-probability sampling was utilised, meaning that the sample was composed of a certain represented field of study/training and occupational cluster (De Vos *et al.*, 2012). The sample included industrial psychologists, intern industrial psychologists, psychometrists and students in industrial psychology. Table 1 summarises the characteristics of the participants.

**TABLE 1:** Characteristics of the participants ( $N=465$ )

<b>Item</b>	<b>Category</b>	<b>Frequency</b>	<b>Percentage (%)</b>
<b>Gender</b>	Male	181	38.92
	Female	283	60.86
	Missing values	1	0.22
<b>Age</b>	25 and younger	349	75.05
	26 to 35 years	48	10.32
	36 to 45 years	29	6.24
	46 to 55 years	14	3.01
	56 to 65 years	7	1.51
	66 to 75 years	1	0.22
<b>Race</b>	White	328	70.54
	Black	72	15.48
	Coloured	52	11.18

Table 1 continues

	Indian	11	2.37
	Other	1	0.22
	Missing values	1	0.22
<b>Language</b>	Western Germanic (Afrikaans and English) languages	395	84.95
	Bantu languages	60	12.90
	Other	3	0.65
	Missing values	7	1.51
<b>English Proficiency</b>	Poor	4	0.86
	Moderate	39	8.39
	Good	228	49.03
	Excellent	189	40.65
	Missing values	5	1.08
<b>Job Level</b>	Students in Industrial Psychology	320	68.82
	Intern organisational psychologists	11	2.37
	Practitioners (Industrial Psychologist and Psychometrists)	93	20.00
	Missing Values	41	8.82
<b>Qualification</b>	Lower than Gr 12	3	0.65
	Grade 12	336	72.26
	Technicon Diploma	5	1.08
	Technical College Diploma	2	0.43
	University degree	7	1.51
	Post-graduate degree	107	23.01
	Missing values	5	1.08
<b>Household</b>	Married without children	57	12.26
	Married with children	35	7.53
	Single/ divorced without children	113	24.30
	Single/ divorced with children	14	3.01
	Living with parents without children	136	29.25
	Living with parents with children	70	15.05
	Other	28	6.02
	Missing values	12	2.58

It is evident from Table 1 that the majority of the participants were White (70.54%), Female (60.86%), and 25 years and younger of age (75.05%). The majority of the participants either lived with their parents without children (29.25%) or were single/divorced without children (24.30%). Most of the participants' home language was Afrikaans or English and the English proficiency overall was good (49.03%). Furthermore, the most common job level was

students (which included both undergraduate and post-graduate students in industrial psychology; 68.82%). More specifically, the majority of the participants had a Grade 12 qualification (72.26%), while 1.51% had already acquired a university degree, and 23.01% had obtained a post-graduate degree.

### **Measuring instruments**

A biographical questionnaire was included that measured the following characteristics: gender, age, ethnicity, marital status, highest qualification, home language, English reading ability (poor/moderate/good/excellent), and job level.

*South African Personality Inventory (The SAPI):* A valid six construct SAPI model emerged that included the factors Conscientiousness, Extraversion, Neuroticism, Openness, Negative Social-Relational and Positive Social-Relational (Fetvadjief *et al.*, 2015). In the present study the six constructs were measured with 50 items in total, with a scale referred to as the shortened version of the SAPI. The items were measured with a five-point likert scale that ranged from 1 (strongly disagree) to 5 (strongly agree). The constructs were measured as follow: Positive Social Relational - 12 items (“I help people realize their potential”); Negative Social Relational - 8 items (“I abuse my power over others”); Neuroticism - 4 items (“I worry a lot”); Conscientiousness - 12 items (“I am involved in my work”); Extraversion - 7 items (“I make friends easily”); and Intellect Openness - 7 items (“I search for answers when I do not have them”). In addition, a previous study (Fetvadjief *et al.*, 2015) indicated Cronbach Alpha coefficients as follow: Conscientiousness  $\alpha= 0.78$ ; Extraversion  $\alpha=0.795$ ; Neuroticism  $\alpha= 0.745$ ; Openness  $\alpha=0.74$ ; Negative Social-Relational  $\alpha=0.71$ ; and Positive Social-Relational  $\alpha=0.81$ .

*Psychological Wellbeing scale:* The Psychological Wellbeing scale was developed by Ryff (1989). The scale consists of 84 items and six dimensions, namely Autonomy, Environmental mastery, Personal Growth, Positive relations with others, Purpose in life, and Self-acceptance. Each of the items within the dimensions is answered on a five-point response scale that ranges from 1 (strongly disagree) to 5 (strongly agree). Sample items from this scale are as follow. Autonomy, “My decisions are not usually influenced by what everyone else is doing”; Environmental mastery, “In general, I feel I am in charge of the situation in which I live”; Personal growth, “In general, I feel that I continue to learn more about myself

as time goes by”, Positive relations with others, “Maintaining close relationships has been difficult and frustrating for me”, Purpose in life, “I have a sense of direction and purpose in life”; Self-acceptance, “Given the opportunity, there are many things about myself that I would change”. The PWB’s Cronbach Alpha coefficient ranges from 0.33 to 0.93. Ryff (1989) indicated Alpha coefficients as follow: Autonomy  $\alpha= 0.86$ ; Environmental Mastery  $\alpha= 0.90$ ; Personal Growth  $\alpha= 0.87$ ; Positive Relations  $\alpha= 0.91$ ; Purpose in Life  $\alpha= 0.90$ ; and Self-acceptance  $\alpha= 0.93$ . Ryff and Keyes (1995) indicated Alpha coefficients as follows: Autonomy  $\alpha= 0.37$ ; Environmental Mastery  $\alpha= 0.49$ ; Personal Growth  $\alpha= 0.40$ ; Positive Relations  $\alpha= 0.56$ ; Purpose in Life  $\alpha= 0.33$ ; and Self-acceptance  $\alpha= 0.52$ .

*Cultural Intelligence Scale:* A twenty-item CQ scale, developed by Ang, Van Dyne, Koh, & Ng (2004), was used. The scale consists of four factors labelled Meta-cognitive CQ, Cognitive CQ, Motivational CQ, and Behavioural CQ. Each of these dimensions is measured with 5 items that are answered on a five-point response scale that ranges from 1 (strongly disagree) to 5 (strongly agree). Sample items from the CQ scale include: Behavioural CQ, “I use pause and silence differently to suit different cross-cultural situations”; Cognitive CQ, “I know the rules for expressing non-verbal behaviours in other cultures”; Meta-cognitive CQ, “I adjust my cultural knowledge as I interact with people from a culture that is unfamiliar to me”; and Motivational CQ, “I am sure I can deal with the stresses of adjusting to a culture that is new to me”. The CQ constructs’ Cronbach Alpha coefficients range is from 0.71 to 0.85: Behavioural CQ  $\alpha= 0.83$ ; Cognitive CQ  $\alpha= 0.85$ ; Meta-cognitive CQ  $\alpha= 0.71$ ; and Motivational CQ  $\alpha= 0.75$ .

### **Research procedure and ethical considerations**

A proposal for this study was presented to the research committee of the North West University’s School of Human Resources and the WorkWell Research Unit. After the proposed study was accepted and ethical clearance was granted the SAPI, PWB scale, and CQS were compiled into a single booklet (for the distribution of hard copies) and an online server was created containing the questionnaires (for online survey distribution and completions). Industrial psychologists and psychometrists, both already in practice and in training, were the sample for data capturing. Participation was voluntary and the purpose of the research was clearly explained. Each participant was provided with a letter of consent and ethical aspects such as anonymity and confidentiality were explained and assured. A

completion period of three weeks was given. Surveys completed in hard copies were returned to the researchers. Data collection was then terminated and the statistical analyses processes were executed.

### **Statistical analysis**

Statistical analysis was performed with the SPSS (IBM SPSS, 2014) and AMOS programmes (Arbuckle, 2011). The SPSS and AMOS programmes were used to determine the internal and external validity of the SAPI, evidently contributing to its nomological network. More specifically, in terms of the internal validity, construct and discriminant validity were determined. In relation to external validity, concurrent and predictive validity were assessed using the CQ and PWB. However, an inventory cannot be valid if it is not reliable, and therefore the reliability of the SAPI was also assessed.

The reliability of the SAPI was assessed through the SPSS programme. Cronbach Alpha coefficients were used to determine reliabilities. Values of 0.70 or higher were regarded as acceptable, although in some measurement situations values of 0.80 are recommended (Lance, Butss, & Michels, 2006). Descriptive statistics were also determined (means, standard deviations, skewness and kurtosis) in order to provide a description of the variables and of the sample. Following the assessment of the reliabilities and descriptive statistics, the internal validity of the SAPI was assessed.

Construct validity, as part of internal validity, was initially assessed through CFA by using AMOS, which is a statistical process to test hypothesised models on the basis of theoretical structures and specific groups of variables. More specifically, using this programme inferences can be made concerning the hypothesised relationships between the observed measuring instrument and its latent factors (Byrne, 2001). This added to the construct validity of the SAPI. CFA was preferred over EFA, as Fetvadjev *et al.* (2015) had already examined the construct validity of the SAPI model using EFA. Additionally, alternative models were applied in order to examine the internal structure (construct validity) of the hypothesised theoretical model and competing models. Consequently, the six-factor personality model of the SAPI (Fetvadjev *et al.*, 2015), as well as the competing nine-factor model (Hill *et al.*, 2013; Nel *et al.*, 2012) and the five-factor model (Taylor & De Bruin, 2005) were assessed.

The Chi-square statistic and several other goodness-of-fit indices were used to draw inferences regarding the correspondence between the implied and observed covariance matrices (Hoyle, 1995). The Chi-square statistic is used in conjunction with additional goodness-of-fit indices as it is sensitive to sample size and the value of the Chi-square tends to be extensive when the sample size is large. The following goodness-of-fit indices were used in conjunction with the Chi-square statistics: 1) the relationship of the chi-square to the degrees of freedom ( $\chi^2 / df$ ); 2) Root mean square residual (RMR); 3) Goodness-of-fit Index (GFI); 4) Parsimony Goodness-of-fit Index (PGFI); 5) Comparative Indexes of Fit (CFI); 6) Normed Fit Index (NFI); 7) Incremental Indexes of Fit (IFI); 8) Relative Fit Index (RFI); 9) Tucker-Lewis Index (TLI); and 10) the Root Mean Square of Approximation (RMSEA). A model that fits the data will yield a Chi-square value, degrees of freedom, and probability level that are insignificant. In addition, the RFI, CFI, TLI, IFI, and NFI should yield values of 0.90 or higher (values close to 0.95 are indicative of superior fit). The PGFI values are acceptable in the parameters of 0.50 and 0.60 and higher. RMSEA has a good fit with a value of 0.05 and higher; reasonable fit with a value of 0.08 to 0.10; and poor fit with a value of 0.10 and higher. The theoretical model that best represented the above required statistics, was the factor model proven to best represent the internal structure of the SAPI.

In addition to assessing construct validity the study also assessed discriminant validity. This was determined through constraining the estimated correlation parameter between two estimated constructs to 1.0 (Byrne, 2001). The chi-square and a number of other goodness-of-fit indices were utilised to determine the extent to which the constructs within each model are distinct from one another. In cases where the results of the chi-square difference test differed, discriminant validity was proven. In addition to the internal validity of the SAPI, the external validity was also assessed.

Concurrent validity, as part of external validity, was determined through product-moment correlations calculated in SPSS. Inferences were made concerning the relationships between the SAPI constructs and the constructs of CQ and PWB. The relationships were indicated through values that ranged from -1 (complete negative relationship) to 1 (complete positive relationship). A value of 0 was indicative of no relationship between personality and CQ/PWB. In addition, it determining the significance of the relationships the statistical and practical significance were taken into consideration. Relationships between constructs were considered to be statistically significant if the value thereof was smaller than 0.05 (Pallant,

2005). The relationship between constructs were considered to be practically significant if the value was smaller than 0.30 (with a medium effect) or smaller than 0.05 (with a large effect) (Pallant, 2005). As part of external validity, predictive validity was also determined.

Multiple regression analysis was applied using SPSS to determine the power of the SAPI to predict CQ and PWB. Each independent construct was assessed in relation to its ability to predict constructs of CQ/PWB as outcomes. The predictive power of personality as a whole, as well as each factor unique to the model, in relation to both CQ and PWB, was determined. The statistics involved in this assessment were the values of R Square, Adjusted R Square, Standardised Beta Coefficients, and semi-partial correlation coefficients (Pallant, 2005). R Square indicates the amount of variance explained by the independent variable (in this case the personality model of the SAPI) in relation to the dependent variable (in this case CQ and PWB). Also, in an attempt to address difficulties arising from a small sample size the adjusted R Square was also calculated because this statistic delivers an enhanced estimate of the exact population value. Although it is useful to have an understanding of the general predictive ability of personality with regards to CQ and PWB it is also useful to understand which particular personality factors have predictive power in terms of specific CQ and PWB factors. The Standardised Beta Coefficients were thus determined. The variable with the largest Beta value is evidently the largest predictor. Additionally, the statistically unique contribution of each independent variable to the prediction of the dependent was determined. The significant value should be less than 0.05 in order to conclude that the independent variable is making a significant contribution to the prediction of the dependent variable. Finally, for additional information, the semi-partial correlations were reported as they established the contribution of each factor to the total R Square.

### **Pre-analyses of the construct validity of the CQS and PWBS**

Empirical evidence concerning the construct validity of the measuring models was provided through the use of CFA by the AMOS programme. This evidence is provided in terms of the four-factor CQ model (i.e. Behavioural CQ, Cognitive CQ, Meta-cognitive CQ, and Motivational CQ):  $\chi^2=395.22$ , IFI=0.94, TLI=0.93, CFI=0.94, and RMSEA=0.06; and the six-factor PWB model (i.e. Autonomy, Environmental Mastery, Personal Growth, Positive Relations, Purpose in Life, and Self-acceptance):  $\chi^2=699.99$ , IFI=0.94, TLI=0.93, CFI=0.94,

and RMSEA=0.04. The SAPI model's construct validity is discussed in the next section since it formed part of the set hypotheses.

The results relating to the objectives and hypotheses are reported in the following section.

## Results

The results are reported in relation to the nomological network of the SAPI. The empirical evidence with regards to the internal validity is discussed first and this is followed by a discussion of the empirical evidence relating to the external validity.

### **Results for internal validity**

*Construct validity of the SAPI:* The results generated through CFA proved that the six-factor personality model (referred to as M1 in Table 2) was the best fit for the data ( $\chi^2=1318.86$ , IFI=0.91, TLI=0.90, CFI=0.91, and RMSEA=0.04; see Table 2). This means that personality within this measure is best represented by the factors of Conscientiousness, Extraversion, Neuroticism, Openness, and Negative and Positive Social-Relations. Hypothesis one is thus supported.

In terms of the two competing factor models that were assessed in comparison with the hypothesised six-factor model certain conclusions can be drawn. The nine-factor personality model (M2), consisting of Conscientiousness, Emotional Stability, Extraversion, Facilitating, Integrity, Intellect, Openness, Relationship Harmony, and Soft-Heartedness, did not fit the data as well as the six-factor personality model ( $\chi^2=3149.43$ , IFI=0.79, TLI=0.77, CFI=0.74, and RMSEA=0.06). The five-factor model (M3), consisting of Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Intellect openness, was assessed and also provided evidence of reduced fit with the data ( $\chi^2=1815.93$ , IFI=0.83, TLI=0.82, CFI=0.83, and RMSEA=0.06). The results are summarised in Table 2 below.

**TABLE 2:** Goodness-of-fit statistics and Chi-square difference tests of nested alternative personality models

	Model	$\chi^2$	$\chi^2/df$	IFI	TLI	CFI	RMSEA	$\Delta \chi^2$	$\Delta df$
<b>M1</b>	Six-factor model	1318.86	1.81	0.91	0.91	0.1	0.04	-	-
<b>M2</b>	Nine-factor model	3149.43	2.54	0.79	0.77	0.78	0.06	1830.57	0.73
<b>M3</b>	Five-factor model	1815.93	2.62	0.83	0.81	0.83	0.06	497.07	0.81

Notes on Table 2:

Acronyms: M = Model

From Table 2 it is evident from the results that the fit of M3 is worse than the fit of M1 ( $\Delta \chi^2= 497.07$ ,  $\Delta df=0.81$ ) and the fit of M2 is significantly worse than the fit of M1 ( $\Delta \chi^2=1830.57$ ,  $\Delta df=0.73$ ).

*Discriminant validity:* The discriminant validity analysis, using CFA in AMOS, tested an unconstrained model (an uncorrelated six-factor model) with several constrained models (covariance value of 1.00 between two factors respectively). It was evident that the unconstrained model (in this case M1 from Table 2 and 3) yielded the following goodness-of-fit indexes ( $\chi^2=1318.86$ , IFI=0.91, TLI=0.90, CFI=0.91, and RMSEA=0.04). Several unconstrained models were tested where two factors at a time were correlated. These results may be viewed in Table 3.

**TABLE 3:** Goodness-of-fit statistics for tests of discriminant validity for the six-factor model of SAPI

Model		$\chi^2$	$\chi^2/df$	IFI	TLI	CFI	RMSEA A	$\Delta \chi^{2*}$	$\Delta df^*$
<b>MI</b>	Unconstrained model	1318.86	1.81	0.91	0.91	0.10	0.04	-	-
<b>CM1</b>	Constrained model 1 (CONS.EXTR=1.00)	1504.06	2.07	0.89	0.88	0.89	0.05	185.20	0.26
<b>CM2</b>	Constrained model 2 (CONS.INOP=1.00)	1437.50	1.98	0.90	0.89	0.90	0.05	118.64	0.17
<b>CM3</b>	Constrained model 3 (CONS.NEGS=1.00)	1777.49	2.45	0.85	0.83	0.85	0.06	458.63	0.64
<b>CM4</b>	Constrained model 4 (CONS.NEUR=1.00)	1567.56	2.16	0.88	0.87	0.88	0.05	248.70	0.35
<b>CM5</b>	Constrained model 5 (CONS.POSS=1.00)	1490.91	2.05	0.89	0.88	0.89	0.05	172.05	0.24
<b>CM6</b>	Constrained model 6 (EXTR.INOP=1.00)	1509.99	2.08	0.89	0.88	0.89	0.05	191.13	0.27

Table 3 continues

<b>CM7</b>	Constrained model 7 (EXTR.NEGA=1.00)	1585.97	2.19	0.88	0.86	0.87	0.05	267.11	0.38
<b>CM8</b>	Constrained model 8 (EXTR.NEUR=1.00)	1540.59	2.12	0.88	0.87	0.88	0.05	221.73	0.31
<b>CM9</b>	Constrained model 9 (EXTR.POSS=1.00)	1524.27	2.10	0.88	0.87	0.88	0.05	205.41	0.29
<b>CM10</b>	Constrained model 10 (INOP.NEGS=1.00)	1771.25	2.44	0.85	0.84	0.85	0.06	452.39	0.63
<b>CM11</b>	Constrained model 11 (INOP.NEUR=1.00)	1588.33	2.19	0.87	0.86	0.87	0.05	269.47	0.38
<b>CM12</b>	Constrained model 12 (INOP.POSS=1.00)	1508.13	2.08	0.89	0.88	0.89	0.05	189.27	0.27
<b>CM13</b>	Constrained model 13 (NEGS.NEUR=1.00)	1506.92	2.08	0.89	0.88	0.89	0.05	188.06	0.27
<b>CM14</b>	Constrained model 14 (NEGS.POSS=1.00)	1540.59	2.12	0.88	0.87	0.88	0.05	221.73	0.31
<b>CM15</b>	Constrained model 15 (NEUR.POSS=1.00)	1595.36	2.20	0.87	0.86	0.87	0.05	276.50	0.39

**Notes on Table 3:**

\*Difference in values between constrained model and unconstrained models

Acronyms: M = Model; CM = Constrained model; CONS = Conscientiousness; EXTR = Extraversion; INOP = Intellect Openness; NEGS = Negative Social Relational; NEUR = Neuroticism; and POSS = Positive Social Relational

From Table 3 it is clear that discriminant validity was proven for the six-factor model of the SAPI. The differences in the fit indices are proof of discriminant validity as they confirm that the SAPI is a six-factor model with distinct factors. It is evident that CM2 (with covariance between Conscientiousness and Intellect/Openness) is the closest in fit with the unconstrained model ( $\Delta \chi^2 = 118.64$ ,  $\Delta df = 0.17$ ), while CM3 (with covariance between Conscientiousness and Negative Social Relational) shows more distinction from the unconstrained model ( $\Delta \chi^2 = 458.63$ ,  $\Delta df = 0.64$ ).

*Descriptive statistics:* Table 4 reports descriptive statistics and levels of reliability for the six SAPI factors, as well as the four CQ factors and the six PWB factors.

**TABLE 4:** Descriptive statistics and Cronbach Alpha coefficients

Item	M	SD	Skewness	Kurtosis	$\alpha$
<b>Conscientiousness</b>	3.91	0.59	-0.52	0.80	0.88
<b>Neuroticism</b>	1.93	0.70	0.88	0.71	0.79
<b>Intellect openness</b>	3.48	0.94	-0.18	-0.74	0.77
<b>Extraversion</b>	4.17	0.56	-0.63	0.16	0.88
<b>Positive social relational</b>	3.77	0.74	-0.43	-0.04	0.78
<b>Negative social</b>	4.11	0.57	-0.69	0.32	0.88

Table 4 continues

<b>relational</b>					
<b>Autonomy</b>	3.26	0.86	-0.16	-0.33	0.76
<b>Positive Relations</b>	3.43	0.87	-0.30	-0.38	0.74
<b>Purpose in Life</b>	3.55	0.75	-0.55	0.74	0.81
<b>Personal Growth</b>	3.67	0.72	-0.37	0.52	0.79
<b>Environmental</b>	2.74	0.86	0.16	-0.33	0.76
<b>Mastery</b>					
<b>Self-acceptance</b>	3.53	0.88	-0.43	-0.25	0.81
<b>CQ Cognition</b>	2.57	0.87	0.31	-0.38	0.74
<b>CQ Behavioural</b>	2.46	0.88	0.43	-0.24	0.80
<b>CQ Meta-cognition</b>	4.04	0.67	-0.45	-0.25	0.77
<b>CQ Motivational</b>	3.81	0.65	-0.53	0.65	0.71

It is evident from Table 4 that all variables were distributed normally. Results pertaining to the reliability of the factors provided evidence of acceptable Cronbach Alpha coefficients of  $>0.70$  (Nunnally & Bernstein, 1994). The PWB factors yielded the following Cronbach Alpha coefficients: Autonomy  $\alpha = 0.76$ ; Environmental Mastery  $\alpha = 0.76$ ; Personal Growth  $\alpha = 0.79$ ; Positive Relations  $\alpha = 0.74$ ; Purpose in Life  $\alpha = 0.81$ ; and Self-acceptance  $\alpha = 0.81$ . The Cronbach Alpha coefficients pertaining to the CQ factors are as follows: CQ Cognition  $\alpha = 0.74$ ; CQ Behavioural  $\alpha = 0.80$ ; CQ Meta-cognition  $\alpha = 0.77$ ; and CQ Motivational  $\alpha = 0.71$ . The Cronbach Alpha coefficients for the SAPI factors were: Conscientiousness  $\alpha = 0.88$ ; Neuroticism  $\alpha = 0.79$ ; Intellect Openness  $\alpha = 0.77$ ; Extraversion  $\alpha = 0.88$ ; Positive Social Relational  $\alpha = 0.78$ ; and Negative Social Relational  $\alpha = 0.88$ .

In the following section, results pertaining to the external nomological network of the SAPI will be conveyed.

### **Results for external validity**

**Concurrent validity:** The product moment correlations between the SAPI constructs and the CQ and PWB constructs are depicted in Table 5. It is evident from the descriptive statistics that all constructs were distributed normally and this made it possible to calculate Pearson product-moment correlations.

The inferences drawn from Table 5<sup>1</sup> are presented in terms of each factor unique to the SAPI model, in relation to the four CQ factors, as well as the six PWB factors. Only relationships that were statistically significant and practically significant are reported.

*Relationships with CQ:*

Positive Social Relational showed a practically significant positive relationship (with a medium effect) with Meta-cognitive CQ. Negative Social Relational showed a negative statistically significant relationship with Cognitive CQ. Furthermore, Intellect Openness was positively related (practically significant with medium effect) to Meta-cognitive CQ.

*Relationships with PWB:*

Positive Social Relational showed a practically significant positive relationship (with medium effect) with Environmental Mastery and a practically significant positive relationship (with a large effect) with both Personal Growth and Purpose in life. Negative Social Relational provided evidence of a practically significant negative relationship (medium effect) with Autonomy and Self-acceptance. Neuroticism was negatively related (practically significantly with medium effect) to Positive relations with others and Self-acceptance. Also, Neuroticism showed a practically significant negative relationship (with large effect) with Autonomy. Intellect Openness as well as Conscientiousness showed positive practically significant relationships (with medium effect) with Self-acceptance. Finally, both Intellect Openness and Conscientiousness provided evidence of practically significant positive relations (large effect) with Personal Growth, Purpose in Life, and Environmental Mastery.

These results supported hypothesis 2 and provide partial support concerning the relationships between the SAPI constructs and the CQ and PWB constructs in a sample of emerging and registered industrial psychologists.

**Predictive validity:** Hypothesis 3 predicted that SAPI constructs will have predictive ability in relation to the CQ and PWB constructs. Firstly, the regression between the SAPI constructs and the CQ constructs was assessed (as indicated in Table 6). The SAPI model as a whole predicted Cognitive CQ ( $p=0.00$ ), Meta-cognitive CQ ( $p=0.00$ ), Motivational CQ ( $p=0.00$ ),

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<sup>1</sup> The sizes of Tables 5, 6 and 7 (orientation: landscaped) necessitated the reporting of results prior to the presentations of the tables

and Behavioural CQ ( $p=0.00$ ). More specifically, higher levels Cognitive CQ was predicted by lower levels of Neuroticism ( $\beta=-0.10$ ;  $p=0.03$ ), and higher levels of Intellect Openness ( $\beta=0.19$ ;  $p=0.01$ ). In addition, Meta-cognitive CQ was predicted by both higher levels of Positive Social Relational ( $\beta=0.29$ ;  $p=0.00$ ) and Intellect Openness. Lower levels of Neuroticism ( $\beta=-0.15$ ;  $p=0.00$ ) and higher levels of Intellect Openness ( $\beta=0.27$ ;  $p=0.00$ ), and Extraversion ( $\beta=0.10$ ;  $p=0.05$ ) predicted higher levels of Motivational CQ. Finally, higher levels of Positive Social Relational ( $\beta=0.25$ ;  $p=0.00$ ) and Intellect Openness ( $\beta=0.21$ ;  $p=0.00$ ), and lower levels of Conscientiousness ( $\beta=-0.17$ ;  $p=0.03$ ) predicted Behavioural CQ. It is evident from the results that Intellect Openness is a predictor of all four CQ constructs.

Table 7 summarises the regression analyses with SAPI and CQ constructs as predictors of PWB. The SAPI constructs (Model 1) in the first step of the regression analysis produced statistically significant results in predicting the PWB constructs and account for an average of 43% of the variance in all the PWB constructs. The significance of regression results for Model 1 are:  $p=0.00$  for Autonomy, Personal Growth, Positive relations with others, Self-acceptance, and Environmental Mastery; and  $p=0.01$  for Purpose in Life. Furthermore, the SAPI constructs together with the CQ constructs (Model 2) at the second step of regression analysis also produced statistically significant results in predicting PWB constructs. The significance of regression results for Model 2 are:  $p=0.00$  for Autonomy, Personal Growth, Positive relations with others, and Self-acceptance;  $p=0.01$  for Environmental Mastery; and  $p=0.04$  for Purpose in Life. However, with the inclusion of the CQ constructs the average variance explained was 44%. The change in the average total variance explained was only 0.01, which indicates that the SAPI has the largest effect on PWB whereas CQ has only a small effect on PWB. As such, only the regression results between personality and PWB are reported below.

In terms of the regressions in Model 1, Positive Relations with others predicted higher levels of Autonomy ( $\beta=0.19$ ;  $p=0.00$ ), Personal Growth ( $\beta=0.18$ ;  $p=0.00$ ), Self-acceptance ( $\beta=0.15$ ;  $p=0.00$ ), Purpose in Life ( $\beta=0.01$ ;  $p=0.03$ ), and Environmental Mastery ( $\beta=0.01$ ;  $p=0.04$ ). Negative Social Relational predicted lower levels of Autonomy ( $\beta=-0.23$ ;  $p=0.00$ ), Positive Relations with others ( $\beta=-0.15$ ;  $p=0.00$ ), and Self-acceptance ( $\beta=-0.18$ ;  $p=0.00$ ). Furthermore, Neuroticism predicted lower levels Autonomy ( $\beta=-0.51$ ;  $p=0.00$ ), Positive relations with others ( $\beta=-0.37$ ;  $p=0.00$ ), Self-acceptance ( $\beta=-0.44$ ;  $p=0.00$ ), Purpose in Life ( $\beta=-0.13$ ;  $p=0.00$ ), and Environmental Mastery ( $\beta=-0.16$ ;  $p=0.00$ ). Intellect Openness predicted higher

levels of Autonomy ( $\beta=0.13$ ;  $p=0.03$ ), Personal Growth ( $\beta=0.36$ ;  $p=0.00$ ), Self-acceptance ( $\beta=-0.15$ ;  $p=0.01$ ), and Purpose in life ( $\beta=0.11$ ;  $p=0.03$ ). Conscientiousness predicted higher levels of Autonomy ( $\beta=0.19$ ;  $p=0.00$ ), Personal Growth ( $\beta=0.23$ ;  $p=0.00$ ), Positive Relations with others ( $\beta=0.15$ ;  $p=0.02$ ), Self-acceptance ( $\beta=0.27$ ;  $p=0.00$ ), Purpose in life ( $\beta=0.61$ ;  $p=0.00$ ), and Environmental Mastery ( $\beta=0.52$ ;  $p=0.00$ ). Extraversion predicted only higher levels of Positive Relationships with others ( $\beta=0.23$ ;  $p=0.00$ ).

It was also important to consider the regression between the SAPI and PWB when CQ was added (Model 2). There were no substantial changes in the regressions between the SAPI constructs and the PWB constructs, with the exception of the regressions between Positive Social-Relations and Purpose in life as well as Environmental Mastery; and Intellect Openness as well as Conscientiousness and Purpose in life. When CQ was included as a predictor the regressions between these constructs of the SAPI and PWB became insignificant.

**TABLE 5:** Product moment correlations for the SAPI constructs in relation to CQ and PWB

Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<b>1.Positive Social Relational</b>	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>2. Negative Social Relational</b>	-0.32 <sup>+</sup>	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>3. Neuroticism</b>	-0.02 <sup>+</sup>	0.07	1	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>4. Intellect_Openness</b>	0.60 <sup>**</sup>	-0.29	-0.07	1	-	-	-	-	-	-	-	-	-	-	-	-
<b>5. Extraversion</b>	0.37 <sup>+</sup>	-0.01 <sup>+</sup>	-0.03 <sup>+</sup>	0.34 <sup>*</sup>	1	-	-	-	-	-	-	-	-	-	-	-
<b>6. Conscientiousness</b>	0.64 <sup>**</sup>	-0.32 <sup>+</sup>	-0.06	0.76 <sup>**</sup>	0.33 <sup>+</sup>	1	-	-	-	-	-	-	-	-	-	-
<b>7. CQ_Cognitive</b>	0.18	-0.02 <sup>+</sup>	-0.11	0.20	0.17	0.14	1	-	-	-	-	-	-	-	-	-
<b>8. CQ_Behavioural</b>	0.26	-0.05	-0.05	0.23	0.11	0.14	0.36 <sup>+</sup>	1	-	-	-	-	-	-	-	-
<b>9. CQ_Motivational</b>	0.21	-0.05	-0.17	0.29	0.20	0.21	0.42 <sup>+</sup>	0.47 <sup>+</sup>	1	-	-	-	-	-	-	-
<b>10. CQ_Meta-cognitive</b>	0.36 <sup>+</sup>	-0.10	-0.09	0.34 <sup>*</sup>	0.11	0.28	0.44 <sup>+</sup>	0.46 <sup>+</sup>	0.52 <sup>**</sup>	1	-	-	-	-	-	-
<b>11. PW_Autonomy</b>	0.09	-0.30 <sup>+</sup>	-0.54 <sup>**</sup>	0.25	0.03 <sup>+</sup>	0.27	0.06	-0.01 <sup>+</sup>	0.17	0.08	1	-	-	-	-	-
<b>12. PW_Personal Growth</b>	0.55 <sup>**</sup>	-0.26	-0.06	0.65 <sup>**</sup>	0.27	0.63 <sup>**</sup>	0.12	0.21	0.26	0.33 <sup>+</sup>	0.30 <sup>+</sup>	1	-	-	-	-
<b>13. PW_Positive Relations with others</b>	0.19	-0.21	-0.40 <sup>+</sup>	0.27	0.28	0.29	0.05	0.06	0.24	0.15	0.54 <sup>**</sup>	0.33 <sup>+</sup>	1	-	-	-
<b>14. PW_Self-acceptance</b>	0.20	-0.30 <sup>+</sup>	-0.47 <sup>+</sup>	0.36 <sup>*</sup>	0.14	0.39 <sup>+</sup>	0.04 <sup>+</sup>	0.00 <sup>+</sup>	0.22	0.13	0.66 <sup>**</sup>	0.40 <sup>+</sup>	0.63 <sup>**</sup>	1	-	-
<b>15. PW_Purpose in life</b>	0.52 <sup>**</sup>	-0.24	-0.18	0.61 <sup>**</sup>	0.22	0.73 <sup>**</sup>	0.15	0.18	0.25	0.31 <sup>+</sup>	0.30 <sup>+</sup>	0.71 <sup>**</sup>	0.33 <sup>+</sup>	0.47 <sup>+</sup>	1	-
<b>16.PW_Environmental mastery</b>	0.49 <sup>+</sup>	-0.24	-0.20	0.55 <sup>**</sup>	0.27	0.66 <sup>**</sup>	0.19	0.18	0.27	0.31 <sup>+</sup>	0.31 <sup>+</sup>	0.58 <sup>**</sup>	0.35 <sup>+</sup>	0.46 <sup>+</sup>	0.70	1

<sup>+</sup> Correlation statistically significant ( $p < 0.05$ )

<sup>\*</sup> Correlation is practically significant  $r > 0.30$  (medium effect), <sup>\*\*</sup> Correlation is practically significant  $r > 0.50$  (large effect).

**TABLE 6:** Multiple-regression analysis with SAPI constructs as independent variables and CQ constructs as dependent variables

Variable	CQ Cognitive				CQ Meta-cognitive				CQ Motivational				CQ Behavioural			
	$\beta$	$p$	R <sup>2</sup>	$\Delta$ R <sup>2</sup>	$\beta$	$p$	R <sup>2</sup>	$\Delta$ R <sup>2</sup>	$B$	$p$	R <sup>2</sup>	$\Delta$ R <sup>2</sup>	$\beta$	$p$	R <sup>2</sup>	$\Delta$ R <sup>2</sup>
<b>SAPI (Model 1)</b>		<b>0.00*</b>	<b>0.06</b>	<b>0.06</b>		<b>0.00*</b>	<b>0.15</b>	<b>0.15</b>		<b>0.00*</b>	<b>0.11</b>	<b>0.11</b>		<b>0.00*</b>	<b>0.08</b>	<b>0.08</b>
<b>Positive Social Relational</b>	0.11	0.08			0.29	0.00*			0.05	0.37			0.25	0.00*		
<b>Negative Social Relational</b>	0.04	0.40			0.05	0.21			0.05	0.34			0.04	0.41		
<b>Neuroticism</b>	-0.10	0.03			-0.08	0.07			-0.15	0.00*			-0.04	0.33		
<b>Intellect Openness</b>	0.19	0.01			0.24	0.00*			0.27	0.00*			0.21	0.00*		
<b>Extraversion</b>	0.09	0.07			-0.07	0.16			0.10	0.05			-0.01	0.91		
<b>Conscientiousness</b>	0-.10	0.18			-0.06	0.39			-0.05	0.47			-0.17	0.03		

Note: \*  $p < 0.01$

**TABLE 7:** Multiple-Regression analysis with SAPI and CQ constructs as independent variables and PWB constructs as dependent variables

Variable		Autonomy				Personal Growth				Positive Relations with others				Self-acceptance				Purpose in life				Environmental Mastery			
		$\beta$	$p$	R <sup>2</sup>	$\Delta R^2$	$\beta$	$p$	R <sup>2</sup>	$\Delta R^2$	$B$	$p$	R <sup>2</sup>	$\Delta R^2$	$\beta$	$p$	R <sup>2</sup>	$\Delta R^2$	$\beta$	$p$	R <sup>2</sup>	$\Delta R^2$	$\beta$	$p$	R <sup>2</sup>	$\Delta R^2$
SAPI (Model 1)		<b>0.00*</b>	<b>0.40</b>	<b>0.40</b>		<b>0.00*</b>	<b>0.48</b>	<b>0.48</b>		<b>0.00*</b>	<b>0.28</b>	<b>0.28</b>		<b>0.00*</b>	<b>0.39</b>	<b>0.39</b>		<b>0.01</b>	<b>0.56</b>	<b>0.56</b>		<b>0.00*</b>	<b>0.47</b>	<b>0.47</b>	
<b>Positive Relational</b>	<b>Social</b>	0.19	0.00*			0.18	0.00*			0.09	0.10			0.15	0.00*			0.01	0.03			0.01	0.04		
<b>Negative Relational</b>	<b>Social</b>	-0.23	0.00*			-0.02	0.59			-0.15	0.00*			-0.18	0.00*			0.03	0.42			-0.01	0.73		
<b>Neuroticism</b>		-0.51	0.00*			-0.02	0.64			-0.37	0.00*			-0.44	0.00*			-0.13	0.00*			-0.16	0.00*		
<b>Intellect Openness</b>		0.13	0.03			0.36	0.00*			0.06	0.31			0.15	0.01			0.11	0.03			0.07	0.20		
<b>Extraversion</b>		0.02	0.55			0.01	0.79			0.23	0.00*			0.03	0.40			-0.05	0.13			0.04	0.32		
<b>Conscientiousness</b>		0.19	0.00*			0.23	0.00*			0.15	0.02			0.27	0.00*			0.61	0.00*			0.52	0.00*		
<b>SAPI and CQ (Model 2)</b>		<b>0.00*</b>	<b>0.41</b>	<b>0.01</b>		<b>0.00*</b>	<b>0.48</b>	<b>0.00</b>		<b>0.00</b>	<b>0.29</b>	<b>0.10</b>		<b>0.00*</b>	<b>0.40</b>	<b>0.01</b>		<b>0.04</b>	<b>0.57</b>	<b>0.01</b>		<b>0.01</b>	<b>0.48</b>	<b>0.01</b>	
<b>Positive Relational</b>	<b>Social</b>	0.16	0.00*			0.15	0.00*			0.09	0.12			0.12	0.02			0.07	0.11			0.07	0.16		
<b>Negative Relational</b>	<b>Social</b>	-0.23	0.00*			-0.02	0.50			-0.15	0.00*			-0.18	0.00*			0.02	0.51			-0.02	0.59		
<b>Neuroticism</b>		-0.50	0.00*			-0.01	0.80			-0.36	0.00*			-0.43	0.00*			-0.13	0.00*			-0.14	0.00*		
<b>Intellect Openness</b>		0.13	0.03			0.34	0.00*			0.04	0.49			0.15	0.01			0.08	0.10			0.03	0.54		
<b>Extraversion</b>		0.03	0.40			0.02	0.61			0.23	0.00*			0.03	0.49			-0.05	0.17			0.04	0.34		
<b>Conscientiousness</b>		0.18	0.00*			0.23	0.00*			0.14	0.03			0.25	0.00*			0.62	0.11			0.53	0.00*		
<b>CQ Cognition</b>		0.02	0.72			-0.08	0.04			0.11	0.02			0.08	0.05			-0.02	0.54			0.02	0.63		
<b>CQ Behavioural</b>		0.09	0.04			0.02	0.55			0.04	0.36			0.12	0.01			0.01	0.77			0.00	0.96		
<b>CQ Motivational</b>		0.10	0.03			0.05	0.30			0.14	0.01			0.15	0.00*			0.03	0.49			0.05	0.26		
<b>CQ Meta-cognition</b>		0.03	0.55			0.09	0.04			0.04	0.39			0.01	0.85			0.08	0.06			0.08	0.09		

Note: \*  $p < 0.01$

## Discussion

There is a growing need for personality measures that can be applied fairly across cultures and within all the eleven official languages of South Africa (Meiring *et al.*, 2005; SAPI, 2015). It is therefore important for researchers to invest in rigorous reliability and validity studies of such measures (Foxcroft, 2004; Foxcroft & Roodt, 2009). This will not only provide personality measures that can be applied in diverse settings but, from an organisational psychology perspective, it will also allow practitioners to predict certain external organisational and employee-related outcomes (SAPI, 2015). This study thus assessed the SAPI's nomological network in order to provide South Africa with a psychometrically sound personality measure as well as to allow individuals practicing within the organisational psychology field to make inferences concerning CQ and PWB in conjunction with personality as measured by the SAPI.

### Outline of the results

The general objective of this study was to assess the nomological network of the SAPI amongst industrial psychologists in South Africa. In assessing the nomological network, the following were established: 1) Internal validity, consisting of construct validity and discriminant validity; and 2) External validity, consisting of concurrent and predictive validity.

**H1: The six-factor model for SAPI will achieve the best goodness-of-fit in comparison to a nine-factor or a five-factor model and with constrained models.**

The current study analysed the construct validity in order to confirm the SAPI structure. It was hypothesised that the SAPI will provide evidence of a six-factor structure. However, it was also considered important to evaluate the validity of the personality structures proposed by Nel *et al.* (2012) and Taylor and De Bruin (2005). The hypothesised six-factor model (Fetvadjev *et al.*, 2015) consists of Conscientiousness, Extraversion, Neuroticism, Openness, and Negative and Positive Social-Relations. The competing nine-factor model (Nel *et al.*, 2012) consists of Conscientiousness, Emotional Stability, Extraversion, Facilitating, Integrity, Intellect, Openness, Relationship Harmony, and Soft-Heartedness, while the five-

factor model proposed by Taylor and De Bruin (2005) consists of Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Intellect Openness. The statistical analysis used was CFA in AMOS as this has been proven to be effective in previous studies (Aluja *et al.*, 2005; Hopwood, 2011; Hopwood & Donnellan, 2010). Aluja *et al.* (2004) and Cooper *et al.* (2010) also followed comparable approaches using different personality models.

The results generated through CFA confirmed the hypothesised six-factor model as proposed by Fetvadjeiev *et al.* (2015), consequently the competing nine- and five-factor personality models were rejected. Although the six-factor model (Fetvadjeiev *et al.*, 2015) was confirmed, the CFA results also showed that the confirmed six-factor personality model delivered a significant model and considerably high Chi-square. In this regard a few matters need to be considered. Firstly, the SAPI is still in its developmental phase and this may contribute to a high Chi-square. However, any evidence regarding the psychometric properties of the SAPI is regarded as valuable and continuous refinement on the nomological network is imperative. The small sample size (10 participants for each item; therefore requiring a minimum of 500 participants) as well as the diversity of the sample (which consisted of students, interns, and practitioners in the field of industrial psychology as well as various age groups and other demographic markers) could also have contributed to the high Chi-square value. The implication for certain constructs, such as Positive and Negative Social Relational, is that these constructs will most probably be refined through age and maturity. It is also important to note that the SAPI consists of both positive and negative constructs (e.g. Positive Social Relational versus Negative Social Relational) and this may contribute to a high Chi-square. Regardless of the high Chi-square, the normed chi-square ( $\chi^2/df$ ) is very low. This means that construct validity does exist. This is also confirmed by the values obtained for the other statistics (e.g. IFI, TLI, CFI, RMSEA; see Table 2) that were all within acceptable parameters pertaining to the model fit.

The findings of this study thus supported the six-factor structure of the SAPI, as described by Fetvadjeiev *et al.* (2015). These findings contribute to the evidence of the internal structure of the SAPI (Hypothesis 1) and contribute to the assessment of the overall nomological network. An important aspect of this study involved ensuring that these constructs are distinct from one another in order to determine discriminant validity (additional information concerning discriminant validity is available in Cable and DeRue, 2002, and Foxcroft and Roodt, 2013).

This study provides evidence concerning the discriminant validity of the SAPI six-factor personality structure since the covariance between two factors in each constrained model showed poorer fit than the unconstrained model. Fetvadjiev *et al.* (2015) followed a similar approach in initially establishing the six-factor structure. Consequently, the model fit indices generated through CFA provide evidence concerning the distinctiveness of the hypothesised six-factor model. This indicates that Hypothesis 1 was confirmed. As a result, the six-factor model was the model assessed for further analysis with regards to the external nomological network of the SAPI.

**H2: The SAPI constructs will show concurrent validity by corresponding with relevant constructs of cultural intelligence and psychological wellbeing.**

The next objective of the study was to determine the concurrent validity of the SAPI constructs in relation to the PWB and CQ constructs. Subsequent to the statistical analyses evidence was provided that confirmed hypothesis 2. More specifically, the SAPI constructs showed practically significant relationships with several of the PWB constructs. It is important to bear in mind that the relationships occurred in both directions. More specifically, as the level of a certain construct changes the level of the other construct alters in the direction of the relation (positive/negative). Thus if one construct has a positive relationship with an external construct then high levels of the one construct are related to high levels of the other construct and low levels of the one construct are related to low levels of the other construct. In the case of a negative relationship high levels of one construct are related to low levels of the other construct (and vice versa). In this study Positive Social Relational was positively related to Environmental Mastery, Personal Growth and Purpose in life. This indicates that the higher inclination an individual has towards a positive approach in managing relationships with other, the higher that individual's advancement in knowledge, skills, and potential. Also, the higher an individual's preference for a positive approach in managing relationships, the higher the sense of determination and significance in the individual's life and the more an individual experiences a sense of control and influence on an individual's environment and events that occur.

Negative Social Relational and Neuroticism showed negative relations (practically significant) with Autonomy and Self-acceptance. This suggests that when an individual is more inclined to have an argumentative approach towards relations with others and has a

tendency to be impulsive and have inconsistent emotions, this individual is also less likely to act in accordance with personal standards and preferences rather than taking into consideration the opinion of others and also less likely to have a positive attitude towards the self. Correspondingly, the higher the Neuroticism, the less inclined an individual is to have close relationships with others. Grant *et al.* (2009) also provided evidence on the correlation between Neuroticism and Autonomy. Furthermore, Singh *et al.* (2012) provided evidence of a negative relationship between Neuroticism and PWB as a whole, which confirms the current study's findings concerning negative relationships with some of the PWB constructs. Intellect Openness and Conscientiousness showed a positive relationship with Self-acceptance. This suggests that the quality of being well-informed, rational, and broadminded and being an individual who is highly orientation towards success, meticulousness, and conventionalism contribute to an individual's self-acceptance. Intellect Openness and Conscientiousness were also positively related to Personal Growth, Purpose in Life, and Environmental Mastery. Thus, an individual who is well-informed and orientated towards success is more likely to advance in knowledge, skill, and potential; to be determined in life; and to participate in external activities. These relationships are similar to the evidence provided by Grant *et al.* (2009) concerning the relationships between Openness and Purpose in Life, as well as Conscientiousness and Personal Growth. Hypothesis 2 is further supported by the correlations between the SAPI constructs and CQ constructs.

Positive Social Relational showed a positive relationship with Meta-cognitive CQ. This relationship suggests that the higher inclination an individual has towards a positive approach in managing relationships with other, the higher that individual's thought processes in order to understand various cultural backgrounds. Moreover, Intellect Openness was positively related to Meta-cognitive CQ. This suggests that if an individual possesses the quality of being well-informed, the individual has thought processes in order to understand cultural contexts. Although the relation between Intellect Openness and Meta-cognitive CQ is similar to the results from Ang *et al.*, (2006), this study has not provided evidence concerning the relationship between Conscientiousness and Meta-cognitive. It is also important to consider that the evidence provided within this study is the only available evidence concerning the six-factor personality model of the SAPI in relation to external variables such as CQ and PWB. However, Nel *et al.*, (2015) did provide evidence concerning the relationship between CQ and the SAPI facets derived from the various constructs. Within the current study no additional evidence was provided in terms of practically significant correlations between the

SAPI factors (except for Positive Social Relations and Intellect Openness) and Behavioural CQ, Cognitive CQ, and Motivational CQ.

**H3: The SAPI constructs will show predictive validity with relevant constructs of cultural intelligence and psychological wellbeing.**

In general, the results indicated that CQ is associated with personality as measured by the SAPI, and the study thus went on to investigate the ability of personality to predict CQ (see Ang *et al.*, 2006). The results indicated that personality has an effect on an individual's ability to deal with situations where cultural diversity is apparent. The study found that both Neuroticism (negative regression) and Intellect Openness had an effect on Cognitive CQ. This is similar to the finding of Ang *et al.* (2006). Surprisingly Neuroticism had a negative effect on Cognitive CQ. It is therefore speculated that an individual who has the tendency to frequently feel nervous and anxious in relating to a variety of things or situations, is also less likely to be knowledgeable concerning other cultures. It is possible that the anxiety prohibits these individuals from seeking out situations where they interact with individuals from different cultural backgrounds. Furthermore, an unexpected result is the fact that Extraversion did not explain variance in Cognitive CQ as it did in the study by Ang *et al.* (2006). This could be due to the fact that when an individual is focused on having fun and making people laugh while enjoying the presence of others, this individual could overlook culture specific practices and ways (Cognitive CQ as defined by Earley and Ang, 2003) or even neglect to assess similarities to others from various cultural backgrounds.

Positive Social Relations and Intellect Openness were predictors of Meta-cognitive CQ. This is partially consistent with the research conducted by Ang *et al.* (2006) and Nel *et al.* (2015). Nel *et al.* (2015) found that Intellect and Facilitating predicts Meta-cognitive CQ. Recent research on the SAPI (Fetvadjev *et al.*, 2015) has established that Intellect is a facet of Intellect Openness and Facilitating is a facet of Positive Social Relations. In addition, Ang *et al.* (2006) confirmed the prediction of Meta-cognitive CQ through Openness (similar to the current study), although in their study Conscientiousness was an additional predictor. Ang *et al.* (2006) confirmed that an individual with Conscientiousness tends to have the ability to work hard in understanding other cultures. However, in the current study Conscientiousness is partially assessed through an individual's orientation towards traditionalism and this may explain why an individual with respect for his/her own culture is unlikely to have Meta-

cognitive CQ. Nevertheless, it is evident that individuals who have the quality of being well-informed and constantly in search of new experiences (Ang *et al.*, 2006) as well as the ability to positively manage relations with others, tend to have cultural mindfulness and awareness in relation to individuals from multicultural backgrounds (Nel *et al.*, 2015).

Furthermore, Neuroticism (negative regression), Intellect Openness, as well as Extraversion explained variance in Motivational CQ. Therefore, an individual who is inclined to be accepting of others and receptive to new experiences, eager to gain knowledge, and has a tendency towards being sociable and talkative is more likely to invest energy in gaining knowledge on various cultures and to effectively function in culturally diverse environments. However, this is not the case when an individual is likely to be anxious in such situations (Rose and Kumar-Subramaniam, 2008, also predicted this finding). These findings are supported by Ang *et al.* (2006) and Nel *et al.* (2015), with the only exception being Positive Social Relations (which are measured by Soft-heartedness and Facilitating in Nel *et al.*'s, 2015, study), which explains variance in Motivational CQ. This unexpected result could be due to Positive Social Relational being measured by additional facets such as Empathy, Integrity, Interpersonal relatedness, and Social Intelligence rather than just Soft-heartedness and Facilitating (Fetvadjev *et al.*, 2015). Moreover, this trait in relation to Motivational CQ could currently be somewhat restricted in the diverse society of South Africa (Vestergaard, 2001).

Finally, Behavioural CQ was affected by Intellect Openness, Conscientiousness, and Positive Social Relations. This suggests that an individual who is loyal and fair towards others, and has the ability to have a positive approach in managing relations with others and displays integrity is more inclined to display appropriate verbal and non-verbal behaviours in culturally diverse settings. This finding is also evident in the research conducted by Nel *et al.* (2012), Nel *et al.* (2015) and Ang *et al.* (2006).

It is obvious that Intellect Openness is the strongest predictor as it predicts all four CQ constructs. This makes sense because a person with the Intellect Openness trait would be generally well-informed, would seek new experiences, would be eager to acquire new information, and would be adaptable. Such an individual is highly likely to have knowledge pertaining to various cultures and to have the drive to successfully adjust to others from various cultural backgrounds. It also makes sense that people with this trait will be able to

effectively engage with people from culturally diverse settings and would display verbal and non-verbal behaviours that are deemed as appropriate by other cultural groups or individuals within these various groups. Although Nel *et al.* (2015) failed to prove this prediction, this finding does support the finding from Ang *et al.* (2006).

Multiple regression was conducted to investigate: 1) the ability of the personality factors that represent the SAPI to predict PWB; and 2) the ability of CQ to predict PWB, after controlling for the SAPI personality factors. The interest in additional empirical evidence concerning the predictive ability of personality in relation to PWB was supported (Grant, 2009; Keyes, 2006; Ryff, 1989). During the first step of regression analyses six predictors were entered: Positive Social Relational, Negative Social Relational, Neuroticism, Intellect Openness, Extraversion, and Conscientiousness. This model was statistically significant ( $p < .01$ ) and explained 43% of the variance in PWB (Table 6). Research by Cox, Wilt, Olson, and McAdams (2010) found that personality (the Big Five) accounts for 48% of the variance in wellbeing. Subsequent to the entry of CQ at Step 2, the total variance explained by the model as a whole was 44% ( $p < .01$ ). The introduction of CQ thus explained an additional 1% of the variance in PWB (whilst controlling for the six SAPI personality factors).

It is clear from these results that personality has the dominant effect on PWB. Research conducted by Singh *et al.* (2012) specifically applied hierarchical regression analysis. In this study Hope (as measured by the Trait Hope Scale; Snyder *et al.*, 1991) was entered at the first step of analysis and during the second and third steps, personality constructs of the Big Five Inventory-10 (Rammstedt & John, 2007) were entered. The analysis showed that the personality traits were the strongest predictors of PWB, thus supporting the findings of the current study. In terms of the regressions of the current study Positive and Negative Social Relations, Neuroticism, Intellect Openness, and Conscientiousness explained variance in Autonomy and Self-acceptance. In addition, Personal Growth is predicted by Positive Social Relations, Intellect Openness, and Conscientiousness. Finally, Negative Social-Relational, Neuroticism, Extraversion, and Conscientiousness predicted positive and trusting relationships with others. It is therefore evident that these personality traits contribute to an individual's general level of PWB.

The results of these regressions were apparent in both the first and second steps of the regression analyses indicated in Table 6. However, this was not the case for the prediction of

a sense of meaning, direction, and purpose one has in life (Purpose in Life). It was also not the case for the sense of managing and manipulating one's life and the direct environment (Environmental Mastery). Purpose in Life was predicted by Positive Social Relational, Neuroticism, Intellect Openness, and Conscientiousness in the first step of regression analysis, but during the second step it was only predicted by Neuroticism. Environmental Mastery was predicted by Positive Social Relations in model 1, but in model 2 it was only predicted by Neuroticism and Conscientiousness. This finding is confirmed by both Grant *et al.* (2009) and Schmutte and Ryff (1997), who suggested that the personality-PWB relatedness is best modelled in specific associations between personality traits and PWB constructs. Also, Neuroticism and Conscientiousness were the strongest predictors in the first step of regression analysis. The variances explained by Neuroticism and Conscientiousness are supported by the findings of Schmutte and Ryff (1997), Bardi and Ryff (2007), and Grant *et al.* (2009). Taken together the research suggests that individuals who have a low tendency to be apprehensive and to fluctuate between emotions, and who are orientated towards achievement, order and traditionalism are more inclined to have purpose in their lives and to be in control of their environments.

### Practical implications

This study contributes to an expanded nomological network of the SAPI. More specifically, the reliability, internal validity as well as the external validity were assessed and proven to be valid and reliable. Additionally, the study contributes to the process of vigorous psychometric analyses of the SAPI with the objective of providing South African organisations with a personality inventory that can be utilised accurately for all employees. Although the SAPI is still in its developmental phases this study added value by providing evidence concerning the associations between personality and CQ as well as PWB and concerning the power of the personality of an individual to predict CQ and PWB. More specifically, inferences can be drawn regarding the likelihood of an employee with certain traits being able to effectively deal with culturally diverse settings and interactions. Moreover, proof is also provided in the probability of individuals with certain personality traits to have needs for optimal functioning and the realisation of own talents and attributes.

## Limitations and recommendations

Although this research provided valuable findings the study does have certain limitations. The first limitation is that the sample size was too small. Using AMOS a minimum of 500 participants was required given the number of items in the SAPI. The sample size clearly did not comply with this requirement. Secondly, the majority of the sample consisted of individuals whose native language is a Germanic language (Afrikaans and English), and most of the participants were students. The generalisation of the findings to other language groups and to practitioners is therefore limited. However, it should be noted that the sample did also include practitioners, individuals from various age groups, and individuals with various other qualities (see Table 1). The sample was thus quite diverse and this could have an impact on how well the theoretical models fit the data. This limitation could explain the high Chi-squares (see Table 2). More importantly, it was not possible to make inferences pertaining to group differences (emerging industrial psychologist and registered industrial psychologists, race groups). Finally, the mere inclusion of CQ and PWB was a limitation of the study. The statistical analysis used could only investigate the SAPI's construct validity, inclusive of discriminant validity, as well as concurrent and predictive validity. As such, convergent validity was not assessed.

Despite these limitations, certain recommendations can also be made. First and foremost, it is important to continue with vigorous research to refine the psychometric properties of the SAPI. Future studies should investigate convergent validity as well as multi-group analysis and Structural equation modelling (SEM). Multi-group analysis and SEM will enable researchers to make inferences between groups (such as occupational groups/gender groups). Future research on the SAPI should also ensure larger sample sizes as required by the statistical analysis programs utilised. It is of utmost importance to ensure adequate sample size as this affects the results obtained from analyses. Not only is it important to ensure a sample that fairly represents the diversity of South Africa but it is also important to narrow the focus of the targeted group. It is therefore recommended that specific occupational groups are targeted in future research. It is further recommended that students and practitioners are not included in the same sample (unless comparisons in relation to differences and similarities are of importance). Moreover, this study included different age, gender and language groups and future research should explore the variances among the groups with

regards to the SAPI constructs. This can be achieved through the utilisation of additional sophisticated statistical analysis techniques such as SEM within MPLUS, but should also include multiple-path analysis in order to test the same model among different demographic characteristics (age, gender, language, etc.). Finally, it is recommended to include additional outcomes that will provide findings contributing to the field of organisational psychology.

## Conclusion

In conclusion, this study provided evidence concerning the expansion of the nomological network of the SAPI. More specifically, the results indicated that the SAPI consists of a six-factor structure and the reliability of this structure was evaluated. The findings of the research also provided evidence on the association between the personality factors of the SAPI and the factors of both CQ and PWB. This study also provided evidence on the predictive power of the personality factor structure of the SAPI in relation to various CQ and PWB factors. This inferences pertaining to personality and external outcomes are valuable contributions that can be applied in the field of industrial psychology.

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## **CHAPTER 3**

### **CONCLUSIONS, LIMITATIONS, AND RECOMMENDATIONS**

## **Conclusions, limitations, and recommendations**

In this chapter the conclusions of the study are presented. The conclusions are aligned with the general objectives of the study. In addition, this chapter discusses the limitations of the study and makes recommendations for research and practice.

### **3.1 Conclusions**

Regardless of the current regulations regarding psychometric measurement, few psychometric measures adhere to the regulations set out by the HPCSA (described in the Employment Equity Act 55, Government Gazette, 1998). The SAPI project was initiated in response to the need for psychometrically sound instruments. This study forms part of the project, which aims to provide SA with a reliable and valid measure that can be applied across all of the 11 official languages.

The general objective of this study was to validate the SAPI among industrial psychologists and emerging industrial psychologists in South Africa by assessing the internal and external validity of the SAPI, evidently expanding its nomological network. This was executed through the analysis of specific objectives in concurrence with the postulated hypotheses.

**The first objective was to conceptualise the SAPI and validity (especially construct, discriminant, concurrent and predictive validity).**

This objective was accomplished by conducting and presenting a literature study in Chapter two of the current study. The SAPI project was initiated ten years ago with the goal of providing a personality inventory that could be utilised within specific cultures, as well as across cultures. The aim of the project is to eventually provide South Africa with a reliable and valid psychometric instrument and thus prevent the use of westernised personality inventories. In order to achieve this aim the nomological network of the SAPI needs to be expanded. A nomological network is defined as a theoretical framework that represents the basic features of the internal structure of a psychometric measure and also evaluates the external validity of the psychometric measure (Cronbach & Meehl, 1955). It is therefore important to understand the statistical analyses that can be used to assess the nomological

network. Internal validity must be determined first, and this must be followed by determining external validity. Construct validity is a method that determines whether the theoretical basis on which a measure is grounded is accurately assessed (De Vos, Strydom, Fouché, & Delpont, 2011; Foxcroft & Roodt, 2013). In this study CFA in AMOS was preferred above EFA in SPSS. Construct validity is further assessed by testing competing models, which in this study was determined by comparing the six-factor personality model to alternative nine-factor (Nel *et al.*, 2012) and five-factor (Taylor & De Bruin, 2005) personality models. To determine discriminant validity, comparisons are drawn between an unconstrained model (uncorrelated factors) and constrained models (covariance value of 1.00 between two factors in each model) (Byrne, 2001). Therefore, it is necessary to make sure that the factors within an instrument measure the same concept (construct validity) but also measures distinct things of the concept (discriminant validity).

The evaluation of external validity determines how theoretical constructs are hypothetically related to certain observed variables and how opposing theoretical constructs are related to each other (Cronbach & Meehl, 1955). Researchers therefore investigated both concurrent and predictive validity. In this study inferences were drawn concerning the relationships between personality and cultural intelligence as well as psychological wellbeing. Concurrent validity was determined using product moment correlations calculated in SPSS. The theoretical factor structure of the SAPI was therefore compared to the theoretical factor structures of external models. Predictive validity was assessed in relation to the predictive power of personality for CQ and PWB by means of multiple regression analysis conducted in SPSS (Pallant, 2005).

**The second objective was to determine whether the SAPI showed internal validity (construct and discriminant validity).**

It was hypothesised that the six-factor model for SAPI would achieve the best goodness-of-fit in comparison to a nine-factor or five-factor model. Another part of this objective was to determine if the factors (as measured by the SAPI) are in fact distinct from each other.

In order to determine the construct validity, CFA in AMOS was used. The results provided evidence of a six-factor personality structure that is representative of the SAPI. These six factors are Conscientiousness, Extraversion, Neuroticism, Openness-Intellect, Negative and

Positive Social-Relational. The six-factor model fitted the data better than the competing theoretical models. These results supported the findings reported by Fetvadjev *et al.* (2015). The six-factor model is the latest evidence since the nine-factor model (Conscientiousness, Emotional Stability, Extraversion, Facilitating, Integrity, Intellect, Openness, Relationship Harmony, and Soft-Heartedness) suggested by Nel *et al.* (2012) and differs slightly from the five-factor model (Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Intellect openness) identified by Taylor and De Bruin (2005).

In addition to the construct validity, the analysis also investigated whether the constructs from the six-factor model were distinct from each other. This assisted the researcher to determine the discriminant validity (Foxcroft & Roodt, 2013). It seems from the results that the six constructs are accurate measures of personality as a whole, but show distinctiveness towards each other in the measurement thereof which proved adequate discriminant validity (Foxcroft & Roodt, 2013).

It is important to bear in mind that a psychometric measure cannot be proven valid unless it is reliable. As such the reliability of the six-factor SAPI model was analysed (Foxcroft & Roodt, 2013). The analysis indicated that all variables were distributed normally. Moreover, the results provided evidence of acceptable Cronbach alpha coefficients for all of the SAPI constructs. The SAPI is thus reliable and can be used to assess personality in a consistent manner (Foxcroft & Roodt, 2013).

**The third objective was to determine whether the SAPI shows external validity (concurrent and predictive validity) in relation to measures of psychological wellbeing and cultural intelligence. It was firstly hypothesised that the SAPI constructs would demonstrate concurrent validity by corresponding with relevant constructs of cultural intelligence and psychological wellbeing.**

The external validity in relation to cultural intelligence (CQ) and psychological wellbeing (PWB) as theoretical outcomes was assessed. Firstly, the correlations between personality, as measured by the SAPI, and CQ were determined. The results indicated that personality constructs were correlated with outcomes relating to CQ (i.e., Cognitive CQ and Meta-cognitive CQ) and PWB (i.e., Autonomy, Environmental Mastery, Personal Growth, Positive

relations with others, Purpose in life, and Self-acceptance). It can be construed that the SAPI shows adequate concurrent validity with theoretical-related psychological constructs.

It was also hypothesised that the SAPI constructs would show predictive validity in relation to relevant cultural intelligence and psychological wellbeing constructs. The results indicated that some personality dimensions are indeed predictors of CQ dimensions. The results specifically indicated that Intellect Openness is a significant predictor of high Cognitive CQ. In addition, Positive Social Relational and Intellect Openness significantly predicted Metacognitive CQ. Intellect Openness and Extraversion predicted high Motivational CQ. Positive Social Relational and Intellect Openness predicted Behavioural CQ. Finally, the results indicated that Neuroticism is a predictor of low Cognitive CQ and Motivational CQ. These findings are similar to results reported by Ang *et al.* (2006) and Nel *et al.* (2015).

Further investigation indicated that SAPI and CQ constructs are predictors of PWB. In the first step of the regression analysis the SAPI constructs produced statistically significant results in predicting the PWB constructs. Specifically, Positive Social Relations, Intellect Openness, and Conscientiousness predicted higher Autonomy and Self-acceptance. Positive Social Relations, Intellect Openness, and Conscientiousness significantly predicted Personal Growth. In addition, Extraversion and Conscientiousness predicted Positive relations with others. In contrast, Negative Social Relations and Neuroticism significantly predicted lower Autonomy, Self-acceptance, and Positive relations with other. In the second step of the regression analysis, the SAPI constructs together with the CQ constructs also produced statistically significant results in relation to the prediction of PWB constructs. However, the change in the average total variance explained was small, suggesting that the SAPI constructs are the largest predictors of PWB whereas CQ has only a small effect on PWB. These results are similar to results reported by Grant *et al.* (2009), Schmutte and Ryff (1997), and Singh *et al.* (2012).

### 3.2 Limitations of the research

Although this research project added value to the SAPI project, it has several limitations. However, given that the SAPI is a newly developed personality measure unique to SA there

is currently limited research available and thus all findings concerning its psychometric properties contribute to the refinement of the instrument.

The first limitation is that during the data collection procedures both paper-and-pencil based surveys and online assessments were distributed. Both these methods have certain advantages and disadvantages. The turnover on online surveys was much higher in quantity and quality than the paper-and-pen based surveys. According to Dal (2011) surveys that are distributed online have a higher response rate than paper-and-pencil based surveys because electronic platforms are a more natural setting for communication and are more easily accessible than paper-and-pencil based surveys. Additionally, paper-and-pencil based surveys create room for error in capturing the data, while the data from online surveys is uploaded directly, eliminating data capturing error. In addition, online surveys are more time-efficient.

The SAPI is still in the developmental stage and thus various versions of the instrument exist. The current study used the shortened version that contains 50 items. However, this is a limitation as for the statistical analysis to truly produce accurate results, a minimum sample size of 500 was required (this is specifically the requirement for CFA in AMOS). The sample size in this study was therefore too small for some of the statistical techniques and this could have influenced the results. Specifically, although construct validity was proven the chi-square statistics generated through CFA were very high, although inferences pertaining to this were made in the Discussion section of Chapter two.

Also, because the SAPI is intended to be applied fairly and validly across cultures and within all 11 official languages, research samples should ideally mirror this cultural and linguistic diversity. This was not the case in the current sample. The sample consisted mainly of students who were proficient in Western-Germanic languages (Afrikaans and English). In addition, although the targeted population was emerging and current industrial psychologists, the sample consisted mostly of emerging industrial psychologists (students). This may be the reason for the high chi-square values. From the researcher's knowledge it could be due to the maturity and age ranging from the students to those in practice. The sample was also very diverse and as such was not very representative of individuals practicing in practice in the field of organisational psychology. However, the diversity of the sample could have been used to perform additional analyses, but these analyses were not performed. These analyses could have included assessing and reporting on the SAPI six-factor model among different

groups (such as emerging psychologists and practicing psychologists, or different race/age groups). Secondly, any differences in personality (as measured by the SAPI) as well as the relationship between personality and CQ and PWB could have been assessed in relation to the different groups within the sample.

Finally, the current study focused exclusively on construct validity, discriminant validity, concurrent validity and predictive validity. The validity of the SAPI could also have been assessed in relation to its convergent validity. Convergent validity entails assessing measures of the same constructs and identifying agreements and differences between the constructs (Widaman, 1985).

### 3.3 Recommendations

Given the developmental stage of the SAPI the results reported here are significant. The following recommendations are made with regards to both practice and future research.

#### **3.1.1 Recommendations for practice**

As mentioned previously, the SAPI is still in development. As such, recommendations for practice should encourage ongoing research on the SAPI and the refinement of the inventory. It is recommended that organisations actively participate in the studies and encourage ongoing studies within the workforce in order to assess the psychometric properties of the SAPI. This will ensure that various age groups, gender groups, language groups, diverse social-economic statuses, occupations, and backgrounds are included in the development process. This will allow for comprehensive research during the development of the SAPI and will result in a valid and reliable tool that can be utilised to measure individuals' personality. Using a valid and reliable tool, future studies can provide concrete evidence concerning personality's ability to predict individual, group, and organisational outcomes. This will ultimately contribute to the functioning of individuals and groups within the workforce and thus to organisations' functioning as a whole.

The relationships between personality and CQ can be used in recruitment and selection processes to ensure that individuals who are employed will function effectively within a

diverse workforce. Also, assessing employees' personalities will allow for the prediction of CQ, which will contribute to an organisation's diversity management in the workforce. In terms of the SAPI and PWB this study found that certain personality traits predict certain dimensions of PWB. This is therefore an opportunity to raise awareness regarding PWB and to develop personal growth programs that take into consideration distinct personality traits in relation to PWB (based on the findings of previous literature as well as the findings of the current study) in order to foster PWB within individuals. This will enhance functioning at an individual and group level, which will contribute to organisational outcomes and functioning.

### **3.1.2 Recommendations for future research**

In relation to data collection procedures and considering the needs of the intended sample this study should have used online surveys exclusively. It is therefore recommended that researchers consider the unique characteristics of targeted samples in order to determine whether quantitative data collection should occur through paper-and-pencil based surveys or online assessments. If a sample consists of individuals in professional occupations or individuals who are in training for professional occupations, it is recommended that online assessments are distributed as these assessments are more time-efficient and less effortful than paper-and-pencil surveys. The uptake on these online assessments is likely to be higher and this is likely to result in larger samples that will allow for the drawing of more valuable findings. Additionally, it is recommended that future studies ensure that samples are large enough to comply with the minimum sample required. Larger sample sizes in future research relating to the SAPI are therefore warranted.

Another important recommendation is that researchers should carefully choose a targeted sample. It is important to know which characteristics need to be represented by the sample in order to draw more accurate inferences. In the SAPI project it is important to ensure that individuals of all races and linguistic groupings are included in the sample.

Furthermore, in relation to the various versions of the SAPI in existence, it is imperative to refine the structure based on the shortened 50 item version. This contributes to future research on the SAPI as using a lengthy measuring instrument could impede the quantity and quality of uptake within targeted samples.

Future research on the SAPI and its validity should focus on 1) various occupational groups and contexts, and 2) additional individual, group, and organisational outcomes in relation to personality as measured by the SAPI. Firstly, it is regarded as essential to validate the SAPI within different occupational groups, since the SAPI needs to be a valid and reliable personality tool that can accurately assess individuals' personality regardless of their social background or occupation. Secondly, it is recommended that personality be assessed as an antecedent of various individual, group and organisational related behaviours. These two recommendations are important for various reasons. The inclusion of various individual, group, and organisational outcomes as well as various occupational groups will allow for the application of statistical analyses that can assess personality within different groups, as well as assess the relationship between personality and various outcomes within various occupational groups. Therefore, using multi-group analysis and Structural equation modelling (SEM) groups can be compared to one another, which will provide literature and industrial psychologists with valuable information. Specifically, future research should include numerous individual/group/organisational outcomes in relation with personality (as measured by the SAPI). Examples of such studies could include assessments of the relationships between personality and burnout, between personality and career success, between personality and integration with work teams, and between personality (particularly the Conscientiousness factor) and job performance (an organisational outcome).

Finally, it is recommended that the ongoing refinement of the SAPI include assessments regarding convergent validity. It is therefore recommended that the SAPI constructs are validated in terms of their correlation and distinctiveness with other personality measures' constructs. In this study the overall factor structure of the SAPI was compared to a five-factor model and a nine-factor model in order to contribute to construct and discriminant validity. In future studies it will be necessary to obtain information regarding the relatedness of specific constructs within these personality models.

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